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ISSUE NO. 304 AUGUST 2026

FEATURES

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ISSN 1466-3643

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AUGUST 2026 issue

featuring...



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COAL TRADE RESISTING A SQUEEZE

Support for import demand among commodity buyers in a range of countries seems to be remaining solid, although signs of slackening in some other areas are also apparent. The result could be a continuation of annual growth in world seaborne dry bulk trade during 2026 and into next year.

A more resilient pattern of global economic activity than expected earlier has been a feature in recent months, providing underlying benefits for dry bulk trade. The latest (early July) International Monetary Fund update suggested that a “modest slowdown” across the world is unfolding albeit with downside risks. Although the Middle East hostilities are a negative influence, according to IMF economists the global economy as a whole has, so far “weathered the shock from the war better than feared”.

COAL

Indications of additional support for coal trade caused by tighter world energy supplies have emerged, reinforced by the severe constraints on fossil fuel availability continuing over recent months. Countries in Asia with under-utilized coal-fired power station capacity have partially switched fuel sources towards extra coal consumption.

Yet forecasters are not all revising estimates upwards enough to show no further decline in coal trade after last year's reduction. At the beginning of last month, for example, analysts at the Australian Government's industry

department estimated that world coal trade (including land movements, but mostly seaborne) could be 41mt (million tonnes) or almost 3% lower in 2026, at 1,418mt, from 1,459mt last year. Lower imports into China are expected to comprise about two-thirds of the fall in the global volume.

IRON ORE

Seaborne trade in steel industry raw materials is holding up better than earlier predictions suggested. Iron ore trade is showing signs of a significant advance in the current year as a whole, with increases occurring in a range of importing countries in Asia and Europe, partly offset by lower volumes into the Middle East region.

Changes in steel production in major raw materials importing countries provide a mixed background. During the first half of 2026, China's crude steel production was 3% below the volume recorded in last year's first six months, at 500mt.

Two other prominent importers, the European Union and Japan, saw only minimal decreases of -0.3% and -0.4% respectively, to 65.4mt and 40.4mt. By contrast, South Korea's volume was up by 2% at 31.7mt.

GRAIN & SOYA

Forecasts of grain trade in the current crop year remain negative. The latest (mid-July) calculations by the US Department of Agriculture indicate that world trade in wheat plus corn and other

coarse grains could decline by 14mt or 3% to 454mt in 2026/27 now beginning, from 467mt in the previous twelve months. Conversely, soyabeans and meal trade is still expected to increase.

Grain trade in 2026/27 (starting July for wheat, October for coarse grains) is expected to weaken, mainly due to lower imports into the Middle East and North Africa regions. These could fall by 10% to 61.6mt, and by 12% to 56.2mt respectively. Signs of upturns in other areas which could partly compensate are not prominent at present. But results for domestic harvests in northern hemisphere importing countries are still awaited, possibly with positive implications for imports, such as in Europe.

MINOR BULKS

Trade in aluminium raw materials — bauxite and the processed alumina — is a dynamic part of the minor bulks segment. Global seaborne movements could rise by 10% or more in 2026, exceeding 300mt, based on current estimates, with much higher imports into China contributing a large part of the overall expansion.

BULK CARRIER FLEET

Newbuilding bulk carriers entering the world fleet in 2026 are expected to increase sharply compared with last year's capacity addition. As shown by table 2, higher volumes of Panamax and Capesize/larger tonnage in particular are predicted.

TABLE 1: KEY ASIAN SEABORNE COKING COAL IMPORTERS (MILLION TONNES)

	2021	2022	2023	2024	2025	2026
Japan	52.1	51.3	49.8	45.6	43.2	44.0
South Korea	21.5	22.3	22.2	25.0	24.1	23.5
China	39.5	36.1	45.3	62.4	55.3	51.0
India	67.8	72.0	76.0	76.2	81.1	85.0
Total of above	180.9	130.4	193.3	209.2	203.7	203.5

source: various & BSA estimates

TABLE 2: BULK CARRIER NEWBUILDING DELIVERIES (MILLION DEADWEIGHT TONNES)

	2021	2022	2023	2024	2025	2026
Handysize (10–44,999dwt)	4.1	4.6	4.5	5.7	5.7	5.5
Handymax (45–69,999dwt)	7.0	7.3	9.4	10.5	12.1	13.0
Panamax (70–99,999dwt)	8.6	9.8	10.8	10.0	11.1	16.0
Capesize (100,000dwt and over)	19.0	10.3	10.8	7.7	7.2	11.5
Total	38.7	32.0	35.5	33.9	36.1	46.0
% change from previous year		-17.3	10.9	-4.5	6.5	27.4

source: Clarksons Research & BSA estimates

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Record harvests in Argentina boost agribulk exports

Ports in Argentina handled a record 52.8mt (million tonnes) of agro-industrial products in the first two quarters of the current year. This includes grain, by-products, and vegetable oils. Significantly, this is an increase of 9% over the equivalent period last year, and beats the former 2022 traffic record by 2.4mt. The figures include both Argentine shipments cargo originating in Bolivia, Paraguay, and Uruguay that was exported through Argentine port terminals.

Much of the increase came from record grain exports, which amounted to 35.8mt in the first six months, up 19% year-on-year, although 34% higher than the average of the last five years. The previous records, which was beaten by almost three million tonnes, dates back to 2020.

- ❖ Wheat, at around 10mt, was up 46% on the year.
- ❖ Corn shipments also performed well, totalling 19.1mt.
- ❖ 1mt of sunflowers were also shipped, eleven times more than last year.

- ❖ Additionally, barley and soybeans reported increases.
- ❖ Only one grain, sorghum reported a decrease, albeit a slight one.



photo:
Fir0002/
Flagstaffphotos

Interestingly, the trend in agro-industrial by-products was downward, falling 10% to 13.3mt. This has been put down to lower exports of soybean pellets, although even this was partially offset by strong growth in sunflower and wheat pellets.

Vegetable oils reported growth of 3%, up to 3.7mt. Soybean oil made up the majority of exports, although sunflower oil continues to show the fastest growth.

Ports in the Rosario metropolitan area handled the majority of the export traffic.

Up-river terminals despatched 39.5mt, or 75% of the national total. The San Lorenzo complex handled 29.3mt, while terminals in the Port of Rosario registered 9.9mt.

Bahía Blanca played a key role too, shipping 7.4mt, which was a 34%. It now accounts for a 14% share of the national total.

Thereafter come the ports of Necochea/Quequén, with 3.8mt, leaving Ramallo, Zárate, San Pedro, and Villa Constitución to ship the remainder.

Although Argentine agro-industrial products were shipped to 82 countries, Asia remained the main market, accounting for 56% of all shipments. The Americas and Africa accounted for 34%, divided more or less equally between them.

China was not the main destination. Vietnam holds pole position with 7.6mt, then China, with 4.3mt, and Saudi Arabia with 3.9mt.

India remains Argentina's biggest market for vegetable oils, accounting for more than half of all purchases.

Barry Cross

Ukraine-Russia war continues to negatively impact dry bulk traffic

The ongoing naval war fought between Russia and Ukraine in both the Black Sea and the Sea of Azov is having a notable impact on the movement of agribulk.

In one of the most recent incidents, a bulk carrier transporting corn out of Odessa was hit by three Russian cruise missiles, which left ten crewmen dead. The *Golden Leo* was being operated by sailors from both India and Syria. However, Odessa is not the only port to be impacted. In recent months, Russian missiles and drones have reached terminals in the ports of Chornomorsk and Pivdennyi, in the Black Sea, and Izmail, located on the Danube River.

According to data released by news agency Reuters, Ukraine has had to reduce capacity at its Black Sea ports by about a third because of recently escalating hostile actions. Previously, Ukraine was responsible for about 6% of global wheat exports and around 11% of maize exports.

In retaliation, Ukraine has used long range drones to effectively shut down



Russian traffic in the Black Sea and Sea of Azov, where numerous bulk carriers have been among the 183 reported vessels struck. As a result, Russia has had to seriously limit transit through the Don-Azov canal, which is used for about a quarter of that country's grain exports.

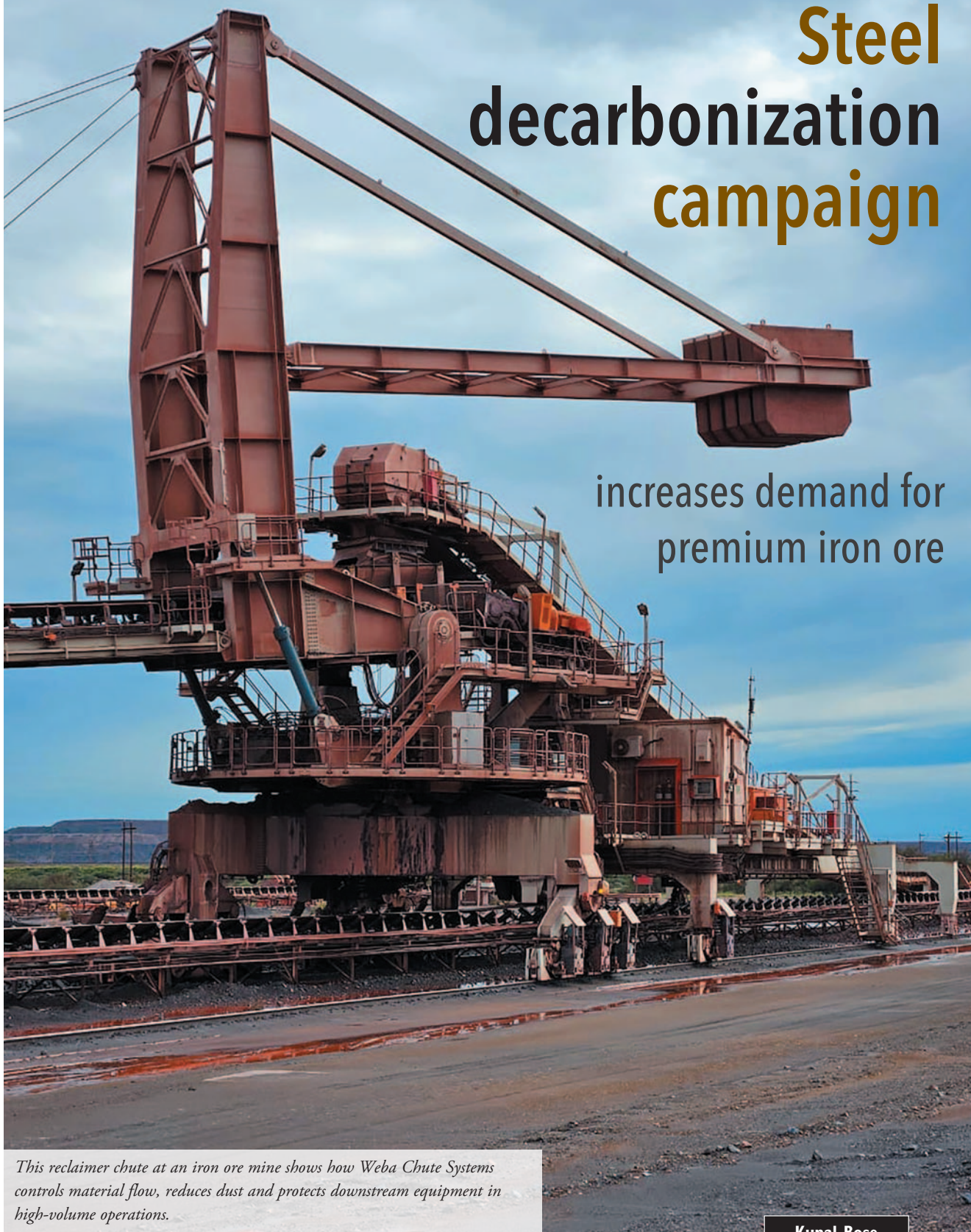
The impact on global trade of the effective shutting down of these two maritime export corridors cannot be overstated. Russia remains the world's

largest exporter of wheat and Ukraine services key markets in Africa, the Middle East and Asia. Recent disruptions have pushed prices for wheat to their highest levels in two years. Maize and rapeseed prices have also risen. Nevertheless, the situation remains better than that following the 2022 Russian invasion of Ukraine, when the latter's exports were all but stopped.

Barry Cross

Steel decarbonization campaign

increases demand for
premium iron ore



This reclaimer chute at an iron ore mine shows how Weba Chute Systems controls material flow, reduces dust and protects downstream equipment in high-volume operations.

Kunal Bose

Steelmakers across the world pursuing decarbonization will need rising supplies of premium iron ore. The emerging ore demand profile will work to the advantage of Guinea and Brazil with big deposits of superior grades of the mineral.

Africa has already served notice. From now on the world will be seeing the rise of this continent, the repository of resources from iron ore to bauxite to oil — in most cases of yet to be discovered quantity —

but with their high quality established, as a significant producer-exporter of the basic raw material from which steel is made. The emergence of Africa as a major exporter of iron ore, signalled by the progressive commissioning of Simandou* mines in Guinea in West Africa will usher in structural changes in seaborne trade in the mineral by way of shifts in global trade flows. This besides, growing supplies from Simandou mines and also expected mines

development in Gabon, Congo and Algeria, all sitting on rich iron ore deposits, will deepen competition for incumbent exporters. Maybe, with exports from Simandou rising, mines elsewhere perched

*See 'EMS-Tech celebrates delivery of world's highest capacity self-unloading system for Rio Tinto SimFer's Landmark Simandou Project,' on p44 of this issue', and 'CSL marks the completion of the first vessel in world-leading transshipment fleet for Simandou Project' on p100. Ed.

on high points of cost curve will find it difficult to stay in business.

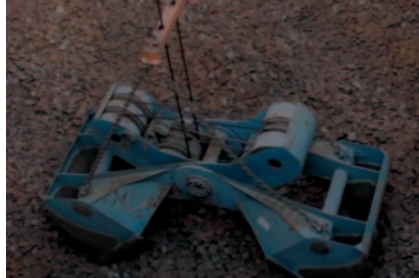
Several factors — but especially, the compulsion to harness economic opportunities and revenues for the exchequer and build infrastructure — have led the African countries to first map natural resources lying under the earth and then start developing mines almost in all cases in collaboration with foreign investors and technology owners.

While Anglo-Australian and Australian mining giants such as Rio Tinto, Glencore and Fortescue are participating in African iron ore mines development, China unsurprisingly has the biggest role in creating the infrastructure and opening and operating mines in that continent. By the time the West, particularly the US, realized what China was up to in Africa, Beijing has consolidated its position in a number of chosen African countries. Its Belt & Road Initiative (BRI) launched by President Xi Jinping in 2013 has a major attraction for African leaders, for in it is found promise of investment in infrastructure and mines development.

CHINESE BARGAINING POWER

Being by far the world's largest producer of steel and aluminium, but not well endowed with essential raw materials iron ore and bauxite, China has remained the biggest client of seaborne trade in the two minerals. Beijing realized early that its bargaining power vis-à-vis global mining giants will improve if iron ore and bauxite, mostly of very high quality, start flowing from Africa in large quantities. Even while China has a dominant share of 70% of the global seaborne market for iron ore, the country's steelmakers will from time to time get into a slugfest with principal producers of the mineral over prices.

The latest such dispute happened in September 2025 when the state-backed China Mineral Resources Group (CMRG) told the country's steel companies to stop or limit purchases of specific BHP products like Jimblebar fines and Jinbao. The dispute was over total reliance on dollar-based Western benchmarks for ore price determination. For as long as it could resist conceding the Chinese demand for yuan-based pricing, the stalemate continued. But in April last, after having suffered an earnings loss of an estimated \$300m over two quarters due to forced price discounts on 'restricted ores,' the standoff ended with the miner agreeing to use a Chinese ore price index for a 26% weighting in BHP's long-term supply contract to run through 2027 fiscal year.



The agreement is seen as a win-win situation for both BHP and CMRG, for while trade will be largely denominated in US dollar, Chinese yuan has finally made a breakthrough in iron ore trade. Trade officials believe the share of yuan in iron ore trade can only rise in future with China certain to flex its muscle, born out of its share of up to 75% in seaborne ore trade in some years. In any case, China's bargaining power will be further strengthened with rising superior grade iron ore flows from Africa. When the world's biggest miner BHP makes a concession to China, can the other important mining groups not fall in line? Rio Tinto and Fortescue have too made changes to their benchmark structures yielding to pressure from CMRG. The former will not deny tensions prevailing between buyers (read mostly Chinese) and sellers, but it pursues long-term ties in its own way and that creates win-win opportunities for all the parties.

SIMANDOU IN FOCUS

In both the Simandou projects, Chinese groups are stakeholders of significance. Baowu Steel Group of China is part owner of Simandou North project while the Aluminium Corporation of China is partnering Rio Tinto and government of Guinea to develop the south block. While iron ore in growing quantities have started flowing from Simandou for exports, regrettably the project suffered over a two-decade delay, particularly for political instability, ownership dispute, corruption charges against politicians and bureaucrats and acute infrastructure deficiencies. Thankfully, the major issues delaying project execution have been solved, except for sufficiently strengthening the rail and port infrastructure to handle the peak export potential of Simandou of 120mt (million tonnes) likely to be achieved by 2030.

Following the commissioning of mines, rail and port infrastructure in November last year, mine production is being progressively ramped up raising hopes of Simandou exports exceeding 20mt this year. Ahead of the start of the rainy season in July, average daily shipments of Simandou ore were around 70,000 tonnes, which were ahead of the most generous expectations. But intense rains that last up to September end could affect shipments through the monsoon. Whatever the rains

related uncertainty and any adverse political developments in the military ruled country, strengthening of rail infrastructure of 650 km heavy haulage railway and commissioning of a new terminal of 40mt capacity at Morebiah port will protect exports. Two more terminals of identical capacity will be built to facilitate annual exports of 120mt by 2030.

NEWER AFRICAN ORE SOURCES

Trade officials say the African challenge to the Australia-Brazil dominance of iron ore seaborne trade valued at over \$150bn will grow as reports of new projects in implementation stages from a number of countries in that continent continue to emerge. The challenge that all the major iron ore bearing African nations from Gabon to Democratic Republic of Congo (DRC) to Republic of Congo (RoC) to Algeria is contending with is to build a strong rail and port infrastructure for shipment of ore to the world market. Arguably, the most promising iron ore project outside Guinea is MIFOR in DRC to claim an investment of \$28.9bn in mines development, ore processing, infrastructure and logistics.

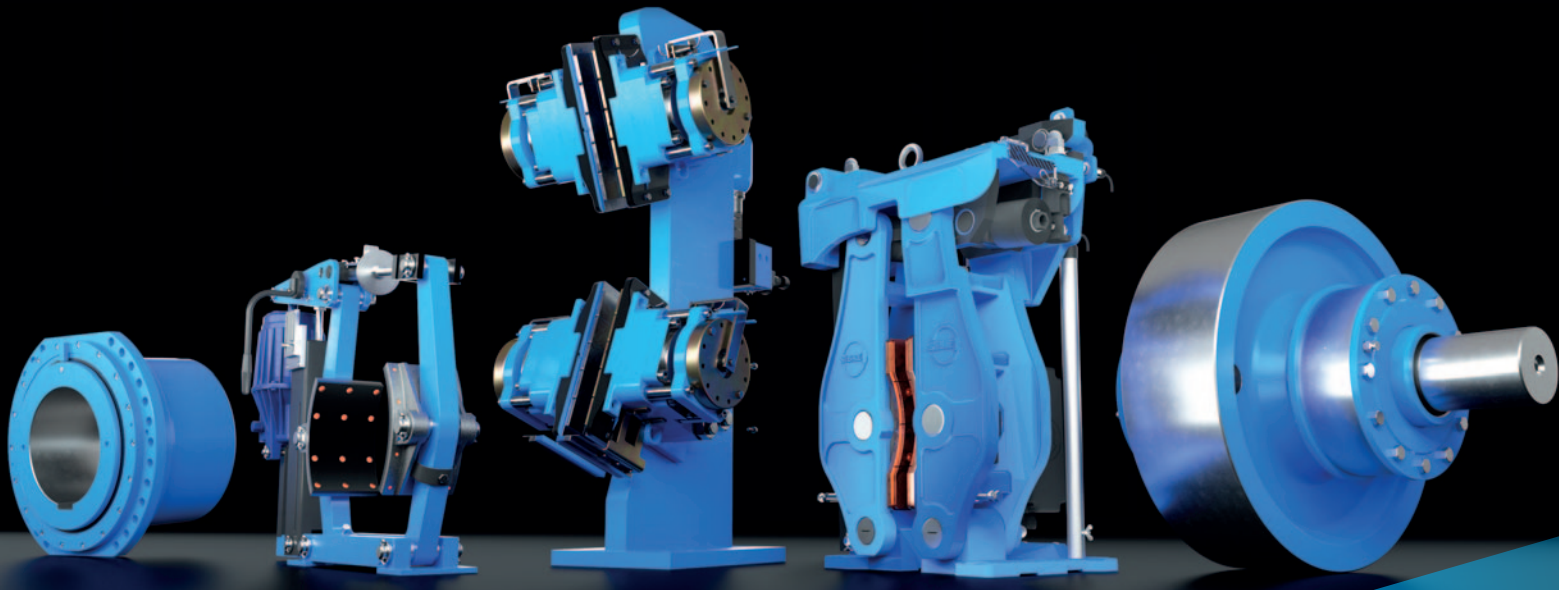
"A very challenging venture because of the deposit location in the remote north lacking in infrastructure. But then the deposit is an estimated 20bn tonnes and the average Fe content of ore is 60%. Huge commercial opportunities the project holds, besides job opportunities of different skills that it will create," says an official of Federation of Indian Mineral Industries (FIMI). The DRC mines ministry is targeting annual production of 50mt in initial stages to be stepped up to 300mt finally. The DRC regime in its bid to expand the mining industry beyond copper and cobalt is expected to aggressively pursue the MIFOR iron ore project.

The other major projects in that continent include Belinga (1bn tonne resources with average Fe content of 60%), Baniaka (758mt resources) and Milingui (estimated resources range from 500m to 1bn tonnes), all in Gabon; Zanaga (7bn tonne resources with Fe content a very high 66%) and Mayoko (resources estimated at hundreds of million tonnes with fairly high Fe content) in RoC; and Gara Djebilet (estimated resources 3.5bn tonnes with Fe content ranging from 57% to 58.5%) in Algeria.

STEEL DECARBONIZATION DRIVE

Incidentally, supplies from Simandou and hopefully from other mines in Africa, now at different stages of development are happening when steelmakers in China, India

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and Europe are under pressure to bring down greenhouse gas emissions through increasingly stricter carbon management. This being the case, the global steel industry will need more of high grades of ore as blast furnace (BF) feedstock. The better the ore the requirement of coking coal and coke in BF will be less and therefore, lower emissions. Mills exporting steel products to the European Union, will have the benefit of lower carbon border adjustment mechanism (CBAM) cost if emissions levels are brought down by using high grades of ore. At the same time, free carbon allowances in the EU will be down to zero, meaning mill operating costs will go up by some notches, unless of course the mills seek remedy by using only high quality iron ore.

Producers of direct reduced iron (DRI) will also be keen buyers of premium ore to originate in Simandou or Carajas of Brazil. Similarly, as hydrogen-based steelmaking is set to gain ground, the BF feedstock will necessarily be superior grades of ore with very low chemical impurities. Against all the demand positives stand the prospect of countries, including China encouraging steelmakers to focus on creating electric arc furnace (EAF) capacity where the feedstock is steel scrap instead of iron ore. In fact, more and more BFs across the world is mixing steel scrap in varying degrees with iron ore for productivity improvement and restricting emissions. Whatever that is, David Cachot of Wood Mackenzie said: "The strategic importance of high grade iron ore in enabling lower-emission steelmaking is becoming increasingly clear... DRI and other emerging technologies remain highly sensitive to feedstock quality, reinforcing long-term demand for premium products [read premium ore]."

As for the impact Simandou will have on global trade in iron ore, Cachot says, the Guinean project comes with the potential to go "beyond volume. [The Simandou

tonnes] will increasingly displace higher cost supply, reshape the cost curve and reinforce the market's shift toward higher quality material. Marginal tonnes become increasingly vulnerable in a more quality sensitive market." Given time, more premium ore from several other African centres will come to the market. As steel mills in the EU and China (nudged by the government) will be stepping up the use of very high grades of ore, the wave of new demand will allow suppliers of premium ingredient to charge higher premium over low and medium grades than available now.

BEARISH UNDERTONE

In the meantime, iron ore fundamentals have deteriorated significantly since the beginning of this year. Against the global benchmark iron ore prices averaging \$105.53 a tonne in January, trade is now done around \$95 a tonne. Largely because of seasonally low demand from the top buyer China plus falling margins of its steelmakers, the Singapore benchmark futures fell to a 13-month low of \$93.65 a tonne on August 4. The most active Dalian contract also continues to show weaknesses. What certainly does not help the market sentiment is the unchecked fall in steel production in China with output in the first six months of 2026 at 499.95mt showing a contraction of 3% over the same period of 2025.

Chinese demand for iron ore has remained soft in the face of continuing slump in construction activities. The country's portside inventory of imported iron ore has remained at an elevated level of around 175mt, 21.1% higher than at the same time last year. So, there is no urgency in China to make any big purchases at this point. Iron ore fundamentals are getting negatively affected with rises in supply in a weak demand situation. No wonder ore prices are hovering around the low end of the range.

RADIANT WORLD SAGA

No doubt, the major narrative for the bearish undertone in the iron ore market is demand falling short of rising supplies. But a dash of uncertainty to the trade has been added by the Bloomberg news break that big names like Cargill and Vitol have stopped doing business with Radiant World. Some other major trading houses having major exposure to iron ore are also avoiding doing business with Radiant World in the wake of allegations that it has used invalid invoices to raise funds. For example, Deutsche Bank and KBC Group NV have frozen some of Radiant's Singapore bank accounts, while broker Marex Group has gone a step further by freezing all Radiant accounts. Highly prudent as Chinese buyers are, they cut ties with Radiant World in June. The actions of Radiant World, in spite of its protestations that it conducts "business to the highest commercial and legal standards," have come under scrutiny of the US Justice Department and Singapore police. Who is the principal character behind Radiant World, which claims to trade annually over 80mt of iron ore worth more than \$7.5bn? The person is Pinkesh Nair of Indian origin who founded the trading house in 2020.

The ground reality being improvement in near term supplies from Australia and Brazil with Simandou exports being scaled up when falling global steel production is weighing on ore demand, majority of institutions are forecasting average lower prices in 2027 than in 2026. This is in spite of providing for rises in diesel prices and freight rates, fallouts of the conflicts in West Asia. Fitch Ratings has slightly revised upward its iron ore price forecast to A\$85 tonne in 2027. New Seaborne supplies coming online have led Australian department of industry, science and resources to suggest a price of \$82 a tonne.

ORE PRICE GUESSING

The World Bank says iron ore prices will continue to register an annual average decline of 2% next year. In the meantime, considering a wide range of estimates from \$77 to \$108 a tonne, London-based economic forecaster Consensus Economics has arrived at an average of \$95 a tonne for iron ore next year. For the merchant traders iron ore price forecasts for 2027 are more like a roll of the dice. Geopolitical uncertainties that affect oil/diesel prices and as a consequence sea freight rates are far from fading away. Whatever the supply scenario, steel demand unpredictability remains. So, what





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will be the average 2027 ore price will remain a grey area.

The immediate concern of iron ore producers is supply continuing to exceed demand in near term, even while at the eroded present prices, rises in delivery costs following the West Asian conflict outbreak are well covered for much of the industry. But now Rio Tinto, which last year produced 327.3mt of iron ore at its Western Australia mines has given the warning that supply pressure in the mineral will continue to build in the wake of depletion of reserves in mines of Australia and other countries built in the early part of the 21st century.

RESERVE DEPLETION

The price impact of the reserve depletion will be felt in the next decade. Rio has estimated that while the world will need addition of 800mt across the coming decade, investments committed or proposed so far will create no more than 300mt new supply capacity. This has prompted Rio's iron ore chief executive Matthew Holcz to say: "I think the rate of depletion is very much underestimated." No wonder then investments in new supplies are falling way short of future requirements of ore. Holcz says unlike the ore demand story, which is well understood, depletion of deposits or supply disruptions at Western Australia's Pilbara caused by annual cyclones are not.

Indian crude steel production grew 10.7% in 2025–26 and the demand for finished steel 8% in 2025–26. This must have led Holcz to say iron ore demand boost will come from 'global south.' As for China, he thinks ore demand will remain steady till 2030 and then there will be a marginal fall in demand. The way steel capacity expansion is happening in India, the

country may well become a net importer of iron ore ahead of Rio deadline of 2035. Major Indian steelmakers, including JSW Steel committed to raising production of green steel are increasingly finding it challenging to procure ore with high iron content from domestic sources.

The US thinktank Institute for Energy Economics and Financial Analysis (IEEFA) says steel decarbonization and technology choices to make that happen in India will finally be decided by how the industry there makes the right quality of iron ore imports and how much of the local supply of the ingredient is upgraded through beneficiation. IEEFA says, expanding the capacity of the country's 27 beneficiation plants from 136mt to 170mt by 2030 will require an investment of approximately \$5.7bn. But to realize this will require of the government to cut royalties levied on beneficiated low grades of ore.

ORE BENEFICIATION

The importance of beneficiation in India is underlined by the fact that as much as nearly 65% of remaining iron ore reserves are either medium or low grades. Not only that, much of Indian ore comes with alumina content ranging from 3% to as much as 7% in fines and slimes compared with 1% and less in many other parts of the world, including Brazil and now Guinea (Simandou). More the alumina in ore, greater is the use of metallurgical coal in BF where productivity is compromised. (Incidentally, the major portion of coking coal and coke used in India is imported, the domestic supply being limited and mostly with high ash content. Nearly 95% of the country's coking coal requirements are met by imports with at least half the shipments originating in Australia.) As a result, steelmakers will not draw comfort from

India's standing as the world's fourth largest producer of iron ore when quality remains the issue.

According to official sources, India will extract 340mt to 345mt of ore this year against 316mt the year before. In 2025–26, India's iron ore imports were a seven-year high around 12mt when exports, including pellets fell nearly 15% to 25.8mt. Whatever the mine expansions, India's ore imports are set to rise year by year. Assessments of imports by 2030–31 by different agencies range from 40mt to 50mt, mostly of premium quality. Coast based steel plants will have an advantage in imports as they are spared of domestic rail and road freight involved in transferring imported ore from ports to inland mills. Indian imports will particularly benefit Brazil, a big volume producer of high grades of ore that Indian mills will need in increasingly bigger volumes to support decarbonization of mill operation. No wonder Brazil's Vale, among the world's leading ore producers has identified India as "a strategic growth market."

Traditionally, Tata Steel for its Indian steelmaking operation has enjoyed total supply security for iron ore based on captive mines in the states of Jharkhand and Odisha. But as the mining leases will be up for expiry by 2030, when under the mining laws these will come for auction-based allocation, the company is readying itself for at least 50% supply security from owned mines in future, according to CEO & MD TV Narendran. An informed guess will be for the balance ore requirement, the company will focus on superior grades of ore from domestic and global markets. That focus of will be guided by Tata Steel goal of becoming net zero by 2045. Use of iron ore with very low alumina content will aid its decarbonization campaign.

Petroleum coke trade

remains resilient amid Middle East Conflict

Ben Ziesmer, Pedro Mackay & Rituraj Jha, Worley Consulting

The Middle East conflict, which began in February, has significantly disrupted global energy markets, particularly crude oil and liquefied natural gas (LNG) trade. Petroleum coke (petcoke) trade has also been affected, although less than many market participants initially expected. The primary reason is that petcoke production in the United States, the world's largest producer and exporter, has remained close to pre-conflict levels.

STRAIT OF HORMUZ DISRUPTIONS RESHAPE GLOBAL ENERGY FLOWS

The Strait of Hormuz is one of the world's most critical maritime chokepoints. Of the eight major global seaborne trade chokepoints, Hormuz ranks second only to the Strait of Malacca in terms of cargo volumes transported. Approximately 20% of global petroleum liquids consumption passed through the Strait of Hormuz, consisting of 14.7 million barrels per day (mbpd) of crude oil/condensate and 6.1mbpd of petroleum products such as gasoline and diesel, during the first half of

2025 according to the U.S. Energy Information Agency (EIA). Consequently, disruptions to traffic through the strait quickly reverberated throughout global energy markets.

Middle Eastern crude oil production fell sharply during the second quarter of 2026 as tanker movements through the Strait of Hormuz were restricted by the conflict. According to data published by OPEC, Iraq's crude oil production declined by nearly 60% to 1.6mbpd, while Kuwait's output fell almost 70% to less than 0.9mbpd. The Kingdom of Saudi Arabia (KSA) experienced a smaller decline, with production falling approximately 30% to 6.9mbpd. The Kingdom mitigated some of the impact by significantly increasing flows through its East-West Pipeline, which provides direct access to Red Sea export terminals and bypasses the Strait of Hormuz. United Arab Emirates' (UAE) production decreased by 15% to about 2.7mbpd. Since the UAE officially exited OPEC on May 1, the country's crude oil production has risen significantly, reaching

nearly 3.9mbpd, compared to an average of 3.2mbpd in 2025.

REFINING SECTOR FEELS THE IMPACT

The Arab Gulf States' oil refining capacity accounts for approximately 8% of global oil refining capacity, with roughly 35% of the region's refining capacity equipped with delayed coking units. These coking refineries are in KSA, Kuwait, Oman, and UAE.

Because Arab Gulf States' refineries are export oriented, the traffic restrictions through Hormuz[1] quickly created logistical constraints. More than half of the region's refined product output is normally exported, and restrictions on tanker movements led to product storage limitations that forced refiners to reduce

1. U.S. Central Command (CENTCOM), which is responsible for commanding U.S. forces in the Middle East and Central Asia, said on July 29, "Since early May, CENTCOM forces have helped approximately 1,000 vessels and 500 million barrels of crude oil pass through the narrow waterway [Hormuz]."

operating rates. Several refining and upstream facilities also sustained damage attributed to missile and drone activities during the conflict. As a result, regional refinery throughput fell from an average of 9.6mbpd in 2025 to approximately 7.6mbpd during the second quarter of 2026, according to the International Energy Agency (IEA). Petroleum coke production declined as refineries processed fewer barrels of crude oil.

According to the IEA, Middle Eastern crude oil supply is expected to average approximately 26mbpd in 2026, down from more than 31mbpd in 2025. Conditions were most severe during the second quarter, when regional production dropped below 20mbpd. Supply has gradually recovered during the third quarter and is expected to improve further during the fourth quarter.

OIL PRODUCTION GROWTH ELSEWHERE HELPS OFFSET LOST SUPPLY

While Middle Eastern crude oil production contracted sharply, growth elsewhere helped prevent a more severe global supply shortfall. The IEA expects non-OPEC+ production to increase by approximately 1.5-1.6mbpd in 2026, led by the so-called "Americas Quintet" of the United States, Canada, Brazil, Argentina, and Guyana.

U.S. crude oil production is forecast to average 13.8mbpd in 2026, up slightly from 13.6mbpd in 2025. Brazil is expected to contribute the largest increase among the group, with production rising roughly 0.5mbpd to about 4.3mbpd. Guyana continues its rapid emergence as a major producer, with output projected to reach approximately 0.9mbpd, compared with 0.7mbpd in 2025.

In addition, Venezuelan crude oil production, which is an OPEC member, is expected to increase from approximately 0.94mbpd in 2025 to around 1.1mbpd in 2026.

GLOBAL IMPACTS ON REFINING

While upstream production losses in the Middle East were partially offset by increased crude oil production elsewhere, the disruption to global crude flows had a broad impact on refinery operations and petroleum coke production worldwide.

In 2025, more than 50% of China's crude oil imports originated from the Middle East, leaving the country particularly exposed to disruptions caused by the closure of the Strait of Hormuz. To mitigate supply risks, China increased crude oil purchases from a broader range of suppliers, including several countries in Latin America. Despite these

efforts, China's overall crude oil imports during the first seven months of 2026 declined nearly 21% year on year (Y/Y) to 9.76mbpd. In June, crude oil imports dropped to ~7.2mbpd, the lowest level recorded in almost a decade. China's refinery throughput in 2025 increased by 4% Y/Y to 14.75mbpd. However, reduced crude oil availability resulting from the Hormuz disruption is expected to lower refinery throughput by approximately 5% in 2026 to around 14mbpd according to IEA.

According to China's Nation Bureau of Statistics (NBS), domestic petcoke production in 2025 declined by 4% Y/Y to 31.6mt (million metric tonnes). YTD production through July is down 3.1% Y/Y to approximately 15.46mt. However, YTD through April production was 3% higher Y/Y. The decline began in May, when domestic petcoke production dropped by 3% Y/Y, followed by a further decline of 11% Y/Y in June and 15% in July.

India imports nearly 90% of its crude oil requirements. Historically, most of these imports came from the Middle East. However, after the Russia-Ukraine conflict and the subsequent Western sanctions on Russian oil, India began importing significant volumes of Russian crude oil. Currently, Russian crude accounts for more than 40% of India's total crude oil imports. In February 2026, just before the Middle East conflict, Iraq, KSA, and UAE, together accounted for nearly 50% of India's crude imports, while Russia accounted for 27%. At the beginning of 2026, Indian refiners gradually reduced purchases of Russian crude due to tighter sanctions. However, imports increased sharply after U.S. sanctions waivers were introduced. Based on the latest available data from the India Directorate General of Foreign Trade (DGFT), Russian crude accounted for 41% of India's total crude imports in May 2026, followed by the UAE at 15%, Saudi Arabia at

8%, and Venezuela at 7%, while Iraq's share declined to just 1%. India's domestic crude runs in 1H26 declined by almost 1% Y/Y to approximately 5.45mbpd, while domestic petroleum coke production fell by 6% Y/Y.

According to U.S. EIA data, U.S. refinery crude throughputs are expected to increase by around 1% year-on-year in 2026 to approximately 16.54mbpd.

In addition to disruptions to refinery operations due to the ongoing crisis in the Middle East, Russian refinery operations have been disrupted due to strikes attributed to Ukraine, and Russian refinery operations are expected to continue to face challenges due to ongoing conflict-related damage. In June 2026, Russian refinery crude throughputs fell to approximately 3.9mbpd, the lowest level in more than two decades. Overall, Russian refinery throughputs are expected to decline by about 15% year-on-year in 2026, averaging around 4.4mbpd, according to the IEA. Given the extent of the conflict-related damage to refining facilities, throughput levels are not expected to return to 2025 levels even in 2027.

Overall, 2026 is expected to be the first year since 2020, the year impacted by the Covid-19 pandemic, in which global refinery throughputs decline on a year-on-year basis. According to the IEA, global refinery crude throughputs are projected to fall by nearly 3% in 2026 to below 82mbpd.

PETROLEUM COKE

The primary purpose of a coking unit is to convert low-value residual oils into higher-value transportation fuels while producing petroleum coke as a by-product. Delayed coking, the dominant coking technology worldwide, accomplishes this by thermally cracking heavy refinery residuum at temperatures of approximately 500°C. Lighter hydrocarbons are recovered and



Green petcoke undergoes calcination.

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Figure 1 – Arab Gulf States Petroleum Coke Trade



upgraded into transportation fuels, while the remaining solid carbon-rich material, which resembles coal in appearance, becomes petroleum coke. Typically, approximately 30% of the coker feed remains as petroleum coke.

PETROLEUM COKE MARKETS

Petroleum coke is unusual because it is used not only as a heat source (i.e., fuel) but also as a carbon source in metal production and chemical processes. Petroleum coke that is used as a carbon source requires better quality (e.g., low sulphur and metals content) and commands a higher value than fuel-grade petcoke prices, driven by different factors than fuel-grade petcoke prices.

Green[2] petroleum coke is usually upgraded by calcination when it is used as a carbon source. Calcination is a process that uses heat [1,150-1,350°C (2,102–2,462°F)] to remove moisture and volatile matter from petcoke, improves critical physical properties, and converts green petcoke into an electrically conductive form of carbon. Green petcoke that has been calcined is referred to as calcined petroleum coke (CPC). The largest market for CPC is in the production of carbon anodes for aluminium smelting. Other uses for CPC are in the production of carbon electrodes for electric arc furnaces, titanium dioxide (TiO₂) production, as a recarburizer (i.e., carbon

raiser) in the iron and steel industry, and, very recently, as a source of synthetic graphite in lithium-ion (Li-ion) battery production. Approximately one-third of petroleum coke that is produced is sold into these higher value-added markets for higher quality petcoke; the remaining production is used as a fuel source. The carbon source market share has been growing recently as demand growth in these specialty markets, especially battery production, has outpaced overall petroleum coke production growth.

Fuel-grade petroleum coke is used in a variety of industries — primarily as a substitute for coal, but sometimes as a substitute for fuel oil. Petroleum coke has higher calorific value (i.e., kcal/kg) and much lower ash content than coal. However, it is more difficult to burn, generally has higher sulphur content, and is often more difficult to pulverize[3] than coal because most fuel-grade petroleum cokes are harder than coal, so it typically sells at a discount to coal. The cement industry is the largest consumer of fuel-grade petroleum coke because cement kilns are particularly well suited to burn petcoke, and cement kilns inherently capture approximately 90% of the sulphur oxides (SOX) emissions resulting from burning petcoke. The next largest demand segment for fuel-grade petroleum coke is the ‘other industry’ category, which includes lime[4], brick,

calcium carbide, and glass production. The next largest demand segment is gasification of petcoke to produce chemicals (e.g., ammonia, urea, ammonium nitrate, etc.), currently dominated by Reliance Industries Limited’s huge gasification complex located adjacent to its 1.24mbpd refinery in Jamnagar, Gujarat, India. The remaining categories in declining market size are power generation, long-term storage, and iron & steel production. The ‘long-term storage’ category refers to petroleum coke produced as a by-product of upgrading bitumen (primarily Western Canadian oil sands) where petcoke is placed underground as part of the reclamation process associated with open cast (open pit) mining of bitumen or was placed in long-term storage in Venezuela because dependability problems at petcoke export terminals located at the Port of Jose prevented exports of petroleum coke from keeping up with petcoke production.

While both calcined and non-calcined petroleum coke are traded internationally, the trade flow discussion will concentrate on non-calcined (i.e., ‘green’) petroleum coke as the seaborne trade of non-calcined petroleum coke is almost eight times larger than calcined petroleum coke (CPC).

PETROLEUM COKE TRADE CHANGES

The disruption to shipping through the Strait of Hormuz caused Middle Eastern petroleum coke trade to contract during the second quarter of 2026, with exports falling 58% versus 2Q25 and imports declining 70% (See Figure 1 above — Arab Gulf States Petroleum Coke Trade).

UNITED STATES

The U.S. is the world’s largest producer of petroleum coke because it possesses the largest refining system globally and ~70% of its refining capacity equipped with coking units.

The U.S. is by far the largest exporter of petcoke because ~70% its coking capacity is located on its coasts and U.S. domestic coal

2. Technically, all petcoke that has not been calcined is green petcoke (GPC). However, within the petcoke industry, the term GPC is usually only used for petcoke that is used as calciner feedstock. Unless otherwise noted, discussion of petcoke or petroleum coke will be referring to green (i.e., non-calcined) petroleum coke.

3. Coal (and petcoke) is typically pulverized to approximately the consistency of talcum powder to facilitate the pulverized (suspension) fuel combustion process used in the power, cement, lime, and many other industries.

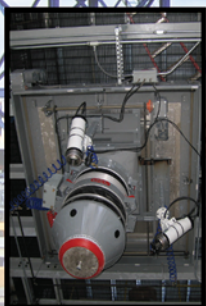
4. Lime kilns are very similar to cement kilns and have the same inherent capabilities to successfully burn petcoke as cement kilns.



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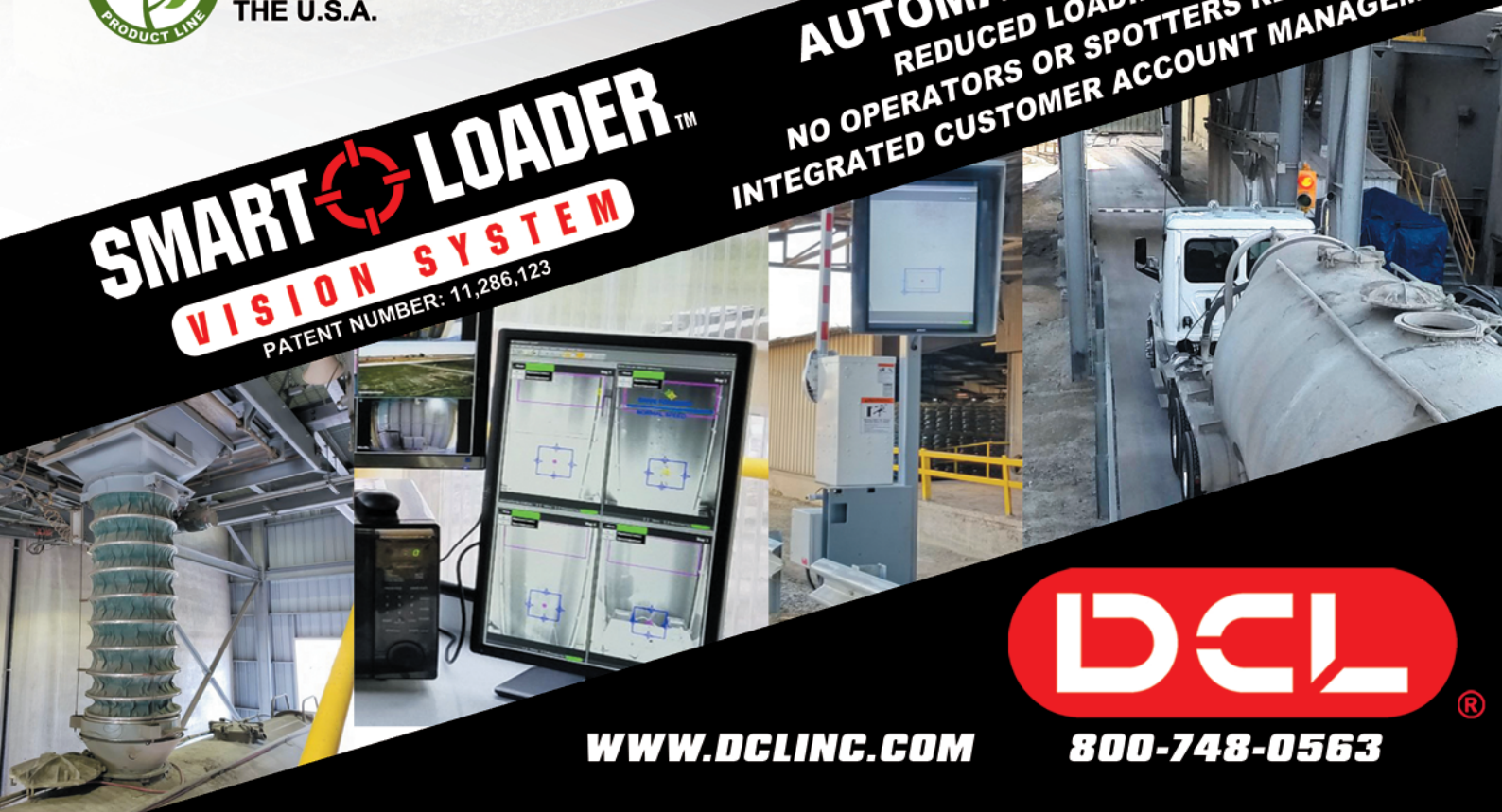
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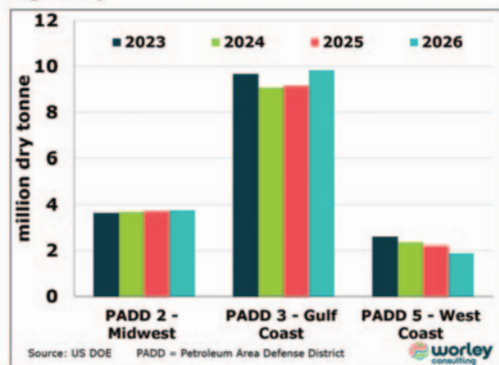
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Figure 2 – U.S. Green Petroleum Coke Production Comparison YTD through May



and natural gas prices are generally much lower than international coal and natural gas prices. In 2025, U.S. petcoke exports dropped by 5% year on year (Y/Y), from an all-time high of 36.7mt in 2024 to 35.1mt as U.S. petroleum coke production also decreased by 5% Y/Y. Year to date (YTD) through May production is up 2%. However, production changes have been mixed with U.S. Gulf Coast (USGC) production up 7%, Midwest production flat, and U.S. West Coast (USWC) production down 15% (see Figure 2 above — U.S. Green Petroleum Coke Production Comparison YTD through May).

Midwest production is stable because crude oil supplies are stable — domestic crude oil and Canadian imports, and U.S. refined product demand is stable. Midwest petroleum coke production is important for international trade because there is limited domestic petcoke demand, so most of the production is exported primarily by barging petcoke down the Mississippi River system to U.S. Gulf Coast (USGC) coal/petcoke export terminals located on the Mississippi River. Additionally, small quantities move by unit train for export through U.S. East Coast coal terminals and occasionally some petcoke is exported via the St. Lawrence Seaway.

USGC petroleum coke production is more volatile because crude oil supplies can vary with imported crude oils being an important component [the U.S. typically exports tight light oil (shale oil) at a price premium and imports heavy crude oils at a price discount]. U.S. imports of Saudi crude oil are estimated to have fallen to almost zero in July 2026, down from 0.496 million barrels per day (mbpd) in February before the Middle East conflict began. Similarly, crude oil imports from Iraq dropped to zero in July, compared to about 0.26mbpd in February. Normally, losing these supplies of medium/heavy crude oils would cause petroleum coke production to decrease

because heavier crude oils produce more petroleum coke per barrel of crude oil than do lighter crude oils. However, increased imports of Venezuelan crude oil have offset the loss of these Arab medium and heavy crude oil imports. Venezuelan crude oil is typically very heavy. It produces approximately twice as much petroleum coke per barrel of crude oil than Arab medium crude oil and produces ~60% more petcoke per barrel of crude oil than Arab heavy crude oil.

Following the change in government at the beginning of 2026, Venezuela's crude oil production has increased, and export destinations have changed significantly. Venezuelan crude production has reached nearly 1.1mbpd, up from an average of 0.94mbpd in 2025. With sanctions lifted by the Trump Administration, the U.S. has regained its traditional position as the largest importer of Venezuelan crude oil, importing around 0.49mbpd in the second quarter of 2026, compared to just 0.12mbpd in the second quarter of 2025. This is the highest import level since 2018, when imports averaged 0.51mbpd. Almost all of the Venezuelan crude oil imported into the U.S. is processed by USGC refineries equipped with cokers.

Elevated utilization rates by USGC

refiners driven by extremely high refining margins have also helped boost USGC petroleum coke production in 2026.

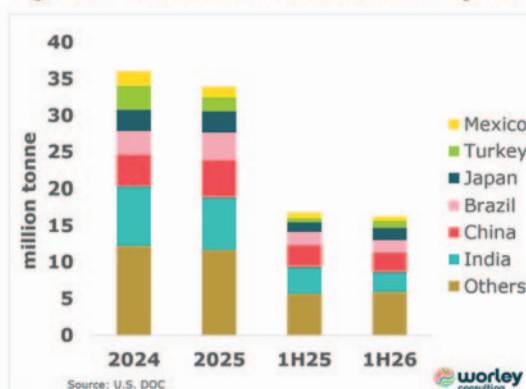
USWC production is down, mostly due to the closure of the Phillips 66 Los Angeles Refinery complex located in Carson and Wilmington, California, in the fourth quarter of 2025 and the closure of the fluid coker at Valero's Benicia (California) Refinery in February of this year as Valero proceeded with its previously announced closure of the refinery.

YTD through May, the U.S. exported 11.6mt of petroleum coke through USGC ports, up 4% versus the same period in 2025, but USWC petcoke exports are down 17% to 1.8mt consistent with reduced production. Delving into USWC exports further, exports to China and Japan are up 10% and 19%, respectively, versus the first five months of 2025 as the share of USWC going to these two countries increased from 69% in 2025 to 91% YTD through May of this year, largely because exports to India plunged from 0.35mt in the first five months of 2025 compared to only 0.06mt during the same period in 2026.

Looking at total U.S. petroleum coke exports, the most notable decline was in exports to India, which fell by more than 25% Y/Y to approximately 2.7mt. Following the start of the Middle East crisis, freight rates increased significantly due to factors ranging from higher bunker prices to shipping availability constraints. In addition, U.S. petcoke FOB prices also increased. Combined with higher freight rates, this resulted in elevated delivered costs for Indian buyers, who consequently favoured relatively cheaper coal alternatives.

Exports to China declined by 9% Y/Y in 1H26 to approximately 2.7mt, largely due to the same factors associated with higher freight rates. Exports to Mexico dropped significantly by 24% Y/Y to 0.6mt, owing to increased domestic petcoke production.

Figure 3 – U.S. Green Petroleum Coke Exports



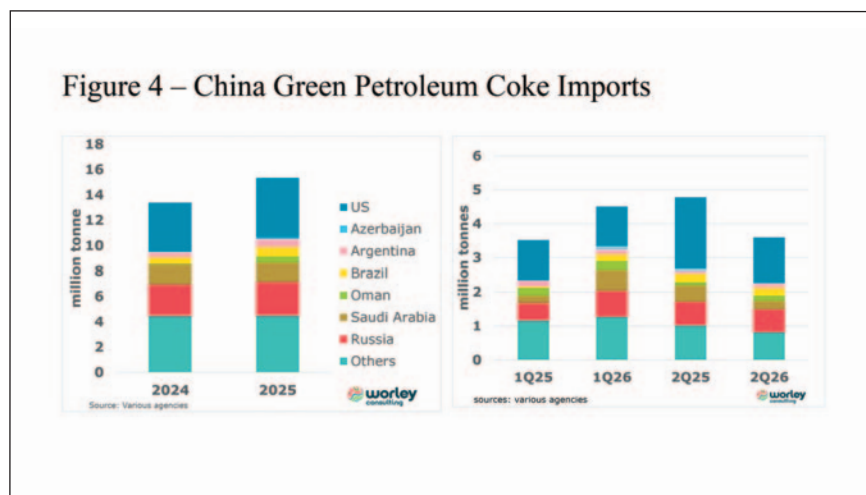
U.S. exports to Brazil also fell by nearly 7% Y/Y to 1.7mt.

On the other hand, U.S. petcoke exports to Türkiye and Japan rose significantly during 1H26. Exports to Japan increased by approximately 25% Y/Y to 1.7mt, while exports to Türkiye surged by 69% Y/Y to 1mt. Exports to other countries also increased by 4% Y/Y to 5.9mt (see Figure 3 — U.S. Green Petroleum Coke Exports on p16)

Türkiye provides an example of how changing fuel economics and industrial activity can influence petcoke demand independently of supply disruptions. Türkiye's petroleum coke imports in 2025 declined by almost 33% Y/Y to 3mt as buyers shifted from petcoke to discounted Russian coal. During 1H26, Türkiye's petcoke imports fell by more than 15% Y/Y to 1.2mt. As noted in the U.S. section, exports of petcoke to Türkiye increased 69% during 1H26. Therefore, Türkiye's petcoke imports from other countries, including Russia, Spain, and Venezuela, declined significantly during the same period.

However, it is important to note that not only did Türkiye's petcoke imports decline in 1H26, but thermal coal imports also fell significantly. During 1H26, Türkiye's thermal coal imports dropped by almost 20% Y/Y to 26.6mt. Russia, which holds the largest share of Türkiye's coal import market, exported approximately 11.4mt of thermal coal to Türkiye in 1H26, representing a decline of 24% Y/Y. Thermal coal imports from all other countries combined declined by 14% Y/Y to 15.2mt during the same period.

Türkiye's hydroelectric power generation during 1H26 increased almost 68% Y/Y to record high 57 billion kilowatt hours according to news sources, driven by significantly higher precipitation and increased reservoir levels. This is one of the prime reasons behind Türkiye's reduced



thermal coal imports so far this year.

Another reason behind Türkiye's decline in both petcoke and thermal coal imports is weakness in its cement sector. In 2025, Türkiye's cement production increased by almost 10% Y/Y to an all-time high of 93.7mt. However, based on the latest available data from the Turkish Cement Manufacturers' Association (TÜRKÇİMENTO), from January through May 2026, cement production declined by almost 5% Y/Y to 33mt. Domestic cement sales fell by nearly 10% Y/Y during the January-May 2026 period to 26mt, while exports increased by 6% Y/Y to 6.4mt.

In addition, consumption of conventional fuels such as coal and petcoke by the cement industry has also declined due to the slow but steady increase in the use of alternative fuel resources (AFR). For example, AFR penetration in Türkiye's cement industry was approximately 4.5% before increasing to 13% by 2025. Many cement producers are targeting AFR penetration rates of around 30% by 2030.

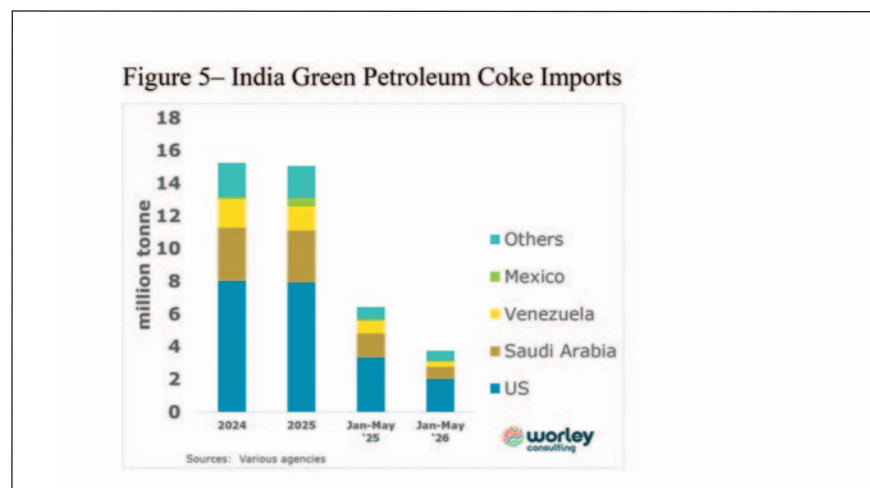
CHINA

In 2025, China's petcoke imports increased by almost 15% Y/Y to 15.4mt. In 2024, imports dropped by 16% Y/Y from the all-time high of 16mt recorded in 2023.

Petcoke imports in 1Q26 totalled 4.51mt, which was almost 28% higher than the 3.52mt imported in 1Q25. However, due to the repercussions of the ongoing Middle East crisis, imports in 2Q26 dropped by almost 25% to 3.6mt, compared with 4.78mt imported in 2Q25 (see Figure 4 above — China Green Petroleum Coke Imports)

As a result, China's overall petcoke imports during 1H26 declined marginally by 2% Y/Y, from approximately 8.3mt in 1H25 to around 8.1mt. Petroleum coke imports from the U.S. particularly, dropped by almost 23% Y/Y to 2.5mt. However, the 2Q25 import volumes were inflated because Chinese importers rushed to import U.S. petroleum coke in anticipation of China imposing retaliatory tariffs on U.S. petcoke because of the trade dispute between the U.S. and China. The trade dispute was settled, and China imports of U.S. petcoke decreased in the second half of 2025. It is important to note that the figures mentioned here will not match those cited in the U.S. section, as U.S. export numbers are based on loading activity during those months, whereas China's reported import numbers are based on vessel arrivals during those months. Generally, a dry bulk carrier takes 35-50 days to travel from the USGC to China.

China's petcoke imports from the Middle East increased significantly in 1Q26 but decreased in 2Q26. Despite the ongoing Ukraine Russia crisis and conflict-related damage to refining infrastructure, Chinese imports of Russian petcoke remained relatively strong during the first half of 2026. However, reported strikes on Russian refineries accelerated beginning in May, so it may be the case that the impact of reduced Russian petroleum coke production had not yet affected the supply chain in the first half of 2026.



INDIA

India's petcoke imports in 2025 declined marginally by 1% Y/Y, from the all-time high of 15.2mt in 2024 to approximately 15.1mt. In 2024, India surpassed China in terms of petcoke imports. Between January and May 2026, India's petcoke imports shrank by 42% Y/Y to just 3.7mt. Imports from all major supplying countries declined during this period due to a combination of factors, including limited availability from the Middle East, extremely volatile freight rates, and relatively higher prices for cargoes originating from the U.S. Based on the data available through May 2026, the decline has been broad-based across all major sources of supply. (see Figure 5 on p17 — India Green Petroleum Coke Imports)

CLOSING OBSERVATIONS

The crisis in the Middle East has significantly disrupted global crude oil markets and caused Middle Eastern petroleum coke trade flows to collapse. Nevertheless, the global petroleum coke market has proven remarkably resilient. While regional trade flows have changed considerably, overall global petcoke trade volume has remained relatively stable.

LONGER TERM OUTLOOK – PETROLEUM COKE MEGATRENDS

Developments in specific industries as well as geopolitical events are expected to significantly shape the petroleum coke industry going forward. We refer to these developments as petcoke megatrends and are summarized as follows:

- ❖ longer term implications of the Middle East conflict;
- ❖ refineries pursuing oil to chemicals strategy, which typically does not involve the installation of a coker;
- ❖ increased demand for synthetic graphite produced from petroleum coke for battery production to support increased use of electric vehicles, renewable power generation, and data centres;
- ❖ growth in aluminium demand (primary and recycled);
- ❖ inert anode (also known as 'carbon free') aluminium smelting technology (eliminates current need for calcined petroleum coke in consumable anodes); and
- ❖ growth in recycled aluminium supply vs. primary aluminium.

Each of these trends will have a different impact on petcoke production or consumption and the net effect will determine the future course of petroleum coke. These megatrends will be discussed in more detail at Worley Consulting's upcoming 25th Annual Petcoke Conference in March 2027. 

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Ben is a widely recognized authority in global petroleum coke consulting. He successfully led Worley Consulting's Fuel Grade Petcoke practice for many years and now acts as a senior advisor to the team. Ben continues to be a key contributor to Worley Consulting's *Pace Petroleum Coke Quarterly*, as well as providing support to single client consulting projects, the annual Worley Consulting Petcoke Conference, and other Worley Consulting petcoke-related publications.



Pedro Mackay (Principal Consultant)

Pedro has over 25 years of experience working in various energy-related fields such as oil exploration, solid fuel purchasing and trading including petroleum coke and coal, ocean freight chartering, consulting in the petroleum coke industry, and raw materials purchasing in the coke calcining industry. Through his career, Pedro has held responsibilities focused on purchasing and supply chain aspects related to solid fuels for cement plants and raw materials for calciners, solid fuel trading, ocean shipping, and consulting. He holds a bachelor's degree in Mechanical Engineering from the University of Texas at Austin and a Master's in International Management from Thunderbird.



Rituraj Jha (Deputy General Manager — India)

Rituraj is the Mumbai-based resource for Worley Consulting's Insights team. He is the lead author of Worley Consulting's *Market Perspective Report* and is a contributing author for Worley Consulting's *Pace Petroleum Coke Quarterly*® (PCQ) and *Calcined Petroleum Coke Report*® (CPC). He is also involved in numerous petroleum coke market studies and is team's regional expert on Indian petroleum coke market and refining segment. Background-wise, Rituraj is a chemical engineer from one of India's top engineering colleges, with a specialization in petroleum refining.

Worley Consulting (formerly Jacobs Consultancy, Inc. and previously The Pace Consultants, Inc) has published the *Pace Petroleum Coke Quarterly*® since 1983. The report has been published monthly since January 1985 and is considered the global authoritative source of petcoke market information.

NORDEN reports net profit of US \$101m in Q2 2026



Group net profit increased significantly to US\$100.8 million in Q2 2026, compared to US\$52 million in Q2 2025. Despite the cost impact from the closure of the Strait of Hormuz, Dry Cargo delivered a turnaround supported by resilient operational performance and successful fleet repositioning. The Tanker unit continued to benefit from strong spot rates driven by the Persian Gulf conflict and the resulting disruption to global oil flows.

By June-end, all NORDEN chartered vessels had safely passed through the strait, and thus no additional related costs are expected for the remainder of the year.

Net asset value (NAV) increased 23% since start of the year to DKK 466 per share, driven by the significant appreciation in asset values. The return on invested capital (ROIC) increased to 10.9% LTM.

In light of the continued good performance over the summer, NORDEN raises the lower end and narrows its full-year net profit guidance to US\$140–190 million (previously US\$120–190 million). This includes vessel sales gains of US\$79 million.

NORDEN CEO, Jan Rindbo, comments: “Group net profit increased significantly to US\$101 million in Q2 2026, driven by an exceptionally strong tanker market and a turnaround in the Dry Cargo business unit. At the same time, strong asset values drove a 23% increase in NAV since the beginning of the year to DKK 466 per share. Reflecting the stronger outlook, we raise the lower end and narrow our full-year net profit guidance to US\$140–190 million.

“Our full-year outlook is strong and NORDEN is well positioned to navigate the market environment. Our commitment to deliver long-term value to shareholders remains and we will distribute US\$34 million for the second quarter of 2026 through a dividend of DKK2 per share and a new share buy-back programme of US\$25 million.”

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New oil condition analyser provides immediate results for engine optimization

CM Technologies (CMT) is set to introduce a new compact oil analyser that brings a laboratory-established analytical technique to enable ship crews to assess lubricant condition within minutes rather than waiting for shore-based test results.

The new WBS Analyser will be presented at September's SMM trade fair in Hamburg, where condition monitoring and machinery efficiency tools are expected to feature heavily on the agenda as shipowners look to reduce operating costs and improve maintenance planning.

Using infrared spectroscopy, the WBS Analyser examines the composition of system oils to assess water (W), base number (BN) and soot (S) content from a single sample.

Based on the results, it is possible for crews to better understand and present the causes of lubricant degradation, such as oxidation of the oil, depletion of performance additives, and contamination by substances including glycol and fuel.

David Fuhlbrügge, Managing Director of CMT, said the next generation test kit will provide engineers with a "faster, reliable and accurate" means of accessing the information needed for maintenance decisions while vessels remain in service.

"Laboratory analysis remains the benchmark for comprehensive oil

investigations and long-term trend analysis," he said. "The objective isn't to replace laboratory testing, but to give engineers reliable information while the vessel is still operating, allowing developing problems to be identified without waiting for laboratory reports."

He said growing pressure to improve machinery efficiency and control maintenance costs was increasing demand for onboard diagnostic tools capable of delivering consistent results across fleets, especially amid ongoing fuel price hikes.

While IR technology is now well established, advances in instrument design now allow the technology to be deployed onboard in a compact format suitable for routine engine-room use.

The analyser's optical system contains no moving parts, reducing mechanical wear and improving suitability for operation in the vibration, temperature variation and confined conditions typically found onboard ships.

The commercial case for earlier diagnosis was recently underscored in Allianz Commercial's Safety and Shipping Review 2026. The insurer identified machinery damage or failure as the leading cause of reported shipping incidents worldwide during 2025, accounting for more than half of all reported casualties.

The report also noted that machinery repair costs continue to rise, increasing the importance of detecting developing faults before they result in major failures.

"The industry isn't looking for more data," Fuhlbrügge said. "It is looking for information that engineers can act upon. The sooner developing changes in lubricant condition can be identified, the sooner corrective action can be taken."

ABOUT CMT

Founded in 2003, CM Technologies GmbH is a prominent global provider of testing and monitoring technology. CMT is a recognized expert in machine health monitoring, fuel and lubricant analysis and water testing. The company's world renowned PREMET range of Diesel Performance Monitoring technology can be traced back to engine pioneer James Watt.



The new CMT IR Analyser.

ClassNK revises 'Guidelines for Ships Using Alternative Fuels'

ClassNK has revised the safety requirements for ships using methanol/ethanol and hydrogen as fuel within the 'Guidelines for Ships Using Alternative Fuels (Edition 3.1).'

In Part D, covering hydrogen-fuelled ships, the revision incorporates the 'Interim Guidelines for the Safety of Ships Using Hydrogen as Fuel (MSC.1/Circ.1701)' issued by the IMO this year, and additionally introduces a hydrogen leak frequency table that can be used for the safety assessments required under the IMO guidelines. In Part A, covering methanol/ethanol-fuelled ships, new structural strength requirements for methanol/ethanol fuel tanks — which are not addressed in the IMO guidelines — have been established.

Through this revision, shipyards, designers, and shipowners can carry out design and safety assessments in line with the latest international standards, and by utilizing ClassNK's own leak frequency estimates and the relevant requirements, they can proceed the development of alternative-fuelled ships in a more rationally.

BACKGROUND

As the building of alternative-fuelled ships advances in response to the global challenge of reducing GHG emissions, ClassNK has comprehensively compiled the safety requirements for ships using methanol, ethanol, LPG, ammonia, and



hydrogen — fuels regarded as promising alternatives — and has issued the guidelines. Taking into account the risks that the use of alternative fuels poses to the environment, seafarers, and ships, the guidelines set out

requirements for equipment, controls, and safety devices to minimize such risks. With the issuance of the IMO guidelines for hydrogen-fuelled ships (MSC.1/Circ.1701), ClassNK has fully incorporated the IMO guidelines to make the guidelines more user-friendly for shipyards, designers, and shipowners, and has enhanced the requirements serving as design and assessment guidance for other alternative fuels.

Damen delivers CF 3850 'CF Anja' to Juru Agentura Forsa



On 3 August, Damen Shipyards Group delivered a Combi Freighter (CF) 3850 to Lithuania-based Juru Agentura Forsa. The handover of the vessel, named *CF Anja*, took place during a ceremony attended by Director Antanas Anilionis and Technical Superintendent Pavel Kirzhner on behalf of Forsa, and Sales Manager Koert Slobbe on behalf of Damen.

The name of the vessel, *CF Anja*, is one that has been in use in the Forsa fleet for many years. As such, the CF 3850 will carry the company's heritage into the future. The delivery of *CF Anja* also marks a milestone for Forsa as the first newbuild vessel in the company's fleet of dry cargo vessels. The vessel is being delivered to Europe to support the needs of Forsa's customers, who are exploring new business opportunities, and to strengthen the company's global presence. In this way, *CF Anja* will make a significant contribution to the modernization and continued growth of the company.

NEXT-GENERATION CARGO VESSEL

The CF 3850 represents a new generation of Damen's iconic cargo vessels. Since its launch just five years ago, Damen has received orders for more than 50 CF 3850 vessels. The vessel features a hull optimized with computational fluid dynamics (CFD) to provide low resistance, reducing fuel

consumption and emissions. The vessel is prepared for the integration of a wide range of additional efficiency-enhancing solutions.

TAILORED TO CLIENT REQUIREMENTS

To meet Forsa's operational requirements, *CF Anja* has been equipped to operate on HVO biofuel. She has also been fitted with a Damen wake equalizing duct, which ensures a smooth flow of water behind the vessel, considerably reducing noise, vibration and fuel consumption.

The vessel also features a 120-kilowatt shore connection to enable use of electricity during port calls. Furthermore, *CF Anja* is prepared for the installation of a wind-assisted ship propulsion (WASP) VentoFoil.

A QUALITY SHIP FOR TRADE

Speaking during the ceremony, Anilionis said, "It is an honour to stand here today and celebrate the delivery of *CF Anja* — the first newbuild vessel for Forsa. I would like to express a very warm and personal thank you to all at Damen. We truly appreciate your dedication in delivering *CF Anja* — a quality ship for trade, and a greener ship for the environment."

Slobbe said, "On behalf of Damen, I would like to congratulate the entire Forsa team on this achievement and thank you

for the trust you have placed in us. I would also like to express my sincere gratitude to everyone who has contributed to this project — your professionalism and commitment have resulted in this beautiful vessel."

DAMEN SHIPYARDS GROUP — OCEANS OF POSSIBILITIES

Damen Shipyards Group has been in operation for over 99 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 160 vessels per year, with a total production value of over €3 billion. The company offers direct employment to approximately 12,500 people.

'Yampu' begins operations

marking a global first in maritime innovation



On 26 August, CSL and Adbri celebrated the commencement of operations of *Yampu*, the world's first battery-powered self-unloading bulk carrier, representing a major milestone for Australian manufacturing, maritime innovation and lower-emissions supply chains.

Purpose-built by CSL, the 125-metre vessel will transport limestone from Adbri's Klein Point quarry on South Australia's Yorke Peninsula to the company's Birkenhead cement manufacturing in Adelaide, helping secure a critical raw material for the supply of locally manufactured cement used in homes, schools, hospitals, roads and major infrastructure projects across South Australia and Victoria.

For more than a century, limestone from Klein Point has underpinned cement manufacturing in South Australia. The *Yampu* represents the next chapter in that

story, combining world-first technology with a resilient local supply chain that supports jobs, manufacturing and economic growth.

The vessel's batteries are recharged while docked at Adbri's Birkenhead facility, allowing *Yampu* to operate on battery power around 40% of the time. Compared with the vessel it replaces, *Yampu* is expected to reduce diesel consumption by more than half a million litres a year, representing a significant step forward in maritime decarbonization.

With a capacity of 11,900 deadweight tonnes, the vessel is expected to transport 2.7 million tonnes of limestone each year. *Yampu* is designed to operate on 100% battery power in the future.

Louis Martel, CSL's Chief Executive Officer, said: "*Yampu* represents a significant step forward in our decarbonization journey and demonstrates

how practical innovation can deliver real environmental benefits while meeting the demands of commercial operations.

"Every improvement in cargo handling, every enhancement to onboard systems, and every operational innovation has been implemented with one goal in mind: helping our crews perform their work safely, efficiently and sustainably.

"Ultimately, this vessel showcases how smart design can improve performance."

Paul Headd, Adbri's Chief Executive Officer, said: "For the teams at Klein Point and Birkenhead, this is much more than a new vessel entering service. It's an investment in their future and the future of manufacturing in South Australia.

"Every day, the limestone carried by

For more details, see 'CSL delivers world's first battery-powered self-unloading bulk carrier to support Adbri Operations' in the June issue of Dry Cargo International. Ed.



Yampu will help produce the cement used to build homes, hospitals, schools, roads and major infrastructure projects across South Australia and Victoria. Being able to do that while further reducing emissions helps Adbri remains at the forefront of lower-carbon cement manufacturing in Australia.

"The *Yampu* strengthens our supply chain, supports local jobs and

demonstrates that reducing emissions and maintaining a strong Australian manufacturing sector can go hand in hand."

'YAMPU' BACKGROUND

The vessel's name, *Yampu*, was selected through an Adbri employee naming process and comes from the Narungga and Kurna languages of South Australia, meaning 'dolphin', reflecting a strong connection to

the marine environment and local communities.

Owned and operated by CSL and crewed by Australian seafarers, *Yampu* was purpose-built to service Adbri's coastal limestone trade, connecting Klein Point and Birkenhead as part of an integrated supply chain that supports cement manufacturing and construction materials production.

DCi



Inaugural discharge of limestone from Yampu.

Global Gateway: Adani Ports explores stake acquisition in the UK's Associated British Ports

In what could represent one of the most significant foreign infrastructure acquisitions by an Indian conglomerate, Adani Ports and Special Economic Zone Ltd. (APSEZ) is evaluating a potential bid to acquire a controlling stake in Associated British Ports (ABP).

If finalized, the transaction — estimated at nearly \$10 billion (£8–10 billion) — would grant APSEZ ownership in 21 port facilities across England, Scotland, and Wales. The deal would mark Gautam Adani's entry into the European maritime sector and expand his global network beyond existing hubs in Israel, Sri Lanka, Australia, and Tanzania.

DEAL STRUCTURE & SELLERS

The potential transaction centres around the divestment of a combined 63.9% controlling interest held by two major institutional investors:

- ❖ **Canada Pension Plan Investment Board (CPP Investments):** holds approximately 30% of equity.
- ❖ **Ontario Municipal Employees Retirement System (OMERS):** holds

approximately 33.9%.

The selling pension funds have engaged investment bankers to manage the process. Remaining equity in ABP is held by institutional backing including Singapore's sovereign wealth fund GIC (20%), Kuwait Investment Authority's Wren House Infrastructure (10%), and Hermes Infrastructure (6.12%).

STRATEGIC VALUE OF ASSOCIATED BRITISH PORTS

ABP is the largest port operator in the United Kingdom, handling roughly 25% of all national seaborne commerce. Its portfolio features several critical commercial assets:

- ❖ **Immingham Port:** the UK's largest port by overall cargo tonnage.
- ❖ **Port of Southampton:** the nation's leading export port, processing tens of billions in annual export value and serving as a hub for container trade, automotive logistics, and cruise shipping.
- ❖ **Clean energy supply chain:** over half of the UK's offshore wind farms

rely on ABP's coastal infrastructure for manufacturing, assembly, and ongoing maintenance.

- ❖ **Financial performance:** ABP generated £819.8 million in revenue with £586.5 million in operating profit (EBITDA of £473.7 million).

STRATEGIC IMPLICATIONS FOR APSEZ

The potential acquisition would meet strategic objectives, and offer added value:

- ❖ **Geographic diversification:** establishes a presence in Western Europe, balancing domestic Indian port operations with international trade routes.
- ❖ **Integrated supply chain:** connects UK maritime gateways with Adani's international logistics, bulk handling, & container distribution networks.
- ❖ **Energy transition synergy:** leverages ABP's offshore wind infrastructure to complement Adani's expanding global clean energy and green hydrogen ecosystem.



Port of Immingham.

Santos explores offshore topping off for Capesize bulk carriers

Santos Port Authority and the Port of Ningbo-Zhoushan, in China, currently the world's largest, have signed a memorandum of understanding to study offshore transshipment operations for soybeans. This would take place off the coast at Santos, Brazil, where smaller vessels would service ocean-going Capesize bulk carriers. The aim is to ensure that these 150,000-tonne vessels can sail with a full

load, taking on the bulk of their cargo at the Port of Santos, and then topping off offshore via transshipment. This would reduce logistics costs and boost overall loading efficiency.

This would represent a major increase in the size of vessel able to visit Santos. At present, those docking in the main port are more or less limited to 80,000 gross tonnes, limitations imposed both by the

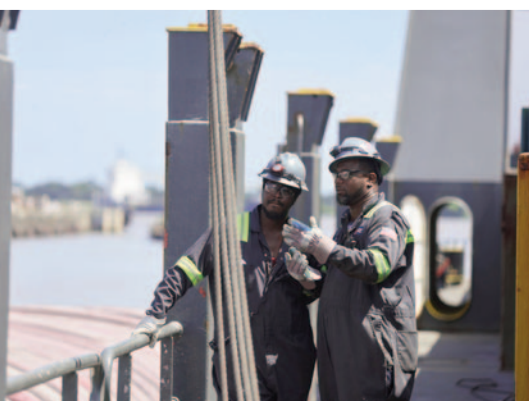
available draft and infrastructure in the access channel. The aim is to reduce the average freight cost per tonne, whilst producing faster turnaround times for smaller vessels using the port.

In 2025, Ningbo-Zhoushan handled more than 1.4 billion tonnes, making it the world's largest port in tonnage terms for the 17th consecutive year.

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Port of Hamburg: cargo throughput figures for the first half of 2026 at a glance

The Port of Hamburg looks back on a challenging first half of 2026. With a total throughput of 56.1mt (million tonnes), Germany's largest seaport recorded a 3.1% decline compared with the same period last year. Having largely offset the weather-related losses from January by the end of the first quarter, this result was characterized by the ongoing terminal modernization process and a decline in imports of petroleum products due to the war in Iran.

BULK CARGO THROUGHPUT VOLUMES BELOW PREVIOUS YEAR'S LEVEL DUE TO THE WAR IN IRAN

In the bulk cargo segment, cargo throughput totalled 15.9mt, around 1.1% below the figure for the same period last year. Whilst throughput of liquid bulk cargo fell significantly by 14.0%, that of dry bulk cargo grew by 4.2%. The pressure on global energy markets caused by the war in Iran has led to lower petroleum imports and a decline in biodiesel throughput since April.

This has been countered by significant growth in ore imports and grain exports.

CONTAINER THROUGHPUT AT 4.0 MILLION TEU IN THE FIRST HALF OF 2026

In the first two quarters of 2026, a total of 4.0 million TEU (twenty-foot equivalent units) were handled at the Port of Hamburg. In the same period last year, volumes were 3.8% higher in TEU and 4.0% higher in tonnes. Ongoing modernization measures by HHLA, which will enable more efficient handling in future, had led to reduced terminal capacity in the past quarter.

Trade increased with Singapore (+13.1%), Finland (+24.7%), India (+7.2%) and Morocco (+4.7%). Overall, however, the market environment remains challenging. The decline in cargo handling with the United States is particularly marked (-13.5%), but negative trends in container handling were also recorded with China and the UK in the first half of 2026.

ABOUT THE HAMBURG PORT AUTHORITY

Since 2005, the Hamburg Port Authority (HPA) has been providing forward-looking, one-stop port management and is active in all areas relating to efficiency, safety and cost-effectiveness in the Port of Hamburg. The HPA meets the port's growing demands with intelligent and innovative solutions.

The HPA is responsible for the efficient, resource-conserving and sustainable planning and implementation of infrastructure projects in the port and acts as the point of contact for all matters relating to water- and land-side infrastructure, the safety and smooth flow of shipping traffic, port railway facilities, property management and economic conditions within the port. To this end, the HPA provides the necessary land and undertakes all public authority tasks and port-related services. It markets specialist, port-specific expertise and represents Hamburg's port interests at national and international level.



Grain silos at the Port of Hamburg (photo: Hamburg Hafen Marketing).

West Coast ACCESS



Port of Stockton
CALIFORNIA

Port of Rotterdam



Rotterdam's Maasvlakte (photo: Martens Multimedia).

Throughput in the port of Rotterdam rose by 0.4% in the first half of the year:

- ❖ Total throughput increased by 0.4% in the first half of 2026.
- ❖ Throughput of oil and oil products rose by 4.7% as a result of the closure of the Strait of Hormuz.
- ❖ Operating result for the Port of Rotterdam Authority stable.
- ❖ The energy transition is taking shape in the port.
- ❖ The Port of Rotterdam Authority is investing in resilience and safety.

Total throughput at the port of Rotterdam rose by 0.4% in the first half of 2026 compared to the same period last year. This brought total throughput to 212mt (million tonnes).

The dry bulk segment rose by 1.7%. The throughput of liquid bulk also increased by 2.4%. There was a dip in throughput in the container and breakbulk segments. Container throughput fell by 0.1% TEU (Twenty-foot Equivalent Unit) or 2.6% tonnes. Breakbulk fell by 1.1%. The previous six months were defined by much uncertainty.

Although the port of Rotterdam continued to operate resiliently due to its

scale, infrastructure and diversity of freight flows, the developments demonstrated the importance of investments in energy security, sustainable alternatives and the flexibility of supply chains. Financially, the first half of the year was stable with a net result of €144.8 million. The Port of Rotterdam Authority's investments totalled €126.0 million in the first six months.

Says Boudewijn Siemons, CEO of the Port of Rotterdam Authority: "The war in the Persian Gulf has drastic humanitarian consequences for people in the region. In addition, the closure of the Strait of Hormuz makes it clear how closely connected global trade and energy flows are. Although direct impact on the operations and throughput in the port of Rotterdam has so far been limited, the higher energy prices and increasing uncertainty has rocked the international market. The events highlight the importance of robust supply chains and a strong European energy infrastructure. The port of Rotterdam has proved itself to be resilient and reliable in the face of challenging circumstances. That's not only crucial for the position of the port but also

for the resilience of the Netherlands and Europe."

MAKING PORTS AND INDUSTRY MORE SUSTAINABLE

In co-operation with the Municipality of Rotterdam, the Port of Rotterdam Authority has taken a new step towards making the port and city more sustainable. In addition to the realization of a shore power installation for cruise ships at Parkade in the city can now also connect to shore power. This results in cleaner air, lower carbon emissions and reduced noise pollution for the neighbourhood.

Another milestone was achieved with the completion of the first part of the national hydrogen network, which was symbolically activated by His Majesty the King in Rotterdam. Via the 32km-long pipeline between the Maasvlakte and Pernis, hydrogen can be transported from hydrogen plants on the Maasvlakte to industry customers. In the coming years, the network will be expanded to other industrial regions and connected to storage sites and hydrogen networks in Germany and Belgium.

In May, the port of Rotterdam achieved a milestone in its alternative fuel bunkering ambitions with the first ethanol bunkering of a seagoing vessel. The successful use of an ethanol-methanol fuel mix demonstrates the potential for alternatives fuels to increase the sustainability of shipping and strengthens Rotterdam's position as a leading bunkering port for renewable fuels.

CITY AND PORT

The Port of Rotterdam Authority is encouraged by the new Rotterdam coalition agreement, presented on 26 June 2026 by PRO, D66, VVD, CDA and Volt. The agreement is well-aligned with its own ambition to achieve a competitive, resilient, circular and climate-neutral port by 2050. In order to stimulate the necessary private investments, key bottlenecks must be resolved, which include nitrogen restrictions and grid congestion. The Port of Rotterdam Authority looks forward to working closely with the new municipal executive to implement the agreement.

To further strengthen the relationship between the port and its surroundings and to foster more mutual understanding, transparency and engagement, the Port of

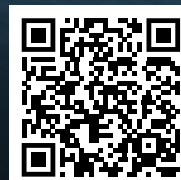
THROUGHPUT PORT OF ROTTERDAM			
	2026 January-June	2025 January-June	difference in %
INCOMING			
Iron ore and scrap	10.4	11.3	-8.1
Coal	9.1	7.5	21.3
Agribulk	4.3	4.9	-12.6
Other dry bulk	5.0	4.2	19.5
Subtotal dry bulk	28.8	27.9	3.2
Subtotal liquid bulk	78.1	78.8	-0.9
Containers	36.8	37.0	-0.6
Total breakbulk	6.9	7.0	-1.8
TOTAL THROUGHPUT	150.6	150.7	-0.1
OUTGOING			
Iron ore and scrap	1.6	1.8	-9.7
Coal	0.2	0.4	-53.7
Agribulk	0.6	0.8	-23.9
Other dry bulk	1.6	1.4	15.6
Subtotal dry bulk	4.1	4.4	-7.8
Subtotal liquid bulk	20.3	17.4	17.0
Containers	28.0	29.5	-5.0
Total breakbulk	9.0	9.1	-0.5
TOTAL THROUGHPUT	61.4	60.3	1.8

Unit: Gross weight in million metric tonnes
Source: Port of Rotterdam

SEA OF SOLUTIONS SINCE 1951

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Rotterdam Authority is intensifying its dialogues with residents living in the port area. On 1 June, the Port of Rotterdam Authority and Deltalinqs kicked off the initiative De Havendialoog (The Port Dialogue). Towns, villages and neighbourhoods in and around the port face major challenges related to housing, accessibility and the environment. De Havendialoog offers residents and companies the opportunity to openly discuss these topics. The meetings are held every six months, in collaboration with municipalities, DCMR, Safety Region Rotterdam-Rijnmond and companies in the port. The first series took place in June and July 2026 at various locations around the port of Rotterdam and attracted considerable interest from local residents.

SAFETY AND RESILIENCE

In the port of Rotterdam, companies, emergency services and governments are making increasing use of drones for tasks such as inspections, security, measurements, environmental monitoring, supervision and incident management. Drones are therefore becoming a more essential part of the daily operations of the port. This development calls for a safe and well-organized low air space. To realize this, in late June, the Port of Rotterdam Authority submitted a request to the Ministry of Infrastructure and Water Management to designate a Pre-U space over the port area. The Pre-U-space is a preparatory phase towards a fully-fledged U-space and focuses on the registration, access policy and authorization of drone flights. This marks the start of a formal process to achieve a better regulated low airspace.

Ferm Zeehavens, the cybersecurity platform for Dutch seaports of national importance, has taken a significant step towards strengthening the digital resilience

of the Port of Rotterdam. In collaboration with a Dutch start-up, Ferm has developed an innovative digital 'cyber shield' that continuously monitors systems accessible via the internet and identifies vulnerabilities at an early stage. More than 15 critical organizations and thousands of systems are now being actively monitored for known and new vulnerabilities. This development comes at a crucial time. On 7 July, the Senate approved the Cybersecurity Act (Cbw) and the Critical Entities Resilience Act (Wwke), with which the Netherlands is implementing the EU NIS2 and CER Directives. From 15 August 2026, hundreds of companies in the port will be subject to new cybersecurity obligations, including registration, a duty of care and the reporting of significant cyber incidents. This further highlights the importance of collective digital resilience. Recently, a secure environment was set up where member organizations can proactively share incident and threat information with the Ferm Zeehavens network.

INVESTMENTS AND FINANCIALS

The Port of Rotterdam Authority has had a stable financial half-year. The Port Authority's revenues rose by 3.2% to €477.0 million. Both contract revenues and port dues have risen, mainly as a result of indexation.

Operating expenses increased by €10.9 million to €178.2 million. In this case, this is also primarily related to price increases of contracts due to pre-agreed indexation and pay rises as a result of the CBA change in 2025. In addition, there is a one-time restructuring expense.

Earnings before interest, taxes, depreciation, and amortization (EBITDA) increased by 1.3% to €298.8 million. This amount is the yardstick for the Port Authority's capacity to continue investing in

the development of the port industrial complex through its own balance sheet.

Net income rose by 0.9% and €1.2 million to €144.8 million.

The Port Authority invested €126.0 million in the first half of 2026. That is 7% less than in the same period last year. This is mainly because more capital was injected into Porthos in 2025 than in 2026.

THROUGHPUT

DRY BULK

The throughput of dry bulk rose by 1.7% in the first half of 2026. The throughput of iron ore and scrap decreased by 8.3%. Iron ore throughput fell by 9.6% in the first half of 2026 compared to the previous year. Although German steel production increased, this did not lead to higher throughput volumes, as steel producers drew on their existing stocks. Scrap throughput rose by 6.1% in the first half of 2026, mainly due to growth in electric steel production in key markets outside the EU. Egypt, in particular, was an important export market.

Coal throughput increased by 17.8% in the first half of 2026. The increase is mainly attributable to a recovery in the throughput of coking coal from the exceptionally low level recorded in 2025. In addition, thermal coal throughput was higher than the previous year, partially due to the relatively high gas prices caused by geopolitical tensions in the Middle East.

In the first half of 2026, agribulk throughput was 14.2% lower than a year earlier, totalling approximately 4.9mt. This decline follows an exceptionally strong 2025 and reflects, among other things, reduced import demand due to the greater availability of agribulk in Europe.

The throughput of other dry bulk increased by 18.5% in the first six months. This growth was largely due to the recovery of construction sector activities in the Netherlands. This led to a higher demand for raw materials for construction projects. In addition, stockpiling and shifts in trade flows resulted in additional volumes.

LIQUID BULK

In terms of overall volume, liquid bulk throughput grew 2.4% in the first six months.

Crude oil & products: throughput rose 1.6% for crude oil and 11.5% for oil products (reaching 25mt).

The Strait of Hormuz closure inflated prices and refinery margins, prompting European refineries to process more crude to offset reduced imports (-9%).



*Kop van de Beer Buildingsite
(photo: ©Danny Cornelissen).*



*Aerial view of the port of Rotterdam
(photo: Danny Cornelissen).*

Exports jumped 36%, driven by fuel oil sent to Singapore and gas oil to Gibraltar and Spain to satisfy new Mediterranean Emission Control Area (ECA) low-sulphur marine fuel regulations.

LNG throughput increased 1.7% to 6.4mt, and other liquid bulk decreased by 5.9% due to a steep drop in chemical product throughput.

The European chemical sector continues to face reduced output, high energy costs, weak demand, and strong global competition.

CONTAINERS AND BREAKBULK

Overall throughput was flat in TEUs (-0.1%), but tonnage fell 2.6% to 98.5mt.

Regional growth: deepsea TEUs rose 5.2% due to an 8% surge in Asian imports, though a 1% drop in full exports widened the trade imbalance. North American throughput jumped 13% on expanded services.

The impact of the Strait of Hormuz was minimal on Rotterdam, despite representing 1% of total volume, Persian Gulf trade was quickly rerouted through non-Gulf ports.

Shortages at Rotterdam terminals drove a 20% drop in transshipment volume, stalling first-half growth.

New terminal capacity expanding late this year is set to reactivate sector growth.

RoRo cargo throughput grew 1% to 13mt, driven by rising demand for goods in the UK.

Other breakbulk dropped 9.5% due to European manufacturing stagnation (notably in machinery and automotive) and reduced aluminium volumes. Stricter sanctions on Russian cargo also weighed on throughput.

The Port of Rotterdam Authority stressed the need for a proactive strategy to address growing bottlenecks in the investment climate.

In order to boost the investment climate in the Port of Rotterdam, a number of major bottlenecks — such as nitrogen-related issues, grid congestion, high energy costs compared with neighbouring countries and the state of Dutch infrastructure — must be resolved and addressed.

PORT OF ROTTERDAM WELCOMES GOVERNMENT NITROGEN PACKAGE, WARNS AGAINST INFRASTRUCTURE BUDGET CUTS

The Port of Rotterdam Authority is encouraged by the package of nitrogen reduction measures recently presented by the government. The package combines nitrogen reduction and nature restoration with measures designed to make it possible to grant permits again. This offers prospects to the various sectors affected such as industry, the energy sector, logistics and the construction sector. One positive aspect is that the government explicitly sets out an area-specific approach for the Port of Rotterdam. Together with the State, the

Municipality of Rotterdam and Deltalinqs, the Port of Rotterdam Authority is already working on a regional approach that should accelerate permit granting for energy and sustainability projects, in particular. It is important that there is swift political decision-making and decisive implementation, so that the necessary investments can actually get off the ground.

The condition of the Netherlands' roads, railways and waterways is a cause for concern for the Port of Rotterdam Authority. Well-functioning infrastructure forms the basis for the logistics sector and, consequently, for safeguarding the Dutch economy's earning capacity. This was recently confirmed by the government. The planned reprioritization of the budget for infrastructure and the necessary maintenance and replacement of infrastructure will affect the road, waterway and rail networks that are essential to the Port of Rotterdam. Meanwhile, the Port of Rotterdam Authority is working with the Ministry of Infrastructure and Water Management on multimodal accessibility and future investments that will support the port's long-term competitiveness, resilience and accessibility. The Port Authority is keen to continue discussions with the government on an area-specific approach to safeguard the long-term accessibility of the port of Rotterdam and the main hinterland corridors.

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Scan to select your plan

Quality control

The sampling, inspection and analysis of dry bulk

Jay Venter

Eriez Heavy-Duty Feeders are ideal for high-volume, rugged environments

By Clay O'Dana Global product manager – Vibratory, Eriez

Eriez offers three styles of heavy-duty vibratory feeders designed specifically for high-volume, rugged environments. Whether customers are presenting conveyed material to separation equipment or need to accurately feed tonnes of rock under a high headload, Eriez has a feeder solution to match the application. The company's heavy-duty feeders can be found in harsh environments like mining operations, rock quarries, steel mills, glass plants, aggregate and cement plants, slag mills, mineral processing facilities, as well as general high-volume bulk material handling applications needing precise metering of materials."

Eriez Heavy-Duty Vibratory Feeders are capable of accurately moving up to 1,814.3 (metric) tonnes per hour (sand). Selecting the correct vibratory feeder is based on several factors, including the type of material to be handled, operating environment, head load demands, base mount or suspension configuration, and desired throughput or feed rate.

Eriez High Volume Mechanical Feeders are rugged, vibrating machines that move high volumes of bulk materials reliably and economically. The feeder is a two-mass vibrating system, spring-coupled, excited by

a motor-driven eccentric shaft. Adjustable angle rubber springs transmit the exciting force, which can 'fine-tune' the motion of the trough to optimize the feed rate for a specific application.

The remarkably compact design creates an extremely low profile for minimum

headroom for installation.

Eriez Heavy-Duty Electromagnetic Vibratory Feeders are designed for high-volume, controlled feeding applications like coal, ore, aggregates, slag, and others. These feeders feature ERIEZ's energy-saving intermeshed AC-operated



electromagnet drives. Powerful, accurate, and highly efficient, this line of vibratory feeders is available in models with capacities to 594 tonnes per hour*. (*Capacity is based on sand weighing 1.6 metric tonnes per cubic metre.)

The Brute Force Vibratory Feeder is ideal to evenly spread conveyed materials for presentation to any sort of processing equipment. These feeders use twin eccentric motors mounted to the rear of the pan or tray to create a powerful vibratory motion. The pan or tray is spring mounted to a heavy structural steel frame. All components' motors and springs are readily accessible for service or replacement. These feeders are available in a range of sizes to suit specific applications. For severe environments, pan liners are available to increase durability and longevity.



RC Inspection awarded Shivee Ovoo Coal Mine tender

RC Inspection announced on 11 May this year that it has been awarded the major strategic tender of operating the Shivee Ovoo coal mine in Mongolia.

This achievement underscores the trust placed in RC Inspection and reaffirms the strength of its capabilities, values and collective ambition. Beyond its immediate commercial significance, this tender opens the door to expanded global reach, accelerated innovation and sustainable growth across new markets.

"This moment represents far more than a contract win," says the company, "It reflects who we are and where we are going. Winning this tender validates our vision, our standards and the passion of our people. It gives us the opportunity to shape the future, expand our global impact, and build enduring value for the communities, partners and clients we serve."

ABOUT THE SHIVEE OVOO MINE

Shivee-Ovoo mine is an operating surface coal mine in Gobi Soum, Gobisumber Aimag, 260km south east of Ulaanbaatar, Mongolia.

There is a large brown coal basin (Jurassic origin), which contains the Baganuur, Ovdogkhudag, Aduunchuluu, Tuvshiingovi, Khoot and Shivee-Ovoo deposits and this is located in the central economic region of Mongolia. The Shivee-Ovoo deposit contains lignite and contains eight coal seams. The deposit has a proven reserve estimated at 2.7 billion tonnes and



Following the recent success of obtaining the Shivee Ovoo coal mine tender, RC Inspection's CEO, Ben Bender, visited the teams at various operational sites and laboratories in Mongolia. With the focus to discuss opportunities and further developments, locally and internationally.

covers an area of 29,500 hectares.

According to the Mongolian National Mining Association (NMA) the mine provides 30% of domestic coal demand and 40% of coal demand of energy production for central region. The construction of the Shivee-Ovoo power station would require approximately 20 million tonnes of coal per year, necessitating a massive expansion of the existing mine.

RC INSPECTION ASIA ASSAYERS

In 2013, RC Inspection Group established "RC Inspection Asia Assayers" LLC in Mongolia with fully equipped modern mineral and metal laboratory as well as coal and coal products laboratory with sample preparation facilities.

The activities of "RC Inspection Asia Assays" LLC have been constantly expanding in recent years, and with the increase in the requirement for external

inspection services and advances in research in mining products in the market.

DEVELOPMENTS

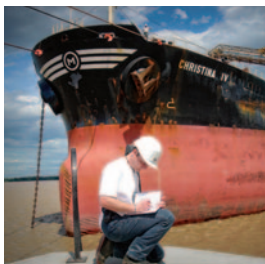
To-date, RC Inspection Group has 4 branches in Mongolia, namely: Testing Laboratory and Technical Inspection Office (in Ulaanbaatar and Erdenet cities), the Onsite Laboratory at Oyutolgoi Copper and Gold Mine and the Technical Inspection Office in Orkhon province which provides external inspection services to Erdenet Mining Corporation.

The organizations are accredited by ISO/IEC 27025:2017 and ISO/IEC 17020:2012 since 2015 and have continuously cooperated with Mongolia's leading companies in the mining sector, Erdenet SOE and Oyu Tolgoi JSC and many other organizations. Recognizing and trusting the results of the offered services and expertise.



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The technical Inspection offices located in Erdenet and Ulaanbaatar city are responsible for taking samples from export products of the Erdenet factory and border customs loading area, preparing them

according to relevant standards and having them tested in Ulaanbaatar.

Additionally, the organization oversees the weight determination of the products being shipped and determines the moisture

content and issues the Export Shipment Certificate. This preliminary work is essential, as the correct sample preparation has an influence on the results of laboratory tests.

Crover introduces in-app Grain Moisture Sensor Calibration to strengthen storage accuracy

Earlier this year Crover released a new Grain Moisture Sensor Calibration flow within its Local Control App, giving operators direct control over how the robot measures moisture across different grain types.

Moisture accuracy remains one of the most critical variables in grain storage. Even small deviations can affect drying decisions, spoilage risk, and overall grain quality. While CROVER robots already provide continuous internal monitoring, field feedback made one thing clear: Users want greater control and transparency in how readings are verified, and to be able to calibrate sensors easily as and when needed. This release delivers exactly that.

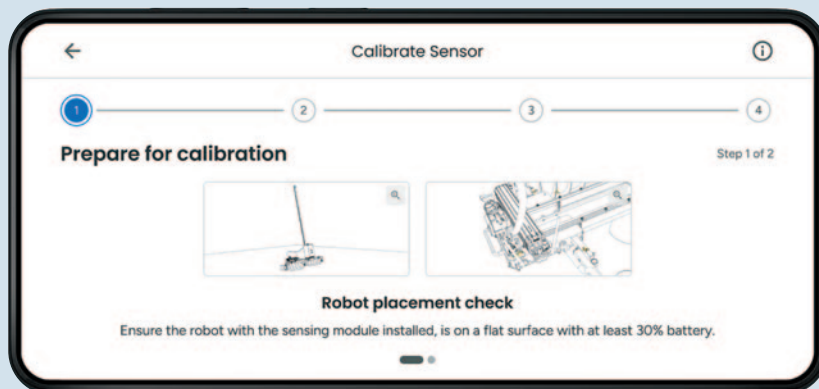
HOW THE IDEA CAME TO LIFE

In real storage facilities, no two harvests are identical. Moisture can vary between wheat varieties, barley batches, and seasonal conditions. Operators often cross-check readings with handheld moisture meters to confirm accuracy before making operational decisions.

Through conversation with farmers, storage managers, and technicians, one common request kept repeating:

“Implement a way to validate a fine-tune the calibration process, without needing external support.”

The result is a guided calibration workflow embedded directly into the CROVER robot's Local Control App.



Instead of relying solely on factory settings, users can now calibrate the robot against a known grain sample, ensuring readings align with their operational standards.

Instead of relying solely on factory settings, users can now calibrate the robot against a known grain sample, ensuring readings align with their operational standards.

WHAT THE NEW CALIBRATION FLOW ENABLES

The new feature provides:

- ❖ **Grain-Specific Calibration:** Users can select a grain type and store a dedicated calibration offset. This ensures tailored accuracy when switching between wheat, barley, or other grains;
- ❖ **Step-by-Step guided workflow;**
- ❖ **Real-Time Transparency:** Live sensor data is displayed during calibration, allowing operators to see exactly how readings respond before saving;

- ❖ **Data Integrity Protection:** Calibration updates do not overwrite historical survey data. Previous monitoring results remain unchanged.

DESIGNED FOR REAL-WORLD OPERATIONS

The calibration flow supports several practical scenarios:

- ❖ Pre-season setup before new harvest storage;
- ❖ Switching between grain types;
- ❖ Routine maintenance checks; and
- ❖ Technician-led sensor validation.

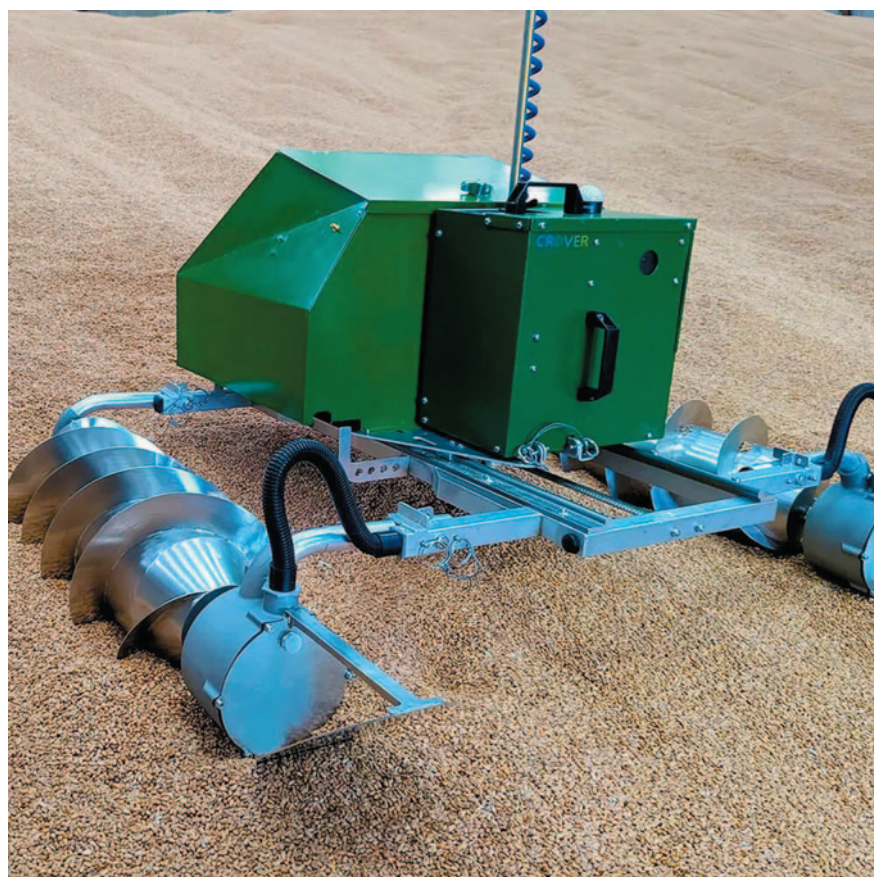
By integrating calibration directly into the app, CROVER aligns its system with the expectations users already have from certified grain moisture meters, while preserving the advantages of autonomous robotic monitoring.

STRENGTHENING TRUST IN AUTONOMOUS MONITORING

Autonomous grain monitoring must be both intelligent and dependable. By giving users visibility and control over calibration, CROVER reinforces confidence in every moisture reading collected inside the grain bulk. This update represents another step toward making robotic grain storage monitoring not only innovative, but professionally reliable.



CROVER: robotic monitoring and sampling inside the bulk



Crover provides the only robot in the world that reaches below the surface of stored grain and other bulk solids and powders, taking measurements and samples at depth without anyone entering the store.

Stored grain is difficult to monitor and sample accurately. In a flat store, cargo or warehouse, fixed temperature cables read only the few points they touch, and taking physical samples usually means a worker walking on the grain, with the risk of entrapment. Crover has built a robot that does the job safely, more accurately, and reaching more points than ever before.

The company was founded in 2018 by Dr Lorenzo Conti, who worked out the underlying physical method during a PhD in granular physics. He found a way for a device to propel itself through granular materials, the Crover Effect, and built a family of robots around it.

HOW IT WORKS

What sets the CROVER robot apart is that it works below the surface. It moves through the stored bulk and takes measurements and physical samples at depth, around two metres deep in the standard configuration. A reading taken at the surface tells you little about what is happening inside the bulk, where hotspots and infestations usually start. As it moves

through the grain the robot logs temperature, moisture and CO₂, and a built-in LiDAR scanner maps the surface and the volume of the store in three dimensions. The operator controls the robot remotely, and the readings come back through Crover's SavingGrains web app, so multiple stores and sites can be watched and managed from one app.

Walking on grain bulks to inspect them or take samples carries the risk of entrapment or engulfment, and remains one of the most hazardous jobs in grain handling. With the CROVER robot doing the work, no one has to step onto the grain at all.

THE ROBOTS

The main robot in the range is the CROVER Main Platform. It carries two interchangeable modules: a Sensing Module that measures temperature, moisture and CO₂, and a Sampling Module that collects physical samples at depth. A separate smaller, pocket-sized unit, the CROVERMini, handles lab-scale bulks. The robots are CE and UKCA marked and receive software updates over the air; the AutoCROVER software upgrade, due for release in the coming months, will add full autonomy.

What the system does, in short:

- ❖ reaches below the surface to measure

and sample at depth, around 2m, without anyone walking on the grain;

- ❖ measures temperature, moisture and CO₂, and builds a 3D map of the store;
- ❖ is operated remotely today, with full autonomy coming via the AutoCROVER software upgrade;
- ❖ is CE and UKCA marked; and
- ❖ Works in grain, minerals and in other bulk solids and powders.

BEYOND GRAIN

The CROVER robot works in most dry bulks, not only grain.

Crover customers have used it on minerals, including high-value copper concentrate, and it suits oilseeds, pellets, sand and chemical powders as well.

WHERE IT IS USED

CROVER robots are in service with operators across the UK, Europe, North America and Latin America, from farms and cooperatives to traders and port terminals. The company has a collaboration with Peterson Control Union, the inspection, testing and certification group that works in more than 80 countries, to bring the robot into inspection operations. Crover won a \$500,000 award from Grow-NY and GENIUS NY, and is growing its US operations from Syracuse, NY.

ABOUT CROVER

Crover is the company pioneering robots that move through bulk solids and powders to monitor and sample them. Its patented grain-swimming technology measures temperature, moisture and CO₂ in real time and helps ports, traders, cooperatives and farmers cut losses, improve safety and keep stored material in good condition. Crover runs its US operations from Syracuse, New York, with further offices internationally.

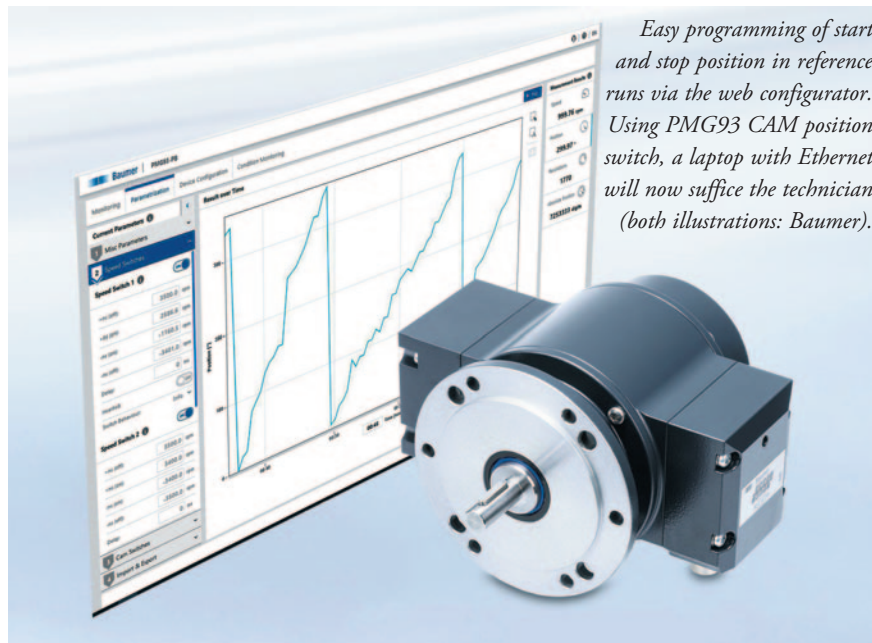


Smart HeavyDuty digital cam switch: easy programming — one for all

The Baumer brand 'Hübner Berlin' is known for its legendary robust encoders and tachogenerators. Baumer is now expanding its HeavyDuty portfolio to include a digital cam switch allowing outstanding user-friendly setup in applications ranging from gantry and process cranes to deck machinery. New, smart PMG93 CAM simplifies programming and operation of hoists and winches in two ways.

- ❖ **Benefit 1:** quick and easy parameterization via web interface. No software is required.
- ❖ **Benefit 2:** thanks to flexible parameterization a single variant of the digital cam switch is sufficient.

PMG93 CAM is available with different installation kits. Thanks to universal parameterization and with the matching kit, a single variant meets different mechanical requirements of hoist and winch. This allows for lean warehousing onboard, in port facilities and on oil rigs as well as in the metal, steel and bulk goods industries. As a digital position switch, PMG93 CAM does not include any mechanical components and hence withstands external impacts such as shocks and vibrations. The new and easy-to-integrate digital limit switch by Hübner Berlin is also the ideal future-oriented retrofit to replace



Easy programming of start and stop position in reference runs via the web configurator. Using PMG93 CAM position switch, a laptop with Ethernet will now suffice the technician (both illustrations: Baumer).

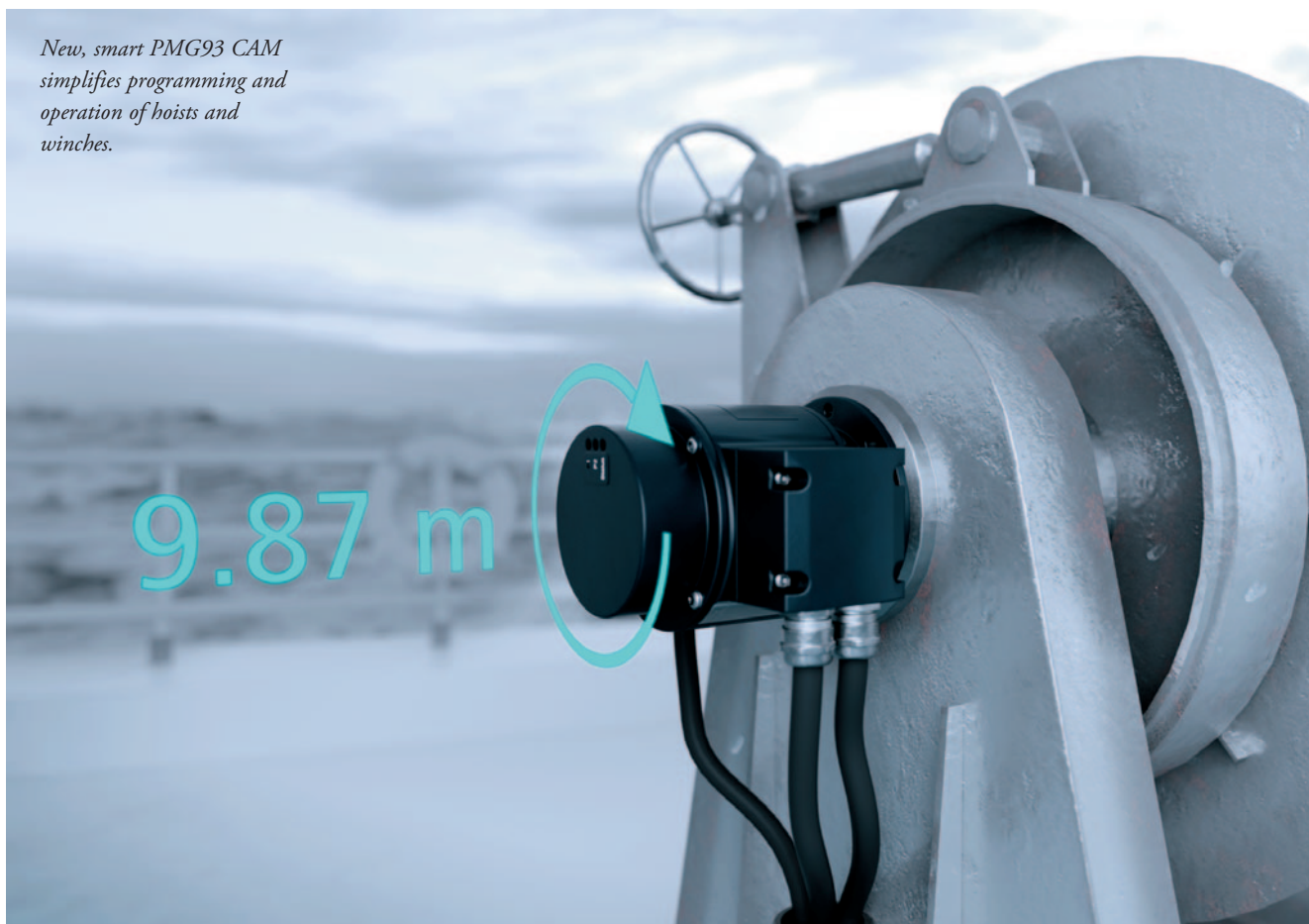
mechanical variants. Extremely easy to handle, robust PMG93 by "Hübner Berlin" sets standards in the demanding segment of HeavyDuty applications.

ABOUT BAUMER GROUP

The Baumer Group is one of the world's foremost experts for high performing sensors and sensor systems in industrial automation. The superb broad product portfolio, measuring precision and smart

sensor functionalities provide intelligent solutions for digitalized production. With around 2,800 employees and 39 development centres, production sites and sales units in 19 countries, the Swiss family-owned Group is always close to the customers. As an innovation expert for more than 70 years, Baumer has been creating decisive market advantages and measurable added value with consistently high quality standards.

New, smart PMG93 CAM simplifies programming and operation of hoists and winches.



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Vollert's shunting solutions find



VOLLERT DELIVERS FIRST SHUNTING ROBOT FOR PULP LOGISTICS IN SOUTH AMERICA

At the new Inocência logistics site of Suzano, the world's largest pulp producer, a PRO DER 100 shunting robot ensures a flexible and uninterrupted process for loading pulp onto railcars. It is Vollert's first shunting robot in South America outside the Port of Santos and precisely moves groups of railcars with a trailing load of up to 1,200 metric tonnes through the loading area.

With the successful project acceptance of the PRO DER 100 shunting robot at the Brazilian site in Inocência, in the state of Mato Grosso do Sul, Vollert has achieved another milestone in the international expansion of its shunting technology. Following its deployment at the Port of Santos, this is the company's first shunting robot in South America outside of Brazil's largest seaport.

The customer is Suzano, the world's largest pulp producer. The company produces the raw material for paper, cardboard, and numerous hygiene and medical products. To this end, it manages large-scale eucalyptus plantations and subsequently processes the wood into pulp in modern production facilities. After production, the packaged pulp is transported by truck to a logistics center, where it is transferred to rail.

FLEXIBLE SHUNTING SUPPORT FOR A SMOOTH FLOW OF MATERIALS

It is precisely at this interface that the PRO DER 100 shunting robot plays a central role. Block trains consisting of up to 71 freight cars enter a specially constructed turning loop. Loading then takes place sequentially in a warehouse using forklifts. To ensure an uninterrupted loading process, the shunting robot handles minor shunting tasks, such as when individual cars need to be replaced or repositioned due to maintenance work. This prevents delays in the logistics process, allowing loading to continue without prolonged downtime. If necessary, the PRO DER 100 also handles the entire loading process. It precisely moves groups of cars — each consisting of up to ten freight cars and with a maximum towing capacity of 1,200 metric tonnes through the loading area.

The PRO DER 100 is powered by a high-performance diesel-electric drive system that delivers 100kN of tractive force to the rails. A 15kW compressed air compressor is installed to supply the braking system. Due to the vehicle's compact design, two compressed-air reservoirs, each with a capacity of 350 litres, are mounted on the vehicle roof and are automatically drained several times per minute during operation. The shunting couplers can be opened

pneumatically, while the compressed-air lines are automatically disconnected during uncoupling. A significant safety advantage is that no shunting personnel need to enter the track area. In addition, a 1,000-litre diesel tank enables 24/7 operation for several days without refueling and ensures high availability during continuous loading operations.

RELIABLE TECHNOLOGY UNDER DEMANDING CONDITIONS

On-site temperatures of up to 40°C combined with humidity levels exceeding 85% placed significant demands on both personnel and equipment. For this reason, the shunting robot was specifically designed for use in tropical conditions. The fully insulated operator's cab is accessible from both sides of the vehicle, so operators do not have to cross the tracks, thereby enhancing workplace safety. Two air conditioning units, each with a capacity of 5kW, combined with UV-protective films on the windows, ensure comfortable working conditions even in intense sunlight.

Additional safety features include a backup camera and a long-range radio remote control system, which also allows for operation with a full crew. To account for the unique weather conditions in Brazil's interior, the PRO DER 100 was also equipped with an electrical surge protector that safeguards the vehicle's electronics during the thunderstorms that frequently occur in the region.

EXPANDING INTERNATIONAL SHUNTING EXPERTISE

With the successful completion of the project, Vollert is strengthening its position as an international provider of intelligent shunting and loading solutions. The project was managed primarily by the team at



favour in bulk operations



Vollert do Brasil, which carried out project implementation and commissioning in collaboration with German specialists.

“The requirements at the Inocência site were exceptional in many respects — from the climatic conditions to the high demands on availability and operational reliability. Together with our team at Vollert do Brasil, we were able to optimally design the system for the local conditions and successfully commission it. This project is an important reference for us for future industrial and logistics projects in South America,” says Wesley Gomes, CEO of Vollert Latinoamérica. With this successful implementation at the world’s largest pulp manufacturer, Vollert once again underscores its expertise in delivering customized shunting solutions for demanding industrial applications — from planning and commissioning to reliable operation.

VOLLERT IMPLEMENTS ZERO-EMISSION SHUNTING TECHNOLOGY FOR BERGER ROHSTOFFE

In March 2026, Vollert Heavy Duty Solutions delivered a completely emission-free PRO TANDEM BR200 shunting robot to Berger Rohstoffe GmbH at its Altenau site near Mühlberg/Elbe. With this new, cutting-edge loading system, Berger is consistently focusing on sustainable and efficient logistics processes in industrial raw material extraction.

Berger Rohstoffe is developing a new gravel and sand mining area in Altenau designed for long-term use. The goal is to extract, process, and transport up to 1.2 million tonnes of material annually by rail. Under the guiding principle of ‘100% from the quarry lake to the rail’, a modern infrastructure was created that optimally integrates conveying technology, processing, and rail loading.

Extraction is carried out using the wet method: a dredger extracts the gravel from a quarry pond up to 50 metres deep. The material is then processed via screening plants and conveyor belts, temporarily stored in stockpiles, and finally transported for rail loading. This is where Vollert’s innovative shunting technology comes into play.

FROM THE QUARRY LAKE TO THE RAILS

With the BR200, Vollert is delivering the most powerful battery-powered shunting robot in the company’s history to date. The vehicle moves train loads of up to 4,300 tonnes and handles gradients of up to 2.5 per mille. Even under these demanding conditions, the robot reaches a speed of up to 5km/h when fully loaded. A particular advantage of the solution lies in its fully electric, emission-free drive technology. As a result, the shunting robot makes a significant contribution to reducing CO₂ emissions and supports Berger Rohstoffe in implementing sustainable operational processes.

The system also sets new standards in terms of ease of operation: trains up to 600 metres long can be controlled centrally from the operator’s console using a stationary radio remote control. While the conveyor belt feeds the gravel into the

railcars at a rate of up to 1,200tph the operator can flexibly and precisely adjust the train’s speed and position. This completely eliminates the need for conventional radio communication between the loading area and the external locomotive engineer, which significantly simplifies and accelerates operations. “With our PRO TANDEM BR200 shunting robot, we demonstrate how efficiency and sustainability can be successfully combined in industrial logistics,” explains Christian Langner, Sales Project Manager at Vollert. “Especially in demanding applications such as bulk material loading, high-performance and emission-free solutions are a decisive competitive advantage.”

PRODUCTION AND LOGISTICS GOALS ACHIEVED

Feedback from operators on site was consistently positive. In particular, the system’s performance, ease of control, and reliability were highlighted. With the transition to full operation, Berger Rohstoffe considers itself well-equipped to efficiently achieve its production and logistics goals.

With the successful project in Altenau, Vollert once again underscores its role as a pioneer and trailblazer for sustainable, high-performance logistics solutions in industry.



WEILONG: engineering the heavy-duty systems that keep global trade moving

WEILONG supplied 14 Cable Reels for Gemma – Adani Vizhinjam, India.



Bulk handling cable reel: tailored solutions for small-batch production, special crane configurations (such as shiploader, ship-unloader, stacker reclaimer, etc.) and unique operating environments. Enhanced protection and optimized sealing and coating against dust, moisture and chemical corrosion.

NINGBO WEILONG PORT MACHINERY (WLG) is a manufacturer that designs and delivers transmission and electrification solutions to enable the development of port machinery and industrial applications. The company started in 1988, and its 35 years of experience ensure safe, efficient, and sustainable operations for a wide variety of clients worldwide.

WEILONG's products are seamlessly integrated into heavy port equipment and machinery.

Bulk operations demand power and endurance. WEILONG has supplied dozens of heavy-duty cable reel systems for ship-unloaders, loaders, bucket wheel reclaimers, and stackers — all engineered for extra-long travel, large power cables, and continuous duty in abrasive, high-load conditions.

WEILONG'S CAPABILITIES

From busbars to Smart Twistlock Stations, the company's solutions make ports safer, faster, and more sustainable.

Why terminals choose WEILONG:

- ❖ **Proven in intensity:** built for 24/7 operations at the world's most demanding terminals;
- ❖ **35 years of expertise:** since 1988, advancing port automation and reliability;
- ❖ **Disruptive innovation:** OCR + AI + Robotics solving problems others won't touch;
- ❖ **Built at the hub:** three high-tech

factories in Ningbo, Yangtze River Delta.

PRODUCTS FOR BULK HANDLING

- ❖ Coupling for port machinery, metallurgy, energy and other industries. Over 700,000 deliveries so far.
- ❖ Cable distribution system including cable festoon system (DLC) and cable belt conveyor system (CBCS) for QC, RTG/RMG and bulk cargo cranes.
- ❖ Cable reel system for new cranes and electrification retrofit.
- ❖ Busbar system & automated electricity collection trolley for STS, RTG & overhead cranes.
- ❖ Data redundancy solutions for port automation: Leaky Waveguide (LWG), Slotted Waveguide (SWG), Millimeter Wave (MMW).
- ❖ Sheaves: patented cold rolling groove sheaves and rigid nylon groove sheaves, for cranes on vessel side and quay side. CCS/ABS/DNV Certified.
- ❖ Shore power solution: WWLG



Customized Cable Reel/Drum: customized solution for metallurgy, paper mills, power plants, chemical plants, open-pit mines, shipyards and offshore industries. Designed for special applications, such as extra-long travel distance, submerged environments, high load conditions, and redundant systems.

supplies multiple shore power solutions for quay side and vessel side, which features agile mobility, extended reach and maritime-grade durability.

- ❖ Automation equipment: JSD1-4. Smart Twistlock Station, JSD5. Standalone Smart Twistlock Station with Sorting Robot.
- ❖ Reeferlex: autonomous reefer power monitoring & management system.
- ❖ Autoloader: autonomous railbag loading system.

Global Strategy W.02.

WEILONG has recently launched its new Global Strategy W.02.

"After 35 years powering ports, we're entering a new chapter. The future of ports is electric. Automated. Reliable." announced Mr Zhao – CEO, WEILONG.

The strategy seeks to deliver smarter, more reliable electrification and automation to ports around the world.





Negrini company, established in 1967, specializes in engineering and manufacturing a comprehensive range of grabs and buckets for rope machines and crawler mounted cranes; they are employed to do many jobs. Negrini buckets and grabs are very well-known for quality as well as for the very accurate and skilful engineering work; in fact Negrini supports their clients by analyzing the job to be done and, if needed, by adjusting the standard design of grabs and buckets to enhance their performance once in operation.

VIA TORRICELLI 4 - CASTELFRANCO E. (MO) - ITALY



Moving mountains

The engineering feats behind dry bulk unloading



Louise Dodds-Ely

EMS-Tech celebrates delivery of world's highest capacity self-unloading system for Rio Tinto SimFer's Landmark Simandou Project

EMS-Tech is celebrating the successful delivery of *Wontanara*, the first of a new class of high-capacity self-unloading transshipment vessels built by CSSC Chengxi Shipyard for the joint venture between Rio Tinto, Chinalco and the Government of Guinea supporting the world-class Simandou Iron Ore Project.

The self-unloading system represents a significant milestone for the global bulk material handling and marine industries. Publicly recognized as the world's largest shallow-water transshipment self-unloader, the fastest specialized self-unloading vessel ever built, and the first bidirectional self-unloading vessel of its class, *Wontanara* establishes a new benchmark in marine bulk handling capability.

At the heart of this achievement is the complete EMS-Tech designed and supplied

self-unloading system, engineered to deliver an unprecedented 12,000 metric tonnes per hour of iron ore — currently the highest unloading capacity of any self-unloading vessel in operation.

The integrated system includes:

- ❖ two of the largest 'C' Loop conveyors ever placed into commercial operation, surpassing the previous record-setting C-Loop system designed and supplied by EMS-Tech only two years earlier;
- ❖ two high-capacity luffing, slewing and shuttling shiploaders;
- ❖ two reversible tunnel conveyors, allowing full operational redundancy; and
- ❖ a series of EMS-Tech patented feeder gates, specifically developed to maximize throughput and maintain

consistent material flow during high-capacity unloading operations.

Designed specifically for the demanding operating environment of Guinea's Simandou Project, the system combines industry-leading unloading performance with the reliability and redundancy required for continuous transshipment operations.

This delivery follows several landmark projects completed by EMS-Tech in recent years, including world-leading self-unloading and transshipment systems delivered for ArcelorMittal and Mineral Resources, further strengthening the company's reputation as one of the world's foremost designers of large-scale marine bulk material handling systems.

For nearly four decades, EMS-Tech has specialized exclusively in the design,

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engineering and delivery of high-performance bulk material handling systems for the global mining and marine sectors.

From self-unloading vessels and floating transshipment systems to shiploaders, stackers, reclaimers, mobile hoppers and complete turnkey conveying systems, EMS-Tech continues to push the boundaries of engineering innovation and operational performance.

“The delivery of *Wontanara* is much more than the completion of another material handling system; it represents years of collaboration, innovation and trust between exceptional organizations around the world. To see a project of this scale become reality is something our entire team takes enormous pride in. It demonstrates what can be achieved when owners, shipbuilders, suppliers and engineers work together with a common vision. We believe this vessel establishes a new global benchmark for self-unloading technology and we’re excited to see it begin operations when it arrives in Guinea,” says — Kyle Sorensen, Director, Business Development & Marine System Sales, EMS-Tech.

EMS-Tech extends its sincere

appreciation to the many partners, vendors and clients whose commitment and expertise made this project possible.

In particular, EMS-Tech wishes to recognize:

- ❖ CSL Group, whose long-standing commitment to advanced self-unloading technology has helped demonstrate the value these systems bring to global bulk shipping and modern transshipment operations (see ‘CSL marks the completion of the first vessel in world-leading transshipment fleet for Simandou Project’ on p100 for more details on CSL’s design and delivery of the *Wontanara*);
- ❖ CSSC Chengxi Shipyard, for more than 20 years of partnership delivering industry-leading self-unloading vessels and continuously advancing marine bulk handling technology; and
- ❖ Rio Tinto, for placing its confidence in EMS-Tech’s engineering capabilities to deliver one of the most technically ambitious self-unloading systems ever constructed.

The vessel is expected to complete final performance testing and undertake its first iron ore unloading operation in Guinea in

the coming months, marking the commencement of commercial operations for the Simandou transshipment fleet. EMS-Tech also looks forward to supporting the delivery and commissioning of the remaining vessels in the series, which are already well advanced in construction and will follow closely behind this historic first delivery.

ABOUT EMS-TECH

EMS-Tech Inc. is a Canadian engineering and equipment supply company specializing in high-performance bulk material handling systems for the global mining, marine and industrial sectors.

For nearly four decades, EMS-Tech has designed and delivered self-unloading vessel systems, floating transshipment systems, shiploaders, stackers, reclaimers, mobile equipment and complete conveying solutions for clients around the world.

Known for its practical engineering, innovative technology and ability to deliver complex, high-capacity systems, EMS-Tech works closely with shipowners, shipyards, mining companies and operators to transform engineering into productivity.

The beating heart of the terminal

WHY RELIABILITY IN SHIP-UNLOADING AND LOADING IS ESSENTIAL FOR MODERN TERMINALS

Shiploaders and unloaders sit at the heart of terminal performance. When these assets become unreliable, the

consequences can quickly extend beyond maintenance challenges to berth delays, demurrage costs and disruption throughout the material handling chain. Combined with skilled labour shortages and growing demands for safer, more

predictable operations, these challenges are driving terminal operators to look beyond traditional equipment replacement strategies and focus instead on modernization, improved availability, maintainability and long-term asset

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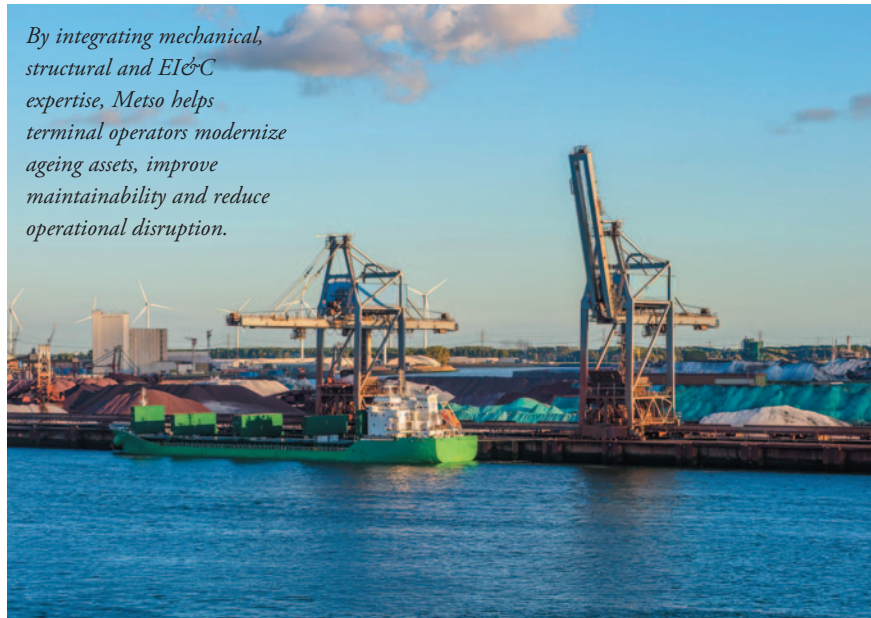
performance. Taking this approach brings many advantages as when the heart of the operation performs reliably, the entire operation benefits.

A MORE INTEGRATED APPROACH TO MODERNIZATION

Today, operators need greater visibility into equipment health, stronger maintenance planning tools and improved insight into potential issues before they affect production. In many cases, extending the life of existing assets requires a broader approach that combines mechanical, structural, electrical, instrumentation and control expertise rather than treating each discipline separately.

This reflects a clear market shift toward greater integration between mechanical, electrical, instrumentation and control systems. In the past, mechanical refurbishment, drive upgrades, PLC replacement, operator interface changes and commissioning were often managed as separate work packages. While this approach may appear practical, it can also reduce efficiency when interfaces are not fully aligned. A change in mechanical component specification can affect control logic, while a change in automation can influence structural behaviour. Likewise, poor interface management during commissioning can slow production ramp-

By integrating mechanical, structural and EI&C expertise, Metso helps terminal operators modernize ageing assets, improve maintainability and reduce operational disruption.



up and delay the realization of project benefits.

Against this background, the integration of mechanical, structural and EI&C capabilities is becoming increasingly important. For modernization projects, the objective is not only to replace obsolete components, but to connect equipment condition, control philosophy, site execution and commissioning into one coherent approach. When these elements are considered together, upgrade projects can improve start-up performance, reduce

disruption and contribute to more stable long-term operations.

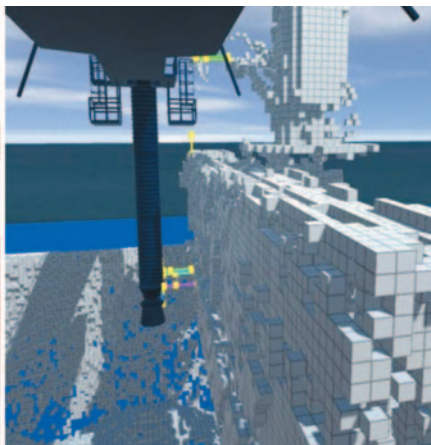
SUPPORTING BULK HANDLING ACROSS THE EQUIPMENT LIFECYCLE

Metso's activities in ports and terminals handling reflect this broader market shift. The company continues to expand its portfolio of shiploaders and unloaders, continuous barge unloaders, grab unloaders, conveyors and related port and terminal handling systems. At the same time, Metso is increasing its focus on modernization and upgrade projects for existing bulk handling assets, particularly in terminals where legacy equipment remains critical to daily operations.

Metso combines more than a century of bulk material handling experience through industry-recognized brands including Stephens-Adamson, McNally Wellman, Strachan & Henshaw, Dravo, McNally Pittsburgh, FAÇO and PECO. This heritage spans equipment that handles a broad range of dry bulk commodities, including iron ore, coal, bauxite, grains, fertilizers, wood chips, sugar and other industrial materials.

For terminals operating ageing equipment, that heritage is particularly valuable. Successful upgrade projects often depend on a clear understanding of the original machine design, structural limitations, mechanical interfaces and control philosophy.

"Many shiploaders and ship unloaders have operated reliably for decades, but age, component obsolescence and changing operational requirements can gradually affect performance. The most effective modernization projects look beyond individual components, combining mechanical, structural and EC&I expertise



Axo33 SHIPS™ combine real-time 3D visualization with advanced vessel tracking, helping operators detect issues sooner, improve equipment availability and reduce collision risk during shiploading and unloading operations.



with lifecycle support to improve reliability and keep these critical assets performing for years to come,” says Danilo Caserta, Product Manager, Bulk Material Handling and Port Solutions, Metso.

EXPANDING ENGINEERING AND AUTOMATION CAPABILITIES

To support the growing demand for modernization, automation and Life Cycle Services partnerships Metso has continued to invest in both engineering capacity and automation capabilities. The opening of engineering hubs in Pittsburgh and Cape Town strengthens technical support, project execution and customer proximity in key bulk handling regions.

In February 2026, Metso acquired MRA Automation, an Australian engineering company focused on automation, software and digitalization for bulk material handling operators, ports and terminals. The acquisition further strengthens the OEM's ability to support customers seeking greater operational visibility, automation and digitalization throughout their operations.

IMPROVING VISIBILITY THROUGH DIGITALIZATION

Digitalization is changing how terminals manage large bulk handling assets. The

Metso Axo33™ platform brings intelligent automation and digital visibility to shiploaders, unloaders and stockyard systems.

“Digitalization is giving terminal operators a much clearer understanding of how their assets perform in real operating conditions. By combining automation, digital twins and real-time visibility, operators can make better decisions, reduce risk and move from reactive maintenance to a more predictive and proactive approach,” says Peter McPherson, Director, Engineering, Bulk Automation Technology, Metso.

In ship-related applications, Axo33 SHIPS™ uses digital twin technology and 3D visualization to support boom movement awareness, fault detection and collision risk management. For operators, the practical value lies in seeing asset performance trends more clearly over time. Better data can help identify potential issues earlier, support condition-based maintenance strategies and reduce the manual workload associated with managing large moving machines, vessels, hatches, conveyors and transfer points.

THE VALUE OF HAVING EXPERTISE NEARBY

Beyond technology, regional engineering

capability also plays an important role in modernization projects. Brownfield work in ports and terminals often requires fast technical response, close coordination with site teams and a practical understanding of local operating constraints. By strengthening its engineering presence in key regions, Metso aims to support project execution, field services and commissioning closer to where customers operate, while leveraging its global bulk material handling expertise.

A NEW DEFINITION OF COMPETITIVENESS

For the shiploading and unloading sector, competitiveness is no longer determined solely by equipment size or nominal capacity. Increasingly, it depends on how effectively operators can extend asset life, minimize maintenance risks, improve equipment availability and integrate automation and digital technologies into everyday operations.

In that context, integrated OEM capability is becoming an important part of how bulk terminals manage both current performance and long-term resilience. Like any living system, long-term performance depends not only on the strength of individual parts, but on how well they function together.



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Ardelt Kranbau: a productive answer to universal cargo handling



Ship-unloaders sit at the centre of terminal economics. Every extra minute a vessel spends alongside the quay adds cost, and every additional rotation a crane performs during discharge adds wear and energy consumption. Terminal operators handling a mix of bulk, general and project cargo face a recurring question: how to combine high productivity with a sensible investment and low running costs, without locking themselves into equipment suited to only one cargo type.

Ardelt Kranbau GmbH, based in Eberswalde, Germany, has been building double jib level luffing cranes since patenting the underlying double jib system in 1932, with engineering roots in the town going back to 1902. After the insolvency of its predecessor in 2022, the Eberswalde business was relaunched in 2023 as an independent company, and in 2025 Ardel received the Zukunftspreis Brandenburg, a regional innovation award, for that comeback and its crane technology. More

than 5,000 cranes have been delivered from Eberswalde to over 56 countries since the company's founding.

For ship-unloading duty, Ardel's answer is the Tukan K, a fully electric double jib crane fitted with a hopper integrated on the waterside, effectively turning the crane itself into a ship-unloader. The working method always takes the shortest route: the grab dips into the cargo, is lifted only as far as the hopper edge, the jib luffs across and the grab empties directly over the hopper. Because the hopper sits alongside the vessel, no slewing motion is required for the unloading cycle, removing the torsional loads that repeated slewing under acceleration and braking would otherwise place on the structure, avoiding the centrifugal forces typical of mobile harbour cranes, and shortening cycle times noticeably. Semi-automatic operation, where the driver is mainly needed for picking up the load, supports a steady, high unloading rate, valuable for operators



facing a shortage of skilled crane drivers. The gantry stays passable despite the hopper, and the crane can still rotate freely, so general cargo and containers can also be



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handled at the same installation.

A further advantage lies in the footprint on the quay. Because the hopper is built directly into the crane rather than positioned as a separate unit next to a conventional slewing crane, the whole installation takes up markedly less space along the berth. Each crane therefore blocks a shorter stretch of quay, so more units can be positioned along the same vessel and a ship can be unloaded from several points at once, shortening turnaround time further.

The hopper and its outlet arrangement are laid out individually for each project, taking into account the density, flow behaviour and abrasiveness of the bulk material handled. Linings and outlets are matched to the cargo, and dedicated grabs keep material loss to a minimum. For dusty or abrasive cargo, dust protection walls, water fogging or air extraction can be added around the hopper edges, so unloading stays clean and meets environmental requirements at sensitive locations.

The crane comes in different size classes, from smaller units for inland ports up to large versions for Capesize carriers at deep water ports. This mirrors Ardel's wider range, from the Tukan family for general port, terminal and shipyard duty to



the Kranich single jib crane for heavy lift cargo and the modular Feeder Server container crane for feeder traffic, all engineered around the customer's quay structure and requirements rather than built as a standard product.

On competitiveness, Ardel relies on tailored solutions rather than standard equipment. Every Tukan K is engineered around the individual customer's specific wishes, from quay structure to cargo and available space. Instead of a crane off the shelf, the customer gets an installation built precisely around their own operation, with the expectation that it keeps running



reliably for decades of service.

From a cost perspective, the fully electric drive, together with energy recovery from braking, keeps power consumption per tonne handled low, while the absence of unnecessary slewing reduces mechanical wear on the structure and its drives. Ardel presents this, together with the crane's comparatively light construction, as a favourable basis for both the initial investment and running costs over the crane's working life, an argument that matters increasingly to terminal boards weighing acquisition cost against decades of operating expenditure.

Recent orders show the concept moving from argument to delivery. At Rhenus Weserport in Bremen, Ardel handed over a Tukan K double jib crane with integrated hopper at the end of October 2025, officially inaugurated on 1 December 2025, an important milestone following the 2023 relaunch.

Rhenus has since ordered a tailored crane for its Midgard site in Hamburg, due for delivery in December 2026, and a new crane of up to 65 tonnes capacity for bulk cargo at the Port of Szczecin in Poland, replacing two ageing units as part of a wider modernization programme. An order from September 2025 also covers two shipyard cranes for Canada, one single jib crane for Halifax on the east coast and one double jib crane for Esquimalt on the west coast.

With a century old double jib patent, continuous refinement of hopper and dust control technology, and a growing order book since 2023, Ardel presents the Tukan K as a long-term investment rather than a one-off purchase: a fully electric ship-unloader designed to keep working, cleanly and efficiently, long after the initial order has been forgotten.





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- Reduced downtime through engineered reliability

Saving fuel in port operations: stevedoring company reduces CO₂ emissions by 15 tonnes per year

A versatile all-rounder – The SENNEBOGEN 870 E handles a variety of general cargo, bulk materials, and scrap metal at Ahtauskone in Finland.



It is late April in southwestern Finland. The sun is shining over the port of Pori. But appearances can be deceiving. Just moments earlier, rain and snow showers had alternated across the harbor. Icy gusts of wind sweep over the quay walls at speeds of up to 50km/h. Finnish weather is showing its harsh and unpredictable side. The stevedoring company Ahtauskone defies these challenging conditions. One constant in the company's operations is a SENNEBOGEN 870 E, which achieves

impressive results even under these demanding circumstances.

The material handler supports Ahtauskone in handling scrap metal, general cargo, and bulk materials. In day-to-day operation, one measurable advantage stands out in particular: the machine consumes around 20% less fuel than the comparable material handler from a competitor that was previously used. As a result, Ahtauskone saves approximately 5,600 litres of fuel and avoids around 15

tonnes of CO₂ emissions per year.

STEVEDORING COMPANY AHTAUSKONE IN THE PORT OF PORI

Ahtauskone Oy is a Finnish stevedoring company operating a terminal at the Port of Pori in southwestern Finland. Founded in 2010, the company specializes in loading and unloading vessels carrying a wide range of materials. "In terms of volume, peat is our main cargo, followed by scrap metal and crushed stone," explains CEO Timo Harjula. "But we are highly flexible and can handle all types of break bulk and bulk materials depending on our customers' needs," he adds.

To handle this broad variety of cargo, Ahtauskone operates wheel loaders in different sizes and has also relied on a SENNEBOGEN 870 E for the past five years.

FLEXIBLE CARGO HANDLING WITH THE SENNEBOGEN 870 E

Thanks to its mobile undercarriage, the SENNEBOGEN material handler can be deployed flexibly across the entire port area. At Ahtauskone, it proves to be a true all-rounder, handling a wide variety of materials. CEO Timo Harjula is particularly impressed by the machine's high handling



capacity: “With the SENNEBOGEN 870 E, we handle around 1,000 tonnes of scrap metal per hour” — an impressive figure for a machine of this size.

HOW DOES AHTAUSKONE SAVE FUEL IN PORT OPERATIONS?

Despite its high handling performance, the SENNEBOGEN material handler is extremely fuel-efficient. “We are very satisfied. The SENNEBOGEN consumes around 20% less fuel than the comparable material handler from a competitor that we used previously,” explains Ronny Ala-Tuori, who is responsible for equipment operations at the site.

This results in annual fuel savings of around 5,600 litres and avoids approximately 15 tonnes of CO₂ emissions per year.

WHICH TECHNOLOGIES REDUCE FUEL CONSUMPTION AND CO₂ EMISSIONS?

The efficiency of the SENNEBOGEN 870 E is based on several technical factors that work together in daily handling operations.

❖ SENNEBOGEN Green Hybrid Energy

Recovery System: the system stores energy from the lowering movements of the boom and makes it available again for subsequent lifting movements. Depending on the application, this can achieve savings of up to 35%.

❖ Optimized hydraulic flow:

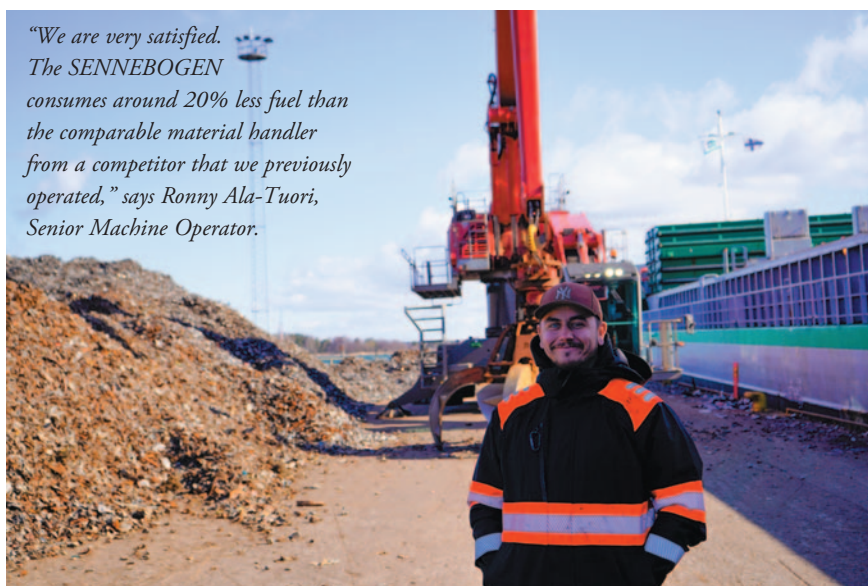
the hydraulic components and lines are designed for efficient flow characteristics. As a result, less energy is required, and the engine can be operated at a lower speed.

❖ Weight-reduced components:

high-strength materials and structural reinforcements on the undercarriage, boom, and stick reduce the moving masses. This supports efficient operation, even in demanding material



“We are very satisfied. The SENNEBOGEN consumes around 20% less fuel than the comparable material handler from a competitor that we previously operated,” says Ronny Ala-Tuori, Senior Machine Operator.



handling applications.

SERVICE PARTNER ROTATOR ENSURES AVAILABILITY IN FINLAND

Ahtauskone Oy is supported by Rotator, the responsible SENNEBOGEN sales and service partner. With numerous service locations throughout Finland, Rotator helps

ensure maximum machine availability.

High performance, low fuel consumption, and reliable operation under harsh weather conditions make the SENNEBOGEN 870 E a key success factor for Ahtauskone. At the same time, the machine makes a measurable contribution to reducing emissions.

Equipped with the Portcab drivers cab and a Skylift cab extension, the operator has an optimal view of the work area.



3D spatial sensing in bulk logistics: bridging the gap between vessel discharge and silo inventory control

HIGH-PRECISION 3D SENSING IN DRY BULK TERMINAL AUTOMATION

In high-throughput vessel unloading and port logistics, operational efficiency depends on absolute inventory transparency. For decades, terminal operators have relied on electromechanical level devices or belt scale calculations to track cargo flow from vessel unloader to storage. Continuous ambient dust, material slumping, and mechanical wear frequently introduce severe cumulative accounting errors.

To address these challenges, RETTAR supplies non-contact 3D spatial scanning systems engineered for harsh industrial environments. By combining dust-penetrating 3D millimetre-wave radar technology with high-density 3D LiDAR calibration, RETTAR provides terminal engineers and procurement managers with an automated platform to verify inventory levels in real time.

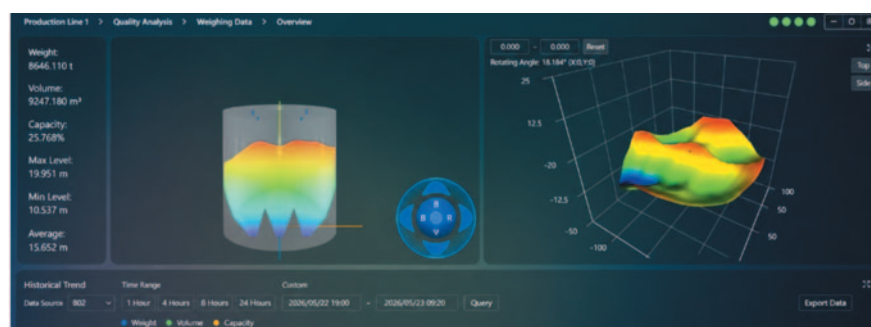
FIELD CASE STUDY: ELIMINATING INVENTORY DISCREPANCIES IN PORT STORAGE SILOS

A major international dry bulk receiving terminal recently addressed persistent mass balance discrepancies between vessel discharge receipts and silo inventory logs.

THE OPERATIONAL CHALLENGE

The facility operates a hybrid storage silo consisting of a 23-metre cylindrical upper section with a diameter of 38 metres, transitioning into a 16-metre conical hopper with an 18-metre discharge base.

Relying solely on traditional belt scales, the facility recorded a cumulative weight discrepancy of 1,577 tonnes over an eight-day operational cycle. This variance created inventory write-offs and auditing challenges for management. Simultaneously, dense



dust clouds generated during vessel discharge rendered standard ultrasonic and optical single-point level sensors ineffective, leaving unmonitored areas across the material topography.

SYSTEM ARCHITECTURE

To resolve these measurement errors, RETTAR deployed a six-point spatial scanning array mounted on the silo dome:

- ❖ **1. Four RETTAR 3DPro2300mm Wave Radars:** functioning as the primary measurement units, these scanners utilize high-frequency millimetre-wave signals to penetrate dense dust. The sensors continually scan the surface to generate accurate 3D volumetric profiles of complex

material piles.

- ❖ **2. Two high-precision 3D LiDAR scanners:** positioned as a spatial benchmark, the LiDAR units capture dense point-cloud data to verify baseline geometric precision and calibrate the radar matrix.

FIELD PERFORMANCE RESULTS

Two weeks of continuous side-by-side field verification against raw point-cloud data demonstrated the system's operational accuracy:

- ❖ **Sub-1% full-scale volumetric error:** the networked RETTAR 3DPro2300 array maintained total volume deviation within 300m³ ($\leq 1\%$ full scale) across the silo's full capacity.

CASE STUDY PERFORMANCE COMPARISON

Feature / Metric	Legacy Belt Scales & Point Sensors	RETTAR 3DPro2300 Multi-Sensor Array	Operational Impact
8-Day Mass Variance	1,577 tonnes cumulative error	$\leq 1\%$ Full Scale ($\leq 300\text{m}^3$)	Eliminates inventory write-offs & manual audits
Dust Immunity	Low (Signal attenuation/false readings)	High mmWave penetration	(3DPro2300 Eliminates lens cleaning dust and lowers maintenance costs)
Surface topography	Single-point estimation	Real-time 3D point-cloud mapping	Prevents structural overload and uneven material loading
System Integration	Manual reconciliation required	Automated SCADA/ PLC integration	Real-time visibility across terminal ERP systems



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- ❖ **Low-stock precision:** during drawdown phases, volumetric variance remained below 100m³, enabling precise reconciliation during final vessel unloading and truck loading.
- ❖ **Industrial protocol integration:** volume-to-mass calculations feed volume metrics directly into existing plant PLC and SCADA architectures via standard industrial protocols without requiring structural modifications to the silo.

EQUIPMENT PORTFOLIO AND INDUSTRY APPLICATION

RETTAR manufactures industrial-grade hardware and software tailored for heavy material handling:

- ❖ **RETTAR 3DPro2300 series:** high-precision, dust-penetrating 3D millimetre-wave volume scanners.
- ❖ **Industrial 3D LiDAR systems:** high-density spatial mappers for structural and surface geometry.
- ❖ **Smart bulk inventory analytics:** edge-based analytical software

converting spatial point clouds into real-time volume and mass metrics.

RETTAR equipment is deployed globally across demanding bulk handling sectors handling commodities such as clinker, cement, iron ore, coal, grain, feed, fertilizer, bauxite, and aggregates.

By integrating sensor fusion algorithms with industrial edge computing, RETTAR provides non-contact 3D spatial scanning systems that automate inventory monitoring and allow port operators to maintain full control over stored material assets.

RIKON: fully electric portal cranes for bulk unloading

RIKON has been designing and building cranes since 1991 and remains the only manufacturer of portal cranes in the Baltic States. The company's production site is located in Riga, and its machines are assembled and tested at the berth of the Freeport of Riga. For bulk cargo handling, RIKON offers the RPS series of fully electric portal cranes. The cranes can be supplied complete with grabs of various types and volumes, and with receiving hoppers. The range is complemented by RMG and RTG container cranes and special purpose equipment.

The core of the series is formed by cranes with a double jib level luffing boom system: as the outreach changes, the load travels horizontally, which shortens the working cycle and simplifies precise positioning. The line includes three base models: RPS-300, RPS-640 and RPS-1600. Intermediate versions, such as the RPS-1100, are built for specific projects. The compact RPS-300 unloads up to

400tph (tonnes per hour), while the RPS-1600, the largest in the line, reaches 1,600tph; machines with higher output are designed on request, since almost every crane is created for the needs of a particular terminal. Lifting capacity in grab mode ranges from 10 to 32 tonnes in standard versions, and up to 50 tonnes as an option. In hook mode the RPS-1600 lifts up to 63 tonnes, so the same crane also serves unit loads.

For heavier and oversized cargo, separate models within the RPS series are designed with hook capacities of up to 200 tonnes. Boom outreach reaches 40 metres in the base configuration, and versions with an extended boom are available. The cranes are rated for continuous intensive operation, duty class A8 under ISO 4301/1, and work with hook, grab, magnet and lifting beam; the RPS-1600 can additionally be equipped with a spreader. All mechanisms, including hoisting, luffing, slewing and travel, are driven by electric

motors with an energy recovery system.

The range of cargoes handled is defined by the choice of grab. Four-rope clamshell grabs are supplied in volumes from 4.5m³ to 48m³ and are matched to the density of the material and the lifting capacity of the crane: coal, iron ore concentrate, pig iron, scrap metal and agricultural bulk cargoes, including grain. For light agricultural products there is a 48m³ grab for a crane with a lifting capacity of 53.6 tonnes; for coal, grab volumes reach 35m³; for dense ore concentrate, compact models of 5.5 to 10m³ are used. Multi-jaw grabs are intended for scrap metal, pig iron and limestone, and a separate model works with timber. The grabs are made of corrosion-resistant materials and are supplied with the crane as a single system. RIKON is also developing solutions in the field of integrated cargo handling complexes.

Projects involving bulk handling equipment have been successfully

RIKON cranes in operation at the quayside.



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Crane assembly taking place at RIKON's berth at the Freeport of Riga in Latvia.

completed in Latvia, Turkey, Kazakhstan, Bosnia and Herzegovina, and Georgia. The largest of the recent projects have been carried out in Turkey. The company has completed a project for the İsdemir Port of OYAK Group, one of the country's largest industrial conglomerates.

This was followed, in the spring of 2026, by the assembly and testing of two RPS-1100 cranes, weighing 430 tonnes each, at the berth of the Freeport of Riga; work did not stop even during one of the coldest Latvian winters of the past 20 years. The cranes were built for a company among Turkey's top 100 industrial enterprises: its specialized terminal handles up to 14.5 million tonnes of cargo a year and receives vessels carrying up to 110,000 tonnes.

In July 2026 both machines departed for the customer fully assembled, aboard the heavy-lift vessel *Poolgracht*. Delivery in fully assembled form has become a signature RIKON method, proven on the İsdemir project: on arrival, the company's specialists unload the cranes, install them on the crane rails and connect them to the terminal's infrastructure, so the customer avoids months of installation work on site.

Beyond the bulk handling segment, RIKON equipment is supplied to France, Poland, Germany, Spain, Uzbekistan and Slovakia.

Particular attention in the design is paid to the cost of ownership. The classic lattice portal is combined with a slewing arrangement based on standard bearings available on the open market: replacing the unit takes a matter of days and does not require large bearings made to order with long delivery times. Each crane is adapted

*Grab operations.*

to the environmental conditions of its working site. The RPS-1100 cranes for Turkey, for example, are designed to operate at temperatures from minus 10 to plus 50° Celsius. RIKON is currently building cranes for a project in France, where the requirement is to withstand wind speeds of up to 200km per hour in out-of-service condition.

Fully electrically driven mechanisms with energy recovery answer the requirements of ports for lower emissions and lower energy costs. The condition of

the equipment is monitored by the RIKON Connect system: it tracks the crane's components in real time, warns of faults and helps plan maintenance in advance, before unloading comes to an unplanned stop.

RIKON has been building cranes in Riga since 1991, delivering them to customers across Europe and Central Asia. Each machine is designed for the berth, the cargo and the conditions of a particular customer, and is handed over ready for operation.

Two 430-tonne RPS-1100 cranes being loaded into the hold for shipment to RIKON's customer in Turkey.



The background of the advertisement is a composite image. The top half shows a dark, starry sky with a large, curved, metallic structure, possibly a crane boom or a ship's hull, curving across the frame. The bottom half shows a harbor scene at sunset or sunrise. In the foreground, there are stacks of colorful shipping containers (red, blue, yellow) on a pier. In the background, a large ship is docked, and two large red mobile harbor cranes are lifting a large, cylindrical object (possibly a ship's hull section) from the water. The sky is a mix of blue, orange, and yellow, with clouds reflecting the low sun.

KONECRANES

Time for the ESP.4

Are you doing multi-purpose material handling across containers, bulk and general cargo? Is your terminal growing? It could be the right time to step up to the mobile harbor crane concept, which we invented and are now perfecting in our Generation 6 family. The Konecranes Gottwald ESP.4 Mobile Harbor Crane is the smallest in the family, but it could be the best for you.



Just scan this QR code to configure
the right crane for your needs
mhc-product-advisor.konecranes.com

READY WHEN YOU ARE

GENMA's Floating Transfer Station heads to Africa for major projects

A GENMA marine transshipment system has just completed commissioning. Soon, it will sail to West Africa to support local mineral exports. So, what exactly is a transshipment system? It solves a major global headache: some ships are too large to enter shallow-water ports.

Take Guinea's *Boffa* – this 300,000-tonne ore carrier can't dock at the smaller ports in West Africa. The solution? Small barges load minerals at the pier, sail to deeper water, and transfer the cargo to the big vessel via the transshipment system. There is no need for the large vessel to enter port.

This GENMA system includes: two deck cranes; two large hoppers; one belt conveyor; and one shiploader. It works by cranes grabbing ore from the barge and dropping it into hoppers; the hoppers feed the conveyor; the conveyor then moves the material to the shiploader, which loads it steadily into the large vessel's hold.

WHAT MAKES THIS SYSTEM STAND OUT?

❖ **Fast, precise, and calm at sea:** the cranes use stepless speed control — smooth acceleration and braking. Even with heavy loads, operators can make millimetre-level adjustments for accurate, spill-free landing. The box-type boom stays stable under load, minimizing ship movement.

The large hoppers handle high discharge rates, keeping the conveyor fed without interruption.

❖ **It is built for harsh marine conditions:** saltwater corrosion is tough on equipment. GENMA's cranes are designed to the highest offshore standards: key components are sealed inside, plus multi-layer anti-corrosion coating. A low centre of gravity and light weight improve stability in heavy seas — stable equipment means faster, safer operations.

The shiploader adapts to constant movement between floating vessels (tides, waves). Its telescopic chute and luffing



boom ensure material lands smoothly with minimal breakage, regardless of how the two vessels shift.

❖ **Easy maintenance — with GENMA's local support in Africa:** one of the biggest fears on site is a breakdown with no spare parts or technicians nearby, causing months of downtime.

GENMA thought ahead. The equipment is designed for easy service: integrated hydraulic power units mean

fewer pipes and leak points; key joints are self-lubricating; a standard diagnostic port quickly identifies issues. Even more reassuringly, GENMA already has service centres and spare parts warehouses in Tangier (Morocco) and Mombasa (Kenya). The *Boffa* (Guinea) warehouse is nearly ready and will open soon. Plus, long-term field service engineers are stationed locally. Any problem — fast response, parts on hand.

ALL SYSTEMS TESTED, READY TO GO

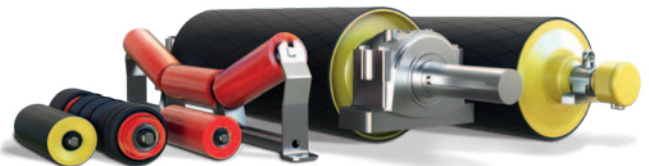
Every motor, sensor, and control system on this GENMA transshipment system has passed individual and integrated testing. Commissioning is complete.

Next stop: West Africa. There, the transshipper will become the most reliable, hardworking bulk cargo transfer tool available to GENMA customers — helping them get the job done efficiently, voyage after voyage.





PREMIUM COMPONENTS FOR MATERIAL HANDLING



Rulmeca offers a wide range of quality Rollers/Idlers, Motorized Pulleys, Pulleys and components used in the most demanding applications in belt conveyors material handling. We are close to you, whenever you need us, with a global network of sales and service centers.

 **RULMECA®**
MOVING AHEAD

Safer, smarter bulk handling: how steute and Kiepe.Industry are elevating unloading technology

Loading and unloading bulk in harbours is a typical application for switchgear developed and manufactured by the steute Technologies Group which, since spring 2026, has also incorporated Kiepe.Industry GmbH. The joint portfolio offers solutions for control- and safety-related tasks at the waterfront — robust, with wireless signal transfer and for areas with dust-explosion risks.

With Kiepe.Industry having been integrated into the steute Technologies Group in March 2026, both brands under the same roof can offer a significantly broader product range. Kiepe.Industry contributes, among other things, a comprehensive range of heavy-duty switchgear for material handling — primarily emergency pull-wire switches and belt alignment switches. There are synergies here with the product lines of the steute Controltec division, which also offers other many types of corrosion-resistant and robust switching devices in its portfolio and, in addition, focuses on wireless switching devices.

ENSURING SAFETY AND PRODUCTIVITY IN BULK CONVEYING PROCESSES

Among the core products of both brands are emergency pull-wire switches. These are based on the principle ‘one pull of the wire — and the belt stops’, and trigger the safety-related shutdown of conveyor belts at loading and unloading facilities in ports — for pull wire lengths of up to 200 metres (photo 1).

It goes without saying that these



Photo 1: Classic switchgear for conveyor belt systems not only in ‘ship to shore’ applications: robust emergency pull-wire switch from Kiepe.Industry.



Photo 2: Especially advantageous in ship-to-shore loading and unloading of bulk: wireless heavy-duty switchgear, in this case a belt alignment switch.

switching devices comply with current machine safety guidelines, as does the fact that they are corrosion-resistant and are

also available in dust explosion-protected versions. The product portfolio includes additional safety and monitoring devices such as those for speed detection and control of conveyor drives, as well as belt alignment switches (see photo 2) and complete systems for belt damage monitoring.

Also part of the portfolio are heavy-duty switches used to monitor the end position of moving machine parts in bulk loading/unloading systems.

They have a robust housing and can be equipped with up to four positively actuated changeover contacts with snap-action function.

In crane-driven ship-unloaders for bulk material, anti-two-block switches made by steute protect the crane hook from colliding with the head of the boom. Another frequent application of steute's switchgear in harbours are robust positioning switches and sensors for monitoring the position of loading arms.



Photo 3: A rough application: footswitch for the release hook of anchoring ropes.



MADE TO MOVE
25 YEARS, LEADING MATERIAL HANDLING



CORROSION-PROOF, DNV APPROVED AND FLEXIBLE TO USE

Many of the mentioned control and safety devices are available in explosion-proof variants, compliant to ATEX and also to other international regulations for use in hazardous areas.

For the majority of the product line, DNV certification ensures suitability for use in demanding maritime applications. The product features also include a corrosion-resistant design and a wide temperature range (down to -60°C , depending on the series).

The position switches, which are frequently used in marine and port engineering, can be adapted to specific applications using different actuators and can also serve as control devices or pull switches.

WIRELESS SWITCHGEAR: AN ADVANTAGEOUS TECHNOLOGY IN HARBOUR APPLICATIONS

In port applications in particular, switchgear that transmits signals via robust, proven radio technology is a good choice (photo 2). In general, these devices eliminate the need for signal transmission cables, which are inherently susceptible to wear and damage. In the case of ship loaders and unloaders, there is the additional benefit that a mobile unit (e.g., mounted on the ship or a flexible belt unit) can communicate with landside conveyor systems without a physical cable connection.

This wireless capability is also advantageous during the anchoring process of ships, specifically with foot switches used to release anchorage hooks (photo 3). For applications directly at the water's edge, a corrosion-proof design and resistance to



Photo 4: Deep dive and pressurizing: waterproof tests of foot switches in the steute lab (and, below, in situ).



Photo 5.

high mechanical stress are key requirements. Looking at a traditional wired foot switch, it becomes clear that operating conditions at the quay are by no means favourable for electrical devices.

'TRIED AND TESTED' IN THE NORTH SEA

The commitment that steute has shown in its development of 'Extreme' switchgear for marine, port, and offshore technology over many years is evident in features such as high IP protection and superior corrosion resistance. These qualities are verified

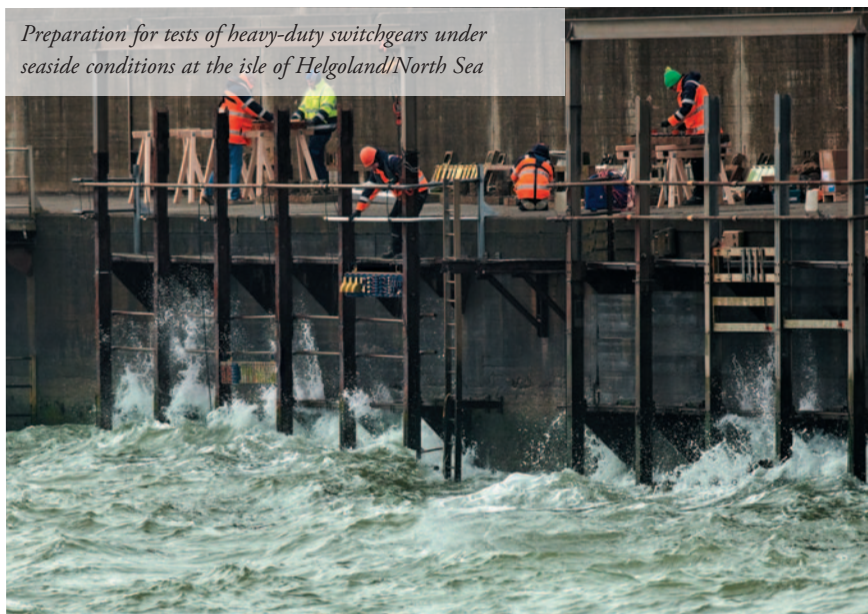
through comprehensive testing (photo 4) and are by no means a given for standard switchgear.

Furthermore, steute has conducted tests under real-world conditions in collaboration with an independent research institute — Fraunhofer IFAM (Institute for Manufacturing Technology and Advanced Materials; photo 5). The institute operates a test facility on the offshore island of Helgoland in the North Sea, where it investigates the performance of materials and components in corrosive environments under real-life conditions, such as continuous quay splash water. Various switching devices made by steute spent a full year exposed to splash water — and in some cases, tidal water — proving their suitability for truly extreme environments, including offshore installations, port hubs, terminals, and ships.

OUTLOOK FOR THE NEAR FUTURE

Finally, a glimpse into the steute development pipeline: an expansion of the wireless position switch lineup is imminent with the launch of the RF 99. Developed from the ground up for use under adverse environmental conditions, this new series will also be the first to feature a new receiver unit characterized by a compact design and exceptional operational flexibility.

Preparation for tests of heavy-duty switchgears under seaside conditions at the isle of Helgoland/North Sea



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MHL375 F - Technical Data
Engine Power: 245 kW · Operating Weight w/o Attachments: 64.3-66.5 t · Reach: max. 20.0 m

Demanding unloading and loading operations in port handling: hybrid material handler from SENNEBOGEN expands the port's fleet

Société Gras, based in northern France, handles around one million tonnes of goods annually — the majority of which is bulk cargo transported via waterways. To reliably meet the growing demands of port handling, the company has specifically expanded its fleet: a SENNEBOGEN 850 G Hybrid has been in operation since 2025.

LOGISTICS WITH A FOCUS ON WATERWAYS

The company, based in Beugny (Pas-de-Calais), was founded around 20 years ago by Maximilien Gras and now employs around 20 people. Its main focus is on organizing complex logistics flows — particularly those involving both road and water transport.

This involves not only the handling of bulk goods, but also palletized goods and industrial products. The demands placed on the technology used are correspondingly high.

A HIGH-PERFORMANCE FLEET FOR DAILY HANDLING

When it comes to its fleet of machinery, Société Gras has relied predominantly on SENNEBOGEN for many years. In total, around 15 material handling machines in the 50 to 70-tonne weight class are in operation.

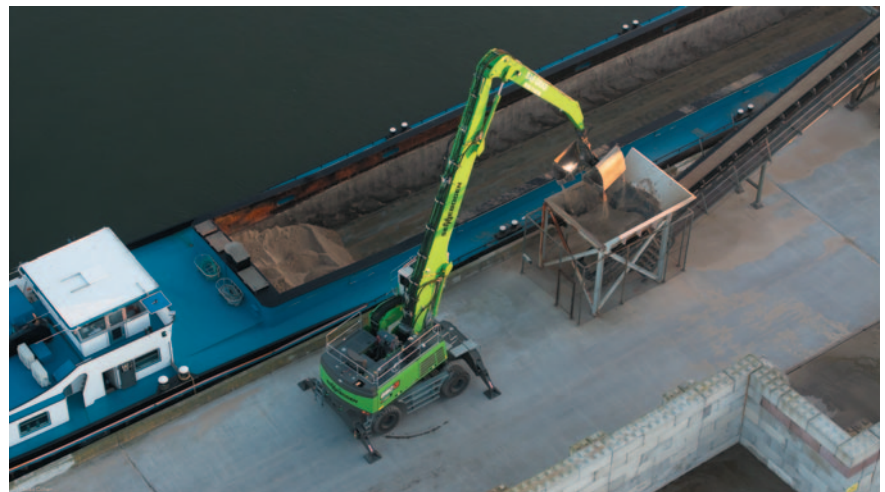
The key factors behind this decision are, above all, the robust construction, high load-bearing capacity and the efficiency of the Green Hybrid technology.

The equipment also plays an important role in day-to-day use:

- ❖ the SENcon control system allows for customization of operating parameters and defined working areas;
- ❖ the spacious cab ensures a comfortable working environment even during long shifts; and
- ❖ the mobile version offers advantages when moving between different locations within the port



With a reach of up to 21 meters and a high load capacity, the SENNEBOGEN 850 G Hybrid delivers the performance required for demanding loading and unloading operations in port handling.



THE 850 G HYBRID EXPANDS THE FLEET

The addition of the SENNEBOGEN 850 G Hybrid has specifically expanded the fleet with a high-performance material-handling solution for demanding applications. The machine has a reach of up to 21 metres, making it particularly suitable for loading and unloading operations in the port.

Thanks to the integrated Green Hybrid technology, some of the energy generated during deceleration can be recovered and

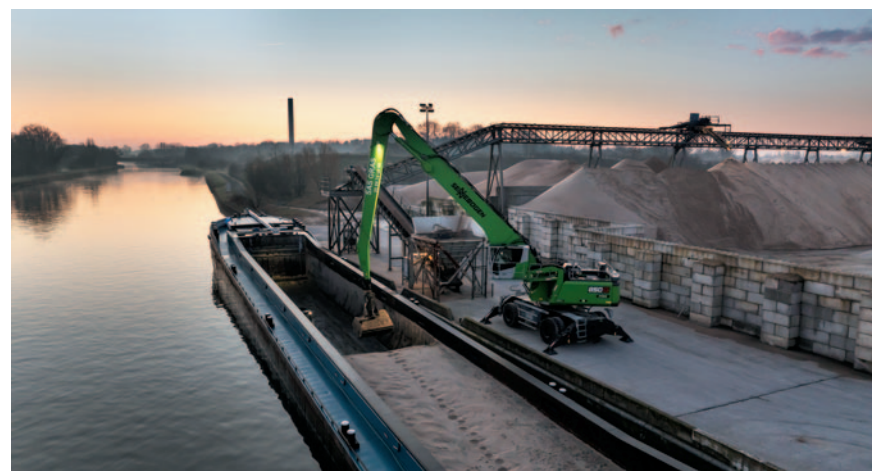
reused. This has a positive effect on fuel consumption, reducing it by around 30 %.

"The material handler is exactly what we need to work efficiently and cost-effectively. It allows us to offer our customers a reliable service whilst providing our operators with a well-designed piece of equipment," explains Maximilien Gras.

COLLABORATION WITH SYGMAT

Société Gras is supported by Sygmat, SENNEBOGEN's French sales partner. In addition to supplying the machines, long-term support plays a key role — from commissioning through to ongoing maintenance.

"We are united by a shared understanding of efficient and sustainable handling technology. This close collaboration pays off in day-to-day operations," says Jérémy Sobczak, Sales Manager at Sygmat.





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BULK HANDLING

The answer to your
bulk handling questions

Ship unloaders



Road mobile ship unloaders



Storage & reclaim



Convey units



Truck loading



Ship loaders



**And yes,
for SCMs too:**

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Fly-ash, GGBFS,
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Product Brochure



Equipping shipping

shipboard
grabs & cranes



The upgrade to the Liebherr CBG 310 cranes marks a significant step in enhancing transshipment performance, enabling higher throughput and improved operational reliability.

Jay Venter

From proven strength to bolder performance

A decade of continuous operation has shaped a clear understanding of performance demands in floating transshipment. The upgrade from CBG 300 to CBG 310 combines increased capacity, improved operator conditions and reduced maintenance requirements and delivers a forward-looking solution that supports both operational continuity and measurable efficiency gains in demanding bulk environments.

A confident upgrade that raises the ceiling. With the introduction of the CBG 310, Liebherr Maritime Cranes advances high-performance transshipment through a measured evolution of its four-rope grab crane portfolio. Developed as the direct successor to the CBG 300, the new model reaches a maximum hoisting speed of 130 metres per minute, representing an increase of 44% and enabling faster handling cycles with

reduced vessel turnaround times. Its lifting capacity rises to up to 45 tonnes on hook, while a standard boom length of 30 metres ensures continuity for floating applications, with an extended outreach of up to 32 metres available for land-based installations. Operator conditions have also been improved, with an enlarged cabin volume of 7m³ enhancing comfort and visibility during extended shifts. At the same time, the transition from hydraulic hoses to integrated piping within the slewing column reduces maintenance exposure and supports lower lifecycle costs. All of these features deliver a balanced improvement in performance, efficiency and operational reliability.

A DECISIVE STEP UP FOR TRANSSHIPMENT

For operators running CBG 300 cranes, the transition to the CBG 310 represents a natural and performance-driven

progression. Rocktree, a global transshipment and logistics provider that optimizes the movement of dry bulk commodities, decided to replace its two CBG 300 cranes after 11 years of continuous service, which demonstrates the tangible benefits of the new generation. By maintaining the vessel's eccentric-arm configuration, the upgrade to the CBG 310 preserves proven geometry while enabling higher throughput and improved responsiveness in daily operations. The project also marks a significant milestone, with Rocktree becoming the first operator to install CBG 310 cranes on eccentric-arms, reflecting the company's pioneering approach to advancing transshipment solutions through proven yet forward-looking technology.

"Moving to the CBG 310 allows us to build directly on our operational experience while achieving a clear



VERSTEGEN
GRAB INTELLIGENCE



Professional companies in more than 110 countries worldwide work with Verstegen grabs, because our grabs offer them the highest reliability and best productivity. Combining our extensive knowledge and experience with the feedback from our loyal customers results in optimized grabs for all bulk materials and unloading situations. We call this 'Grab Intelligence'.

Looking for increased reliability and productivity, lower maintenance costs and an extended lifespan? Let us know, because together we can move mountains.

LET'S MOVE MOUNTAINS

WWW.VERSTEGEN.NET



improvement in handling speed and lifting capability,” said a Giovanni Colotto, Managing Director & Head of Fleet at Rocktree.

Faster cycles, combined with enhanced grab performance, support increased turnover rates and contribute directly to reduced vessel idle time. This ensures that transshipment operations remain both efficient and predictable, even under demanding conditions where consistency is essential.

ENGINEERING CONTINUITY, REFINED WITH CONFIDENCE

Beyond structural enhancements, the CBG 310 introduces an expanded digital layer that supports a more controlled and intuitive operating experience. At its core is Liebherr’s Litronic control system, enabling precise and consistent crane movements even under challenging transshipment conditions. During operation, SmartGrip supports the handling process by automatically adjusting grab behaviour in real time, helping operators achieve optimal filling while reducing material loss. In parallel, LiCAS, the Liebherr Collision Alert System, enhances operational safety by continuously monitoring distances to nearby Liebherr cranes and warning operators of potentially unsafe conditions. This provides an additional layer of

	CBG 300	CBG 310	Your advantage
 Hoisting speed max.	90 m/min	130 m/min	+44%
 Load capacity (hook) up to	30 t	45 t	+12,5%
 Boom length	30 m	32 m*	More outreach
 Cabin	3 m³	7 m³	Greater comfort for the crane operator
 Hydraulic conduit	Hydraulic hoses	Hydraulic pipes (inside slewing column)	Reduced service and maintenance costs thanks to durable pipes

The CBG 310 has been refined specifically to support more demanding bulk handling requirements - without changing the fundamental operating concept familiar to CBG 300 users.

awareness during complex cargo handling scenarios and supports safer crane coordination in confined environments. Together, these systems operate seamlessly in the background, reinforcing efficiency and control without increasing complexity.

“The CBG 310 is designed for operators who expect more from a proven concept,” said Tim Ladendorf, Head of Sales Ship Cranes, Port and Transshipment Solutions at Liebherr-Rostock GmbH. “It delivers a clear step forward in capability while preserving the handling philosophy that crews know and trust.”

Liebherr’s global sales and service network remains closely aligned with fleet

operators, ensuring dependable support, technical expertise and long-term availability throughout each crane’s working life. Its regional proximity and responsiveness enable consistent performance across demanding operating cycles.

As transshipment requirements continue to evolve, the CBG 310 positions operators to meet increasing demands with confidence. By combining established engineering principles with enhanced speed, intelligent assistance and durable design, it supports a balanced approach to performance, reliability and long-term operational success.

GUVEN Grab: 400+ hours of battery life, Zero-Shock technology and 15,000+ grabs delivered worldwide

400+ HOURS OF OPERATION WITHOUT CHARGING

With more than 40 years of engineering experience, GUVEN Grab has established a strong global presence in bulk cargo handling, with more than 15,000 grabs delivered worldwide.

At the heart of GUVEN’s product range is its battery-operated remote control grab, designed to combine long operating endurance, crane protection and reliable cargo handling without requiring an external power source.

One of the key advantages of GUVEN’s remote control grabs is their exceptional battery endurance of more than 400 hours of operation without charging.

The fully wireless system requires no external electrical power source, allowing the grab to operate independently with ship cranes and mobile harbour cranes. This simplifies daily operation while reducing dependency on additional power

connections or equipment.

GUVEN ZERO-SHOCK SYSTEM DESIGNED TO PROTECT THE CRANE

Another defining feature is the GUVEN Zero-Shock System.

The system is engineered to provide a

controlled, shockless opening sequence, helping to minimize sudden loads transferred from the grab to the crane during operation.

For vessel owners and operators, this means smoother grab operation and reduced mechanical stress on the crane,



particularly during intensive and repetitive bulk cargo handling cycles. The shockless opening technology is one of the key features highlighted in GUVEN's Remote Control Grab design.

MORE THAN 15,000 GRABS DELIVERED WORLDWIDE

Technology is only meaningful when proven in real operating conditions.

Today, more than 15,000 GUVEN grabs have been delivered worldwide, serving vessel owners, operators, terminals and shipyards across the international bulk handling industry.

In recent years, GUVEN has also experienced significant growth in deliveries to leading shipyards in China, Japan and South Korea, with GUVEN grabs operating aboard Handysize, Supramax and Ultramax vessels.

GLOBAL STOCK AVAILABILITY, CLOSER TO THE VESSEL

For vessel operators, equipment availability can be just as important as equipment performance. A vessel's schedule often leaves little room for long manufacturing or transportation lead times.

To support customers with faster availability, GUVEN maintains strategic grab stock at key maritime hubs around the world:

- ❖ Shanghai Free Zone, China;
- ❖ Singapore;
- ❖ Dubai, UAE;
- ❖ Durban, South Africa;
- ❖ Istanbul, Türkiye — approximately 30 units continuously available; and



❖ USA.

This international stock network enables GUVEN to respond more quickly to urgent requirements and helps customers reduce lead times when grabs are required for upcoming cargo operations.

ENGINEERED FOR DEMANDING BULK HANDLING

Beyond its battery endurance and Zero-Shock technology, GUVEN's battery-operated remote control grabs are designed with a single heavy duty hydraulic cylinder and can operate at working angles of up to 60°, providing flexibility under demanding vessel and cargo conditions.

From production to final quality checks, GUVEN focuses on the reliability of both

the complete grab and its individual components. Genuine GUVEN spare parts are manufactured to maintain compatibility, performance and long term operational reliability throughout the grab's service life.

GLOBAL SERVICE AND SPARE PARTS SUPPORT

With deliveries to more than 120 countries, GUVEN combines its manufacturing experience with worldwide technical support and spare parts services.

Through its remote support network, initial technical assessments can be performed rapidly, allowing the necessary service or spare parts requirements to be identified before intervention and helping minimize operational delays.



REMOTE CONTROL TECHNOLOGY FOR ORANGE PEEL GRABS

GUVEN has also expanded its battery-operated remote-control technology to orange peel grabs, developed for soft, loose and irregular materials.

Their multi-jaw design provides effective gripping and control when handling cargoes such as scrap metal, coal and waste, extending the advantages of remote operation to more challenging cargo applications.

400+ hours of battery endurance. Zero-Shock technology. More than 15,000 grabs delivered. Strategic stock across major maritime hubs.

Together, these capabilities reflect GUVEN Grab's focus on one objective: keeping bulk cargo operations moving safely, efficiently and reliably — wherever the vessel operates.



Cost-efficient lifting solutions from Jiangsu ZDPM Manufacturer Co., Ltd

Jiangsu ZDPM Manufacturer Co., Ltd. is a specialized manufacturer of port cranes, shipboard cranes, grabs, and related port machinery. Established in 2009, the company integrates product development, design, manufacturing, and installation under one roof. Jiangsu ZDPM's product line covers 29 series and over 200 specifications, serving a diverse global clientele ranging from shipowners and port operators to bulk cargo handlers.

Jiangsu ZDPM's products have been widely adopted by leading enterprises across various industries. Its valued partners and clients include Tsingshan Holding Group, SAIC Motor, China Railway Major Bridge Engineering Group, ZPMC, COFCO, China National Coal Group, as well as international port operators such as Kuantan Port (Malaysia), Port Qasim (Pakistan), and Hai Phong Port (Vietnam), among many others. These partnerships reflect the trust and recognition that Jiangsu ZDPM has earned in the global market, and the company is committed to delivering reliable, cost-effective lifting solutions that meet the evolving demands of the marine industry.

30-TONNE, 30M PURE ELECTRIC DECK CRANE

Jiangsu ZDPM's 30-tonne capacity, 30 metre working radius pure electric deck crane is designed for bulk carriers, container vessels, and other geared vessels. It represents a leap forward in sustainable cargo handling, with the following key advantages:

❖ **Energy efficiency:** equipped with



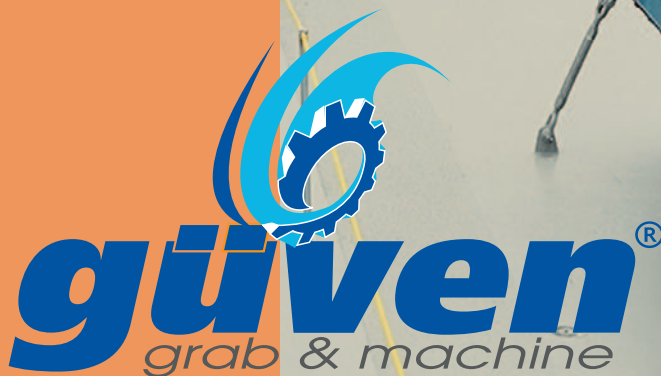
30-tonne, 30 metre pure electric deck crane.

variable frequency drive (VFD) and an energy recovery system, the crane recovers potential energy during lowering, improving overall energy utilization by 30-40% compared to conventional hydraulic cranes.

Standby power consumption is about 80% lower.

❖ **Zero emissions:** fully electric operation means no local exhaust emissions and no risk of oil leaks, making it a clean choice for

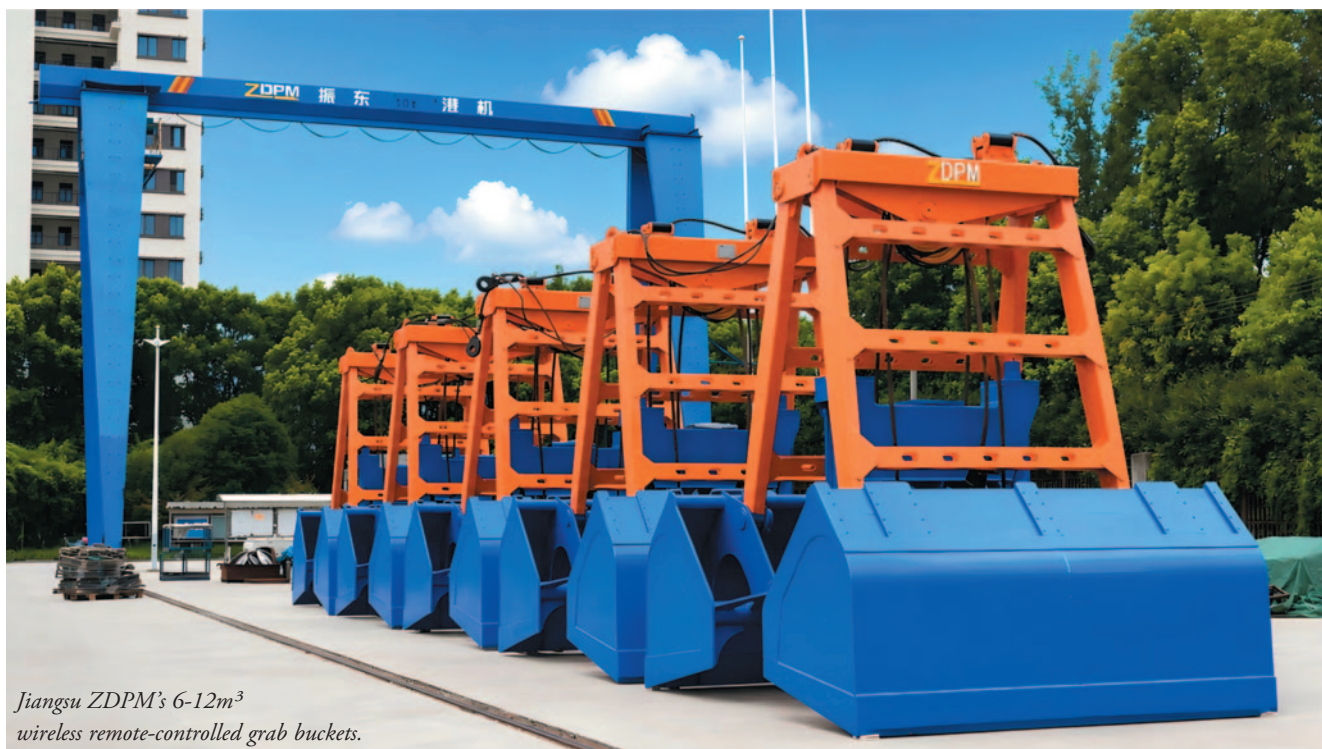
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Jiangsu ZDPM's 6-12m³
wireless remote-controlled grab buckets.

environmentally sensitive ports and waters. Each unit can cut hundreds of tonnes of CO₂ annually.

- ❖ **Precision and productivity:** VFD enables smooth, jerk-free motion and 360° continuous slewing, reducing cycle times and improving cargo handling efficiency.
- ❖ **Lower total cost of ownership:** no hydraulic oil, filters, or hoses, which slashes maintenance costs and extends service intervals by up to 50%. Repair costs are reduced by about 40%, and smaller generators lower initial investment.
- ❖ **Quiet and comfortable:** reduced noise and vibration improve operator working conditions on board.
- ❖ **Intelligent monitoring:** realtime data collection on motor temperature,

load, and system performance enables predictive maintenance and minimizes unplanned downtime.

This crane is already in production and available for order with flexible customization options to suit various vessel configurations.

WIRELESS REMOTE-CONTROLLED GRAB

Key features of these grabs:

- ❖ **Wireless control:** the grab can be opened and discharged at any position in the air via a handheld remote, offering maximum operational flexibility.
- ❖ **Self-contained power:** powered by a high-performance rechargeable battery, it requires no external power supply. A single charge supports over 100 hours of continuous operation,

ideal for long voyages.

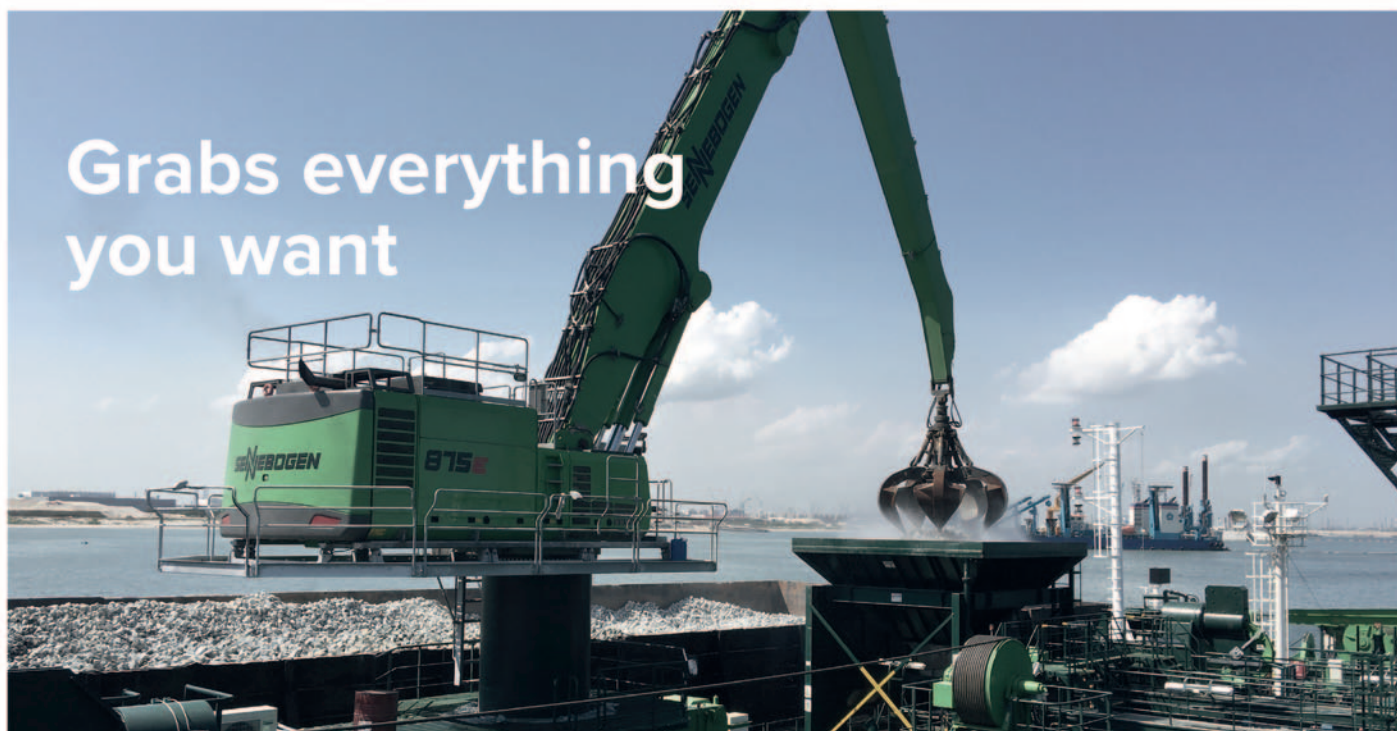
- ❖ **All-weather performance:** reliable in high temperatures, extreme cold, dust, and rain, with a remote control range of over 50 metres.
- ❖ **Advanced hydraulic system:** utilizes a power-controlled hydraulic pump with closed loop internal circulation, ensuring excellent sealing, fast cycle times, and smooth opening/closing without pressure shocks.
- ❖ **Dual control options:** comes standard with both a handheld controller and a foot pedal for operator convenience.
- ❖ **Versatility:** suitable for handling coal, iron ore, grain, clinker, and other dry bulk cargoes, with capacities and volumes customizable to customer requirements.

Engineering precision in action: heavy-duty grab buckets and material handling solutions from ENBL Machinery

General Background and Product Scope
ENBL (Kunshan) Machinery Co., Ltd., located in the industrial hub of Kunshan, Jiangsu Province, China, operates as a specialized manufacturer of heavy-duty material handling attachments with an annual production capacity of 6,000 tonnes.

The company focuses on the engineering and fabrication of high-performance mechanical, electro-hydraulic, and radio remote-control grab buckets designed for demanding





Our products

For all kinds of bulk handling

- Cactus Rope Grabs
- Clamshell Rope Grabs
- Hydraulic Cactus Grabs
- Hydraulic Clamshell Grabs
- Hydraulic Log Grabs
- Hydraulic Demolition & Sorting Grabs
- Quick Change System
- Multipurpose Spreader

All our grabs are custom made, designed and produced to our customers requirements.

J&B Grabs are highly efficient for large volume and low deadweight handling.

We grab everything you want!

J&B Grabs The Netherlands



Take a look at our website jb-grijpers.nl

maritime, port, rail, and barge terminal operations. ENBL equipment is built to handle a broad range of dry bulk commodities, successfully managing materials from heavy, high-density abrasive iron ore and coal to lighter, free-flowing agricultural bulks such as grain and fertilizer.

GLOBAL MARKET FOOTPRINT AND CORPORATE ACTIVITIES

This rigorous focus on engineering reliability has established ENBL as a trusted tier-one supplier to leading global crane and equipment integrators, including MacGregor, Konecranes, and ZPMC. Beyond these multinational integration partnerships, the company maintains a truly global footprint, delivering specialized bulk handling solutions directly to port authorities and terminal operators across all major worldwide trade routes.

To support this ongoing global expansion, ENBL actively participates in prominent international trade exhibitions and industry forums across Asia, Europe, and other strategic maritime hubs, continuously engaging with global partners to broaden its international market penetration.

These commercial initiatives reinforce an active project presence that spans Southeast Asia, East Africa, and southern Europe, while rapidly expanding into broader global markets. Recent inter-



national contracts highlight this capability, including a major bulk handling project for Johor Port Berhad executed in partnership with Tecgates Engineering to deploy advanced remote-control grab systems like the RCSG16.0-1.2-8000 model. Additionally, ENBL is currently executing technical documentation and specialized component manufacturing for active infrastructure operations under project codes Project MD60069 and Project DRCH-2026-025.

CORE TECHNICAL INNOVATIONS AND MANUFACTURING COMPETITIVENESS

To maintain a strong competitive edge in

the global market, ENBL invests heavily in advanced manufacturing processes that preserve raw material integrity. In a joint R&D partnership with SSAB, the company utilizes proprietary edge-milling machinery to bevel Hardox plates. This mechanical process limits surface hardness loss to under 8%, which vastly outperforms traditional underwater thermal cutting that typically results in a 20% hardness loss. Furthermore, precision interference components such as manganese steel bushings and bearings are assembled using a cryogenic freezing process at temperatures between -80°C and -100°C , completely eliminating the micro-cracks



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and structural defects caused by standard room-temperature forced assembly.

MACHINING PRECISION AND STRUCTURAL FORMING CAPABILITIES

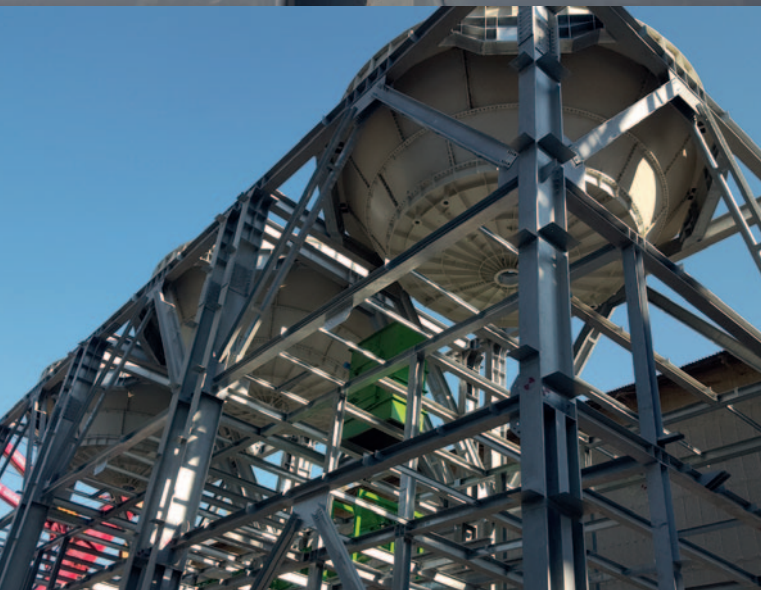
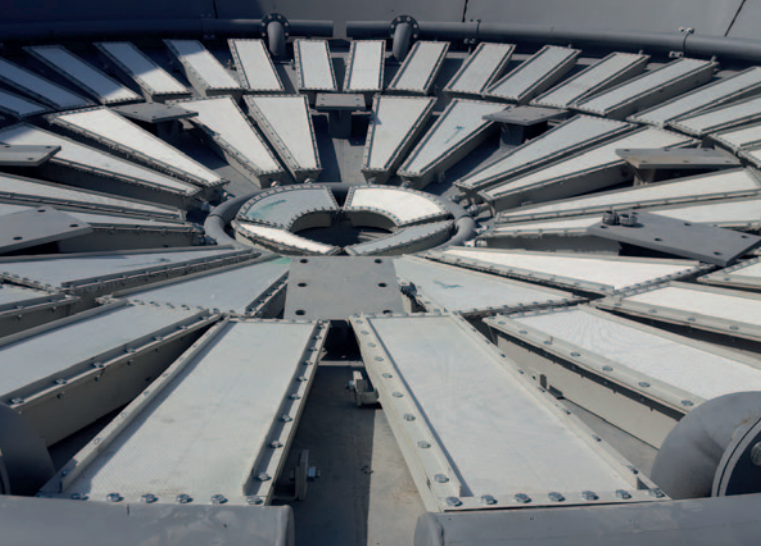
Structural integrity is further reinforced through integrated single-clamping boring. Following structural welding, major assemblies including upper and lower beams, struts, and bucket bodies undergo integrated boring on a 360° rotating machine table. ENBL can accommodate structures up to 72 tonnes for single-clamping machining, which completely neutralizes the cumulative alignment errors common with secondary clamping. To

preserve the baseline yield strength of high-tensile steel plates, bucket bodies for grabs up to 72 tonnes are shaped using a 500-tonne CNC cold rolling machine — capable of forming plates up to five metres wide and 25mm thick — and a 630-tonne CNC cold bending machine to guarantee uniform geometric consistency.

QUALITY CONTROL AND TRACEABILITY STANDARDS

All structural steel fabrication conforms rigorously to international codes, including EN25817, DIN8507A, and JB/2Q.4000-4-86. Automated CO₂ gas shielded welding incorporates precise pre-heating and

thermal insulation protocols to disperse welding stress and prevent local deformation. Raw steel sheets undergo integrated shot-blasting prior to production logging, and all parts are categorized through a centralized ERP system, making every finished component fully traceable back to its original mill heat number, material supplier, and individual welder stamp. Finally, critical load-bearing joints undergo non-destructive ultrasonic testing using a Nantong Union PXUT-330 system, conducted by in-house Level II UT inspectors certified under the China Special Equipment Inspection and Testing Association.



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Bateman Manufacturing's shipboard grabs: engineering efficiency for marine & port material handling

In maritime logistics and stevedoring, operational speed directly translates to financial profitability. Delays during vessel discharge lead to costly demurrage fees, making high-performance vessel-mounted and port material handling equipment essential.

Bateman Manufacturing, a prominent manufacturer of heavy-duty material handling attachments, addresses these high-stakes dockside challenges with its specialized line of port and marine attachments, most notably the Ships Gear Grapple (Diesel Hydraulic Grab).

THE CORE SOLUTION: THE SHIPS GEAR GRAPPLE (DIESEL HYDRAULIC GRAB)

Designed specifically for ship cranes, gear ships, and port material handling applications, Bateman's Ships Gear Grapple — often referred to as a diesel hydraulic grab — is engineered to handle bulk materials, scrap, and heavy cargo efficiently.

KEY FEATURES & DESIGN ENGINEERING

- ❖ **Self-powered operation:** equipped with an internal diesel engine-hydraulic power pack, allowing the grab to operate independently on ship crane hooks without relying on complex hydraulic feed lines from the host vessel or shore crane.
- ❖ **Heavy-duty cylinder & body protection:** the wide-body steel construction provides 100% protection to the hydraulic cylinders. This prevents impacts from bulk cargo, hatch covers, or vessel walls during rapid loading cycles.
- ❖ **Leak-free hydraulic integrity:** features high-pressure SAE split flange fittings on hose connections to optimize hydraulic seal security and prevent fluid leaks in environmentally sensitive marine settings.
- ❖ **Serviceability & service access:** designed with a split body and hinged access doors. Maintenance teams can access the diesel engine, pumps, and fuel points directly on the dock, minimizing downtime during vessel turnarounds.



- ❖ **Quick hitch tines & wear protection:** built with wear-resistant material in critical contact zones. The tines feature quick-hitch mechanisms for easy removal during transport or service.

B5TD & B6TD MODELS

Bateman now offers its B5TD and B6TD Ships Gear Grapples as rental units. Customers can get immediate access to reliable, high-capacity handling solutions without the upfront investment.

The Bateman Ships Gear Grapple is engineered to maximize uptime and minimize costs where it matters most — at the dock. Designed for durability and operational efficiency, it helps operators achieve some of the lowest demurrage fees in the industry, keeping vessels moving and projects on schedule. Built with heavy-duty tines and ultimate cylinder protection, this grapple delivers

exceptional strength and reliability in demanding port environments. Its leak-free split flange fittings enhance hydraulic integrity, reducing maintenance concerns and ensuring consistent performance.

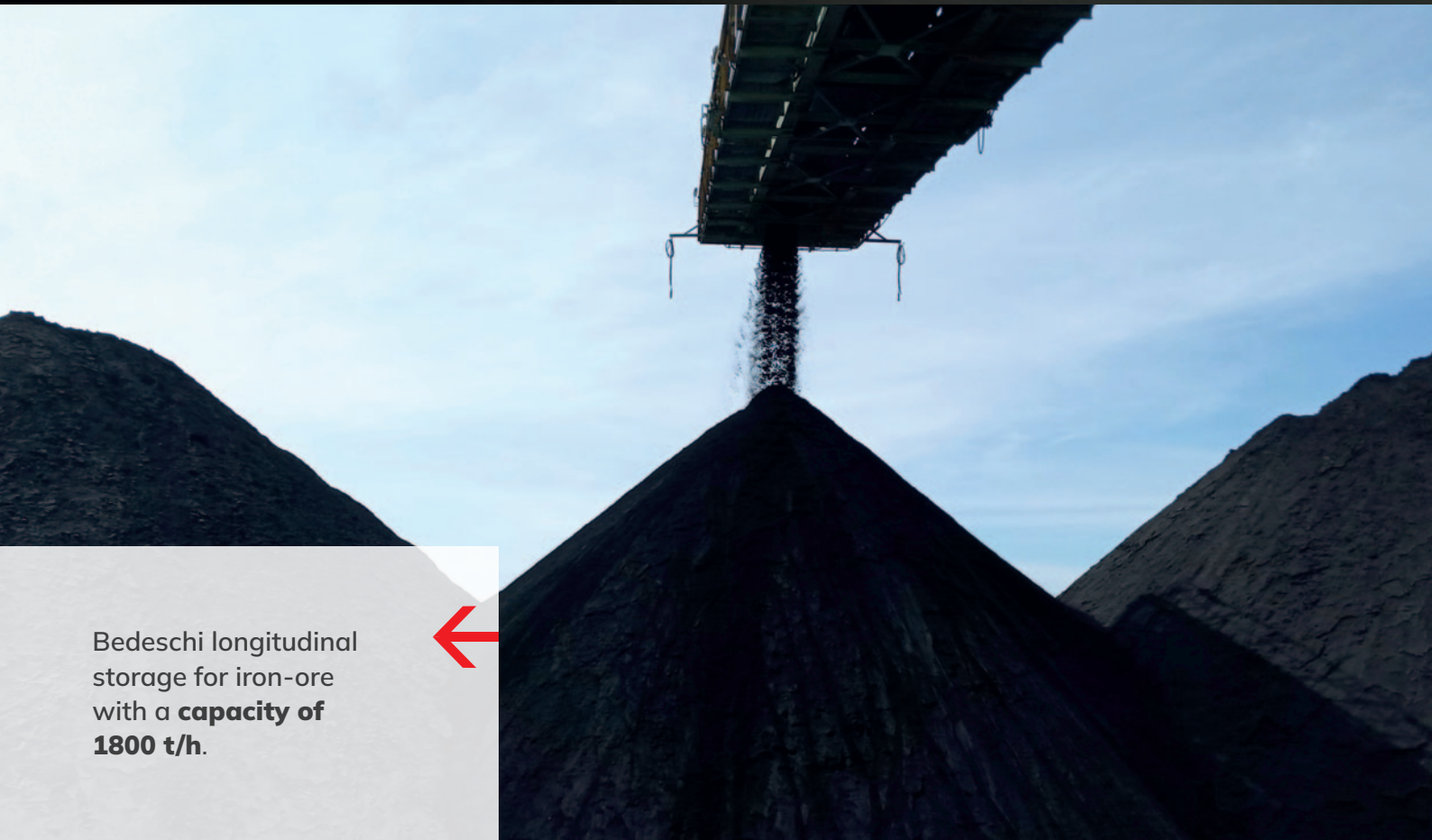
Serviceability is a priority. With easy engine and pump access and readily available spare parts, maintenance is straightforward — minimizing downtime and keeping operations running smoothly. For added convenience, the grapple comes equipped with quick hitch tines, allowing for fast tine removal to simplify transport and improve jobsite flexibility.

The Bateman ships' Gear Grapple combines rugged construction, smart engineering, and cost-saving performance.

BENEFITS OF BATEMAN GRABS

- ❖ **Reduced demurrage costs:** high volumetric capacity and rapid cycle times help clear ship holds faster, avoiding expensive port delays.
- ❖ **Built for harsh marine environments:** tough T1 steel construction and AR wear-plate protection resist salt air corrosion and continuous impact wear.
- ❖ **Jobsite flexibility:** quick-hitch tine designs make transport between different vessel assignments or storage berths straightforward.





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Self-discharger: 'Nor Viking' handles bulk cargo and timber with a SENNEBOGEN 875 E

A durable, seawater-resistant coating protects all components of the material handler from corrosion and ensures a long service life in harsh offshore conditions.



Arriva Shipping, based in Ølen, Norway, has operated a specialized fleet of modern cargo vessels for more than 50 years. The family-owned company primarily transports bulk cargo and timber throughout Northern Europe. With eight self-unloading vessels of up to 8,000dwt, Arriva Shipping offers customers a high degree of flexibility, even in ports with limited cargo-handling infrastructure.

The largest vessel in the fleet to date is the *Nor Viking*. Since entering service in 2022, the ship has been equipped with an integrated SENNEBOGEN 875 E material

handler. Permanently integrated into the vessel's structure, the machine enables independent loading and unloading of the approximately 11,500m³ cargo holds.

THE CHALLENGE: CARGO HANDLING WITHOUT PORT CRANES

A self-unloading vessel, also referred to as a self-loader or self-discharger, is a cargo ship equipped with its own cargo-handling system. Its key advantage is the ability to load and unload cargo independently, without relying on shore-based cranes.

For Arriva Shipping, this independence is

a major operational benefit. The *Nor Viking* can call at smaller ports where no cargo-handling infrastructure is available.

This concept places demanding technical requirements on both the vessel and the machine:

- ❖ safe integration of the material handler into the vessel's structure;
- ❖ robust, seawater-resistant corrosion protection;
- ❖ sufficient reach and lifting capacity for cargo handling between the cargo hold and the quay;
- ❖ energy-efficient operation via the vessel's onboard power supply; and
- ❖ excellent visibility into both the cargo hold and the quay area.

HOW DOES THE SENNEBOGEN 875 E MOVE ON A SELF-UNLOADING VESSEL?

On board the *Nor Viking*, the uppercarriage of the SENNEBOGEN 875 E is mounted on a fully traversable gantry. This gantry moves between the cargo hatches, allowing the material handler to reach different sections of the cargo holds.

Instead of operating from a fixed position, the machine follows the material flow along the length of the vessel. This is essential for efficiently handling bulk materials and timber from the deep and

Thanks to a movable traverse, the SENNEBOGEN 875 E can move flexibly across both cargo holds to reach even areas which are difficult to access.



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A durable, seawater-resistant coating protects all components of the material handler from corrosion and ensures a long service life in harsh offshore conditions.



difficult-to-access areas of the cargo holds.

For the operator, the Skylift elevating cab provides excellent visibility. The cab can be raised and lowered continuously, ensuring an unobstructed view of both the cargo hold and the quay throughout the handling operation.

ROBUST, LOW-MAINTENANCE ELECTRIC DRIVE

The SENNEBOGEN 875 E aboard the *Nor Viking* is powered by a 390kW electric motor, supplied directly via the vessel's onboard electrical system. The electric drive enables quiet and low-emission operation while offering several practical advantages compared to a diesel-powered machine:

- ❖ significantly extended maintenance intervals;
- ❖ reduced service requirements;
- ❖ no time-consuming refueling;
- ❖ operation via the existing onboard power supply; and
- ❖ lower emissions during port operations.

In addition, the Green Hybrid energy recovery system further improves operating efficiency by reducing operating costs by up to 35%.

WHY IS REACH SO IMPORTANT ON A SELF-UNLOADING VESSEL?

With a reach of 26 metres, the SENNEBOGEN 875 E can access even the deepest and most difficult-to-reach areas of

the cargo holds, ensuring the *Nor Viking* can carry out completely autonomous cargo handling operations.

In addition to a clamshell bucket for bulk cargo, the machine can be quickly equipped with a timber grab or other attachments, allowing it to adapt flexibly to different cargo types and customer requirements.

Following the positive experience with the *Nor Viking*, Arriva Shipping has already commissioned two additional sister self-unloading vessels, both of which will also be equipped with a SENNEBOGEN 875 E. The shipping company is supported by SENNEBOGEN's Norwegian sales and service partner Volvo Maskin, which provides technical consultation, service support, and long-term customer care.

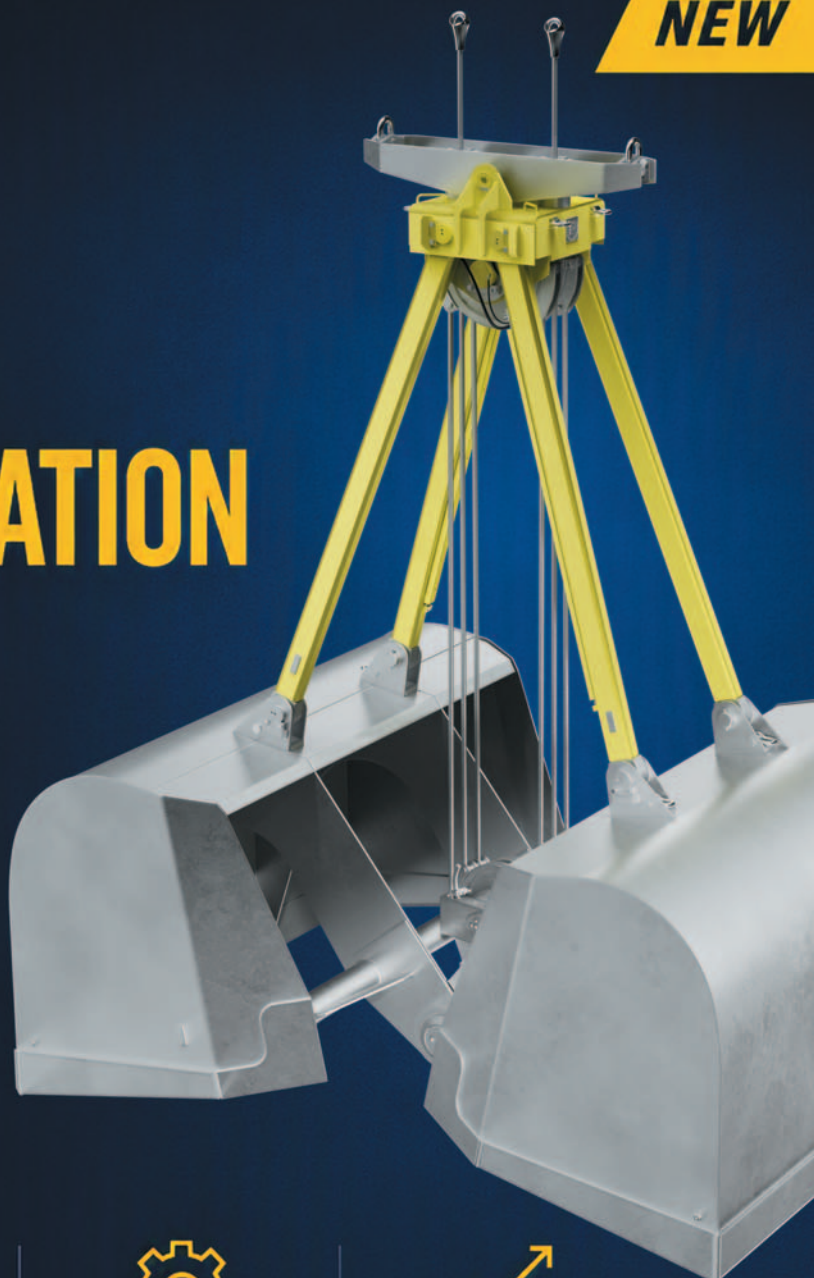


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STEMM shipboard grabs deliver high-speed bulk handling in harsh maritime environments

Shiploading and unloading operations demand high speed, structural durability, and low maintenance. Self-unloading bulk carriers, transshipment vessels, and mobile harbour cranes rely on robust attachment systems to maintain fast cycle times. Spain-based manufacturer STEMM engineering grabs designed to meet these harsh maritime conditions.

THE ROLE OF SHIPBOARD GRABS IN MARITIME BULK HANDLING

Shipboard grabs operate under distinct constraints compared to onshore industrial overhead cranes:

- ❖ **Dynamic marine environments:** pitching, rolling, and saltwater spray introduce constant mechanical stress and corrosive forces.
- ❖ **Variable bulk material densities:** cargo ranges from heavy ores (iron ore, bauxite) to fine grains, coal, and clinker, requiring specific penetration forces and volume capacities.
- ❖ **Crane power integration:** ship deck cranes often run electro-hydraulic or mechanical single-wire systems, requiring grabs engineered to integrate seamlessly into existing deck machinery.

STEMM PRODUCT RANGE FOR MARITIME & PORT APPLICATIONS

STEMM designs specialized clamshell and orange-peel grab configurations to optimize penetration force and fill factor across bulk cargo types.

ELECTRO-HYDRAULIC CLAMSHELL GRABS

Electro-hydraulic clamshell grabs are widely used for self-unloading vessels and deck cranes handling free-flowing or granular bulk cargoes (coal, grain, sand, or aggregates).

- ❖ **Integrated motor pump units:** hydraulic pressure is generated directly within the grab structure, minimizing external fluid lines.
- ❖ **Optimized shell kinematics:** curved shell profiles maximize penetration depth and closing force, preventing material drag and improving fill factors.
- ❖ **Sealed & dust-tight design:** sealed structures prevent spillage of fine powders during transit from hold to hopper.

ELECTRO-HYDRAULIC ORANGE PEEL GRABS

For irregular, heavy, or non-free-flowing

KEY DIFFERENTIATING FEATURES OF STEMM MARINE GRABS	
FEATURE	MARITIME BENEFIT
Grab-connect system	Remote monitoring and real-time diagnostic system tracking operational parameters, hours, temperatures, and maintenance alerts via telemetry.
Heavy-duty marine coatings	Multi-layer epoxy paint systems and nickel-chrome-plated cylinder rods resist salt-fog corrosion and harsh deck conditions.
High penetration geometry	Low centre of gravity and optimized deadweight-to-payload ratio maximize penetration into compact cargo heaps.
Automated test bench QC	Each grab undergoes pre-delivery load and pressure testing at STEMM's facilities to verify zero-leakage hydraulic circuits.



cargoes — such as scrap metal, pig iron, or heavy rocks — STEMM provides multi-tine orange peel grabs.

- ❖ **Independent hydraulic cylinders:** each tine operates with dedicated hydraulic actuation, ensuring a firm grip on irregular shapes.
- ❖ **Anti-wear materials:** built using high-tensile, abrasion-resistant steels (e.g., Hardox) on tine tips and cutting edges.

MECHANICAL & SINGLE-ROPE/RADIO REMOTE CONTROL GRABS

For vessels without direct electric power supplies to the crane hook, mechanical and wireless remote-controlled grabs offer hook-on simplicity. These grabs automatically lock and release via radio frequency triggers or mechanical latching systems.

OPERATIONAL IMPACT: LOWER CYCLE TIMES, HIGHER THROUGHPUT

Unloading a Panamax or Supramax vessel involves high daily laytime costs. A grab failure or inefficient fill rate directly increases port turnaround time. STEMM's shipboard grabs address these challenges through:

- ❖ **Faster closing speeds:** high-efficiency hydraulic circuits reduce closing and opening duration per cycle.
- ❖ **Reduced spillage:** precise edge-sealing prevents material loss over open water, aligning with environmental regulations at port terminals.
- ❖ **Preventative maintenance:** real-time data from internal sensors identifies hydraulic temperature spikes or filter clogs before major component failure occurs at sea.

Passive dust control

at conveyor transfer points



(All images: © 2026 Martin Engineering.)

Most belt conveyors experience some spillage and dust at the transfer point, leading to safety and air quality concerns, writes Todd Swinderman, CEO Emeritus/ Martin Engineering. Passive dust control is achieved by retrofitting the conveyor transfer point to seal the enclosure and control airflow within it, allowing dust to settle back onto the material stream, rather than using powered air cleaners or HVAC hoods to extract particulates. Although passive methods are not a silver bullet, this engineering control should be the first step toward transfer-point dust suppression, for the long-term ROI with low maintenance and a track record of compliance.

Nearly all global government air quality regulations for bulk handling address respirable crystalline silica (RCS) due to its association with silicosis, pneumoconiosis, and chronic obstructive pulmonary disease (COPD). Raw material handlers are acutely affected by RCS. However, general particle emissions are also harmful, so most bulk handlers, such as recyclers, agricultural operations, ports, and steel producers, greatly benefit from the workplace safety that passive dust control provides.

HAVE DUST, WILL TRAVEL

The skirtboard enclosure is essentially a settling chamber. The basic concept is that a dust particle will settle out of a laminar

air stream based on the speed of the air flow (V_{air}), and the terminal velocity (V_t) of the dust particle [see Fig. 1 on p90].

Current practice for conveyor enclosures is to design for $V_{air} \leq 1.0$ m/s by increasing enclosure height. Two common rules of thumb for the enclosure length are two times the belt width or 0.6m per 1.0m/s of belt speed. It is interesting to note that if H is increased, the distance (L) that the average dust particle must travel also increases.

CONTROLLING AIRFLOW

The average air velocity through the skirtboards is directly proportional to the induced airflow and cross-sectional area.

Average velocities in the skirtboards due to induced air can range from 0.8 to 2.8m/s. Belt speed has a minor effect on the average velocities. The maximum air velocities are almost always found where the air flows under the skirtboard curtains [see Fig. 2, right].

- ❖ **Particle density:** particles of 40 and 100 microns (μm) in size — roughly the size of a human hair — settle quickly. A particle $10\mu\text{m}$ or smaller is 'respirable', or able to penetrate the lungs' natural defences and cause serious lung diseases. As bulk density increases, respirable dust emissions decrease moderately and must be properly contained.
- ❖ **Curtains:** the best results are obtained using three or more curtains. Martin® A.I.R. Control™ Dust Curtains create controlled recirculation zones that allow dust particles to agglomerate and settle [see Fig.3, below].
- ❖ **Figure 3:** the Martin® A.I.R. Control™ Dust Curtain slows dust and turbulent air flow through the transfer point.
- ❖ **Loading chute and tailbox:** the width of the loading chute should be narrower than the skirtboard width.

Skirtboard Enclosure Dust Settling

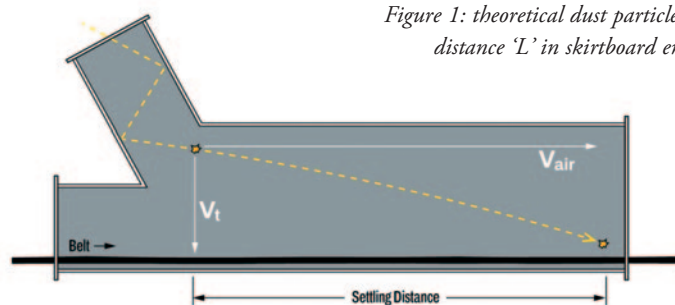


Figure 1: theoretical dust particle settling distance 'L' in skirtboard enclosure.

Skirtboard Enclosure Air Recirculation

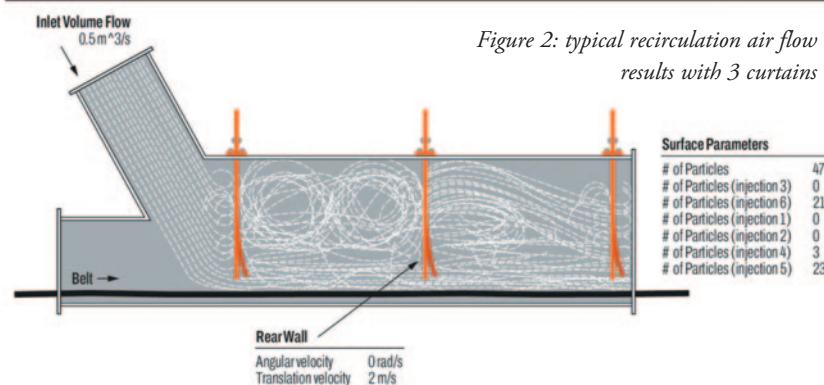


Figure 2: typical recirculation air flow results with 3 curtains



Figure 3: the Martin® A.I.R. Control™ Dust Curtain slows dust and turbulent air flow through the transfer point.

This folds the airflow between the first curtain and the tailbox, encouraging it toward the top of the enclosure rather than along the material's surface.

- ❖ **Skirtboard length:** if airflow is under 0,5 cubic metres per second (1,000ft³/minute), the length of skirtboard is 0.6m (2ft) for every 0.5mp/s (100fpm) of belt speed. If airflow is greater than 0.5m³/s (1,000ft³/m), the length of skirtboard is 0.9m (3ft) for every 0.5mp/s (100fpm) of belt speed. This allows enough room to establish circulation zones and — if properly sealed with skirting like Martin® ApronSeal™ Urethane Skirting — results in passive dust control [see Fig.4 on p91].
- ❖ **Skirtboard height:** an enclosure height beyond 600mm (24in.) for the standard conveyor with a single exit curtain can reduce nuisance emissions but, space allowing, a taller enclosure increases the average settling path for greater control.

CONCLUSION

Along with reducing emissions and spillage, passive dust control requires no power and only limited maintenance. By controlling airflow, dustbags can be added for an extra layer of passive particle suppression. Retrofitted equipment decreases cleaning

ApronSeal™ Urethane Skirting

One-Piece Skirting



Two-Piece Skirting



Figure 4: the choice of one- or two-piece Martin® ApronSeal™ Urethane Skirting depends on the available space along the belt edge.

labor, increases system life, improves compliance, and reduces downtime, making a quantifiable case for a short return on investment.

ABOUT MARTIN ENGINEERING

Martin Engineering is a global expert in bulk materials handling solutions. For over 80 years, Martin has designed, manufactured and installed innovative products that make

the world's foundation industries cleaner, safer, and more productive. Based in the USA, the privately owned company has drawn on its unrivalled experience and expertise to help operations improve safety, enhance material flow, reduce spillage and dust, and minimize downtime. With factory-owned facilities in 20 countries, on-the-ground presence in another 40, and a worldwide service

partner network, Martin has built an enviable reputation for high performance products delivered with exceptional technical service and support. The company's comprehensive *Foundations™* textbooks, learning resources, and training programs are the global standard for the efficient and effective design, operation, and maintenance of bulk materials handling equipment.

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Louise Dodds-Ely

SLSMC reports resilient 2025 performance driven by agri exports

The Europe-North America trade route is a vital transportation link and is a long standing and vital link for continental trade. Vessel traffic between the European continent and North America via the St. Lawrence River and Seaway System serves as one of the world's foremost two way trade. The Great Lakes–St. Lawrence Seaway System is a deep draught waterway extending 3,700km (2,340 miles) from the Atlantic Ocean to the head of the Great Lakes, in the heart of North America. The St. Lawrence Seaway portion of the System extends from Montreal to mid-Lake Erie. Ranked as one of the outstanding engineering feats of the twentieth century, the St. Lawrence Seaway includes 13 Canadian and two US locks.

The Great Lakes and St. Lawrence River have been major North American trade arteries since long before the US or Canada achieved nationhood. Today, this integrated navigation system serves miners, farmers, factory workers and

commercial interests from the western prairies to the eastern seaboard. With economic output estimated at \$6 trillion, the provinces and states bordering the Great Lakes–St. Lawrence Seaway System account for 30% of combined Canadian and US economic activity and employment. The region would rank as the third largest economy in the world if it were a country. Positioned at the core of this economic powerhouse, the Great Lakes St. Lawrence Seaway System serves as a vital supply chain.

THE 2025 NAVIGATION SEASON

The 2025 navigation season for the St. Lawrence Seaway Management Corporation (SLSMC) demonstrated the fundamental resilience of North America's marine supply chains. Against a backdrop of shifting international trade policies, changing industrial demand, and global macroeconomic fluctuations, bulk commodity movements served as the

2025 BULK CARGO PERFORMANCE VS. 2024

COMMODITY	MN TONNES	% CHANGE
Grain	12.91mt (+9.36%)	
Dry bulk	11.31mt (+2.38%)	
Iron ore	4.97mt (–2.15%)	
Liquid bulk	4.02mt (+0.61%)	
Coal	1.58mt (–16.25%)	

primary stabilizing engine for the Great Lakes–St. Lawrence Seaway System.

In total, the binational waterway — stretching from Montreal to the inland reaches of Lake Superior — handled 37mt (million metric tonnes) of cargo across 3,937 vessel transits. While total tonnage remained virtually unchanged compared to 2024 (a modest 0.15% gain), the structural makeup of the cargo traffic revealed a significant narrative: a record-setting surge in agricultural bulk compensated for steep

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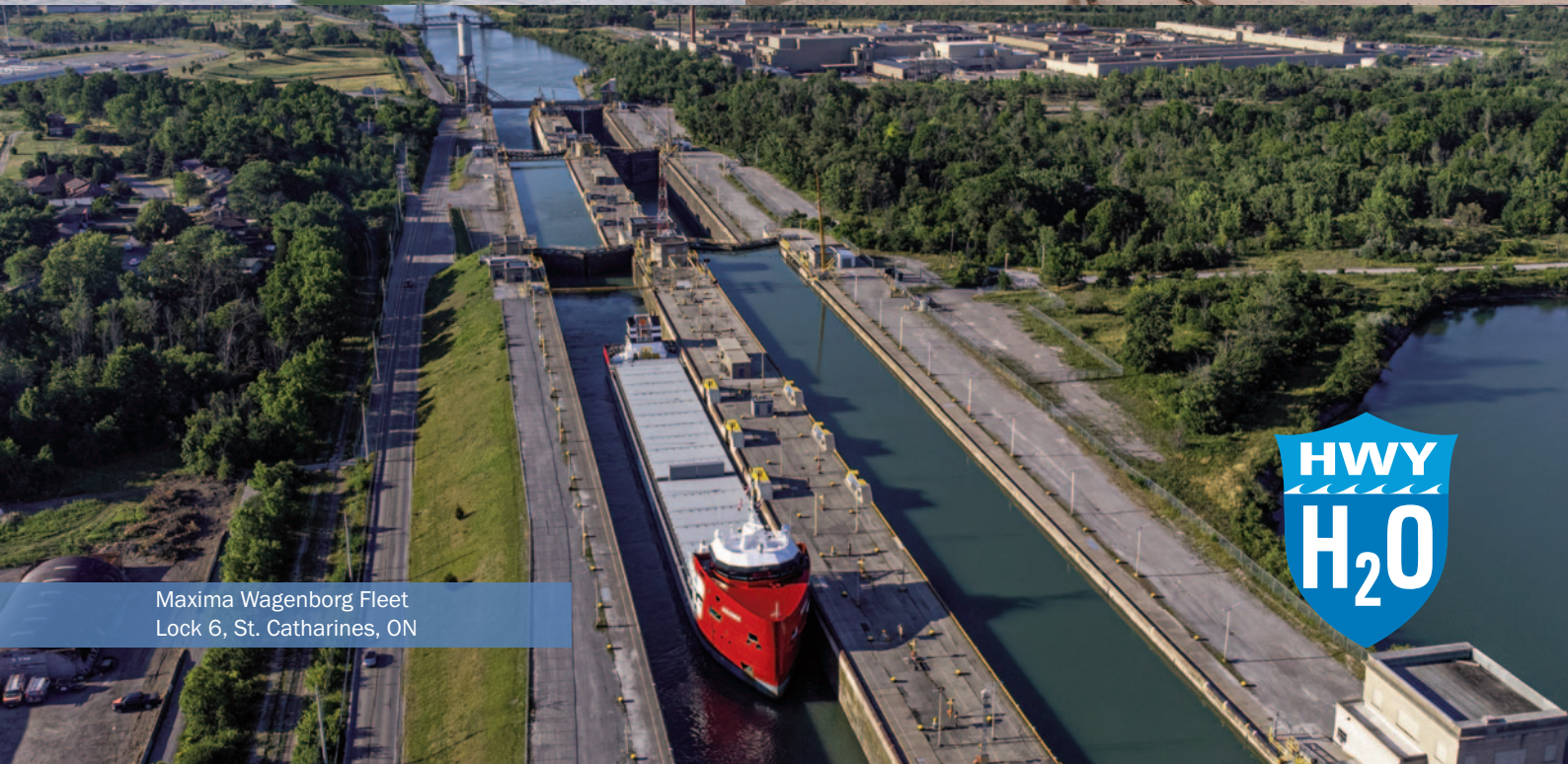
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downturns in manufactured steel and general cargo.

AGRICULTURAL GRAIN: THE DOMINANT ENGINE OF TONNAGE GROWTH

The defining operational success story of 2025 was the extraordinary volume of agricultural grain moving downbound through the system. Grain shipments soared to 12.91mt, representing a 9.36% year-over-year increase and accounting for over a third of all system-wide cargo.

Canadian wheat, combined with bumper harvests in both Canada and the US Midwest, drove continuous vessel movements throughout the 298-day shipping window. Canadian and American wheat dominated the category, supplemented by strong movements of corn and soybeans destined for European, North African, and Middle Eastern markets.

Primary grain-loading hubs, particularly the Port of Thunder Bay on Lake Superior, reported near-capacity terminal operations. Strategic infrastructure investments made by port operators and marine terminal partners over recent years paid substantial dividends, ensuring rapid vessel turnaround times and preventing bottlenecks at critical lock choke points such as the Welland Canal and the Montreal–Lake Ontario (MLO) section.

DRY AND LIQUID BULK: POTASH AND DE-ICING SALT DRIVE STABILITY

Beyond agriculture, traditional dry bulk and liquid bulk categories posted steady gains, reflecting sustained regional industrial consumption and global demand for North American minerals.

DRY BULK OPERATIONS (+2.38%)

Dry bulk cargoes expanded to 11.31mt in 2025; two main commodities led this growth:

- ❖ **Fertilizers (potash):** Canadian potash shipments remained exceptionally strong. As global buyers continued to diversify supply sources away from Eastern European producers, Western Canadian potash moved steadily via Seaway ‘Lakers’ and ocean-going ‘salties’ to international buyers.
- ❖ **De-icing salt:** municipal and commercial salt replenishment surged during early and late-season navigation windows. Heavy winter stocking across Great Lakes cities triggered consistent short-sea shipping routes from major salt mines in Ontario and Michigan.

LIQUID BULK OPERATIONS (+0.61%)

Liquid bulk shipments edged up slightly to 4.02mt. Refined petroleum products, asphalt, and specialized liquid chemicals maintained steady transit schedules,

serving regional refineries and industrial plants along the St. Lawrence River corridor.

CONTRACTIONS IN HEAVY INDUSTRY: IRON ORE AND COAL

While agriculture and raw minerals flourished, bulk commodities tied directly to steelmaking and traditional power generation experienced noticeable contractions.

- ❖ **Iron ore (4.97mt, –2.15%):** iron ore pellets — sourced primarily from Labrador Trough mines and transshipped through Lower St. Lawrence ports to domestic steel mills — saw a minor pull-back. Fluctuating steel production schedules in Ontario and the US rust belt led to reduced domestic mill demand.
- ❖ **Coal (1.58mt, –16.25%):** coal posted the sharpest decline among all bulk categories. This 16.25% reduction highlights the long-term structural phase-out of thermal coal in regional power grids, alongside weaker metallurgical coal exports.

This softening in industrial bulk coincided with a severe downturn in general cargo (down 29.47% to 2.18mt), where finished steel imports were heavily impacted by shifting international trade tariffs and domestic trade friction.



OPERATIONAL FLUIDITY AND MODERNIZATION

Managing a complex system of 13 Canadian locks (alongside two US locks) requires high operational availability. Throughout 2025, the SLSMC maintained lock reliability rates near 99%, minimizing unexpected delays for commercial carriers.

The corporation's ongoing modernization efforts — specifically hands-free mooring (HFM) systems, automated vessel traffic management, and predictive maintenance protocols — enabled high efficiency despite tight seasonal weather windows. Furthermore, downbound traffic (outbound grain and bulk exports) significantly outpaced upbound traffic, requiring precise scheduling to balance empty vessel returns with loaded departures.

LOOKING AHEAD

The SLSMC's 2025 performance underscores the role of the Great Lakes–St. Lawrence Seaway as a vital trade corridor. When global trade tensions or manufacturing shifts dampen general cargo movements, bulk commodities — especially grain, potash, and essential industrial minerals — provide the tonnage foundation that keeps the marine economy moving forward.



By leveraging modern lock technology, maintaining high operational reliability, and accommodating long-haul bulk carriers, the

SLSMC proved in 2025 that it remains indispensable to North American export competitiveness.

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Steering the system: GLS infrastructure powers Great Lakes shipping resilience

QSL's Terminal Iroquois at the Port of Chicago.



The Great Lakes St. Lawrence Seaway Development Corporation (GLS) — a federal agency within the U.S. Department of Transportation operating in tandem with Canada's St. Lawrence Seaway Management Corporation (SLSMC) — serves as the critical steward of one of North America's most vital trade arteries. Over the recent navigation season, the Seaway system demonstrated remarkable resilience, handling approximately 37mt (million metric tonnes) of cargo.

While overall volume held steady, the true story of the past year lies in the central role of bulk cargoes. Accounting for over 85% of total throughput, bulk commodities — ranging from agricultural grains and road salt to iron ore and liquid energy products — buffered the regional economy against broader macroeconomic headwinds and trade volatility.

AGRICULTURAL BULK: GRAIN DRIVES SYSTEM TONNAGE

Agricultural bulk served as the primary engine of growth across the Seaway corridor. Total grain throughput reached 12.91mt, representing a 9.4% year-over-year increase and accounting for nearly 35% of all cargo moved through the binational waterway.

This surge in agricultural exports was fuelled by bumper grain harvests across

the US Midwest and Canadian Prairies, paired with sustained global demand for North American wheat, soybeans, and corn. Port facilities across the Great Lakes — including Duluth-Superior, Toledo, and Hamilton — benefited from efficient vessel turnaround times, highlighting the Seaway's efficiency as a direct conduit from the American Heartland to overseas markets in Europe, North Africa, and the Middle East.

INDUSTRIAL AND MINERAL DRY BULK: INFRASTRUCTURE AND WINTER DEMANDS

Beyond agriculture, general dry bulk commodities delivered a steady performance, rising 2.4% to 11.31mt. A standout performer within this category was road salt, which experienced a dramatic 34% surge to over 3.06mt. Regional municipalities and transport departments actively replenished stockpiles following severe winter weather cycles in the Great Lakes basin.

Concurrently, construction-related dry bulk — such as cement, stone, aggregates, and synthetic gypsum — remained stable. Sustained public infrastructure funding under federal development initiatives supported steady movements of construction raw materials between US and Canadian ports, compensating for localized slowdowns in private

commercial real estate.

ENERGY AND MINING BULK: DECARBONIZATION AND INDUSTRIAL REALIGNMENT

The performance of mining and heavy industrial bulk reflected ongoing structural shifts in the energy and manufacturing sectors:

- ❖ **Iron ore:** total iron ore volume dipped slightly by 2.1% to 4.97mt. While domestic steel mills in North America maintained steady production levels, fluctuations in global steel demand and shifts in mill feedstock requirements created modest downward pressure on transshipments.
- ❖ **Coal:** coal shipments recorded the steepest decline among bulk commodities, dropping 16.2% to 1.58mt. This drop underscores the ongoing, long-term transition of regional power utilities away from thermal coal in favour of natural gas and renewable energy sources.
- ❖ **Liquid bulk:** comprising refined petroleum products, liquid fertilizers, and biofuels, liquid bulk held firm at 4.02mt (+0.6%). Increased demand for bio-based fuels and industrial chemicals offset slight dips in traditional petroleum transit.

STRATEGIC SIGNIFICANCE AND INFRASTRUCTURE INVESTMENT

The strong performance of bulk cargoes stood in stark contrast to general cargo, which dropped by nearly 30% to 2.18mt due to trade tariffs and supply chain realignment in foreign steel imports. The reliability of bulk commodities ensured that overall Seaway tonnage remained virtually unchanged (+0.15% year-on-year), demonstrating the system's ability to absorb sector-specific market shocks.

To maintain this economic lifeline, the GLS and SLSMC expanded operational windows — maintaining navigation seasons spanning over 290 days — while achieving commercial reliability rates near 99%. Multi-year infrastructure programs exceeding \$350 million are actively upgrading lock infrastructure, hands-free mooring systems, and digital transit management technologies.

KEY TAKEAWAYS

- ❖ **Bulk cargo dominance:** agricultural and mineral bulk provided the essential backbone of Great Lakes shipping, compensating for declines in breakbulk and imported steel.
- ❖ **Grain leadership:** a 9.4% surge in grain underscored the Seaway's critical role in global food security and North American export supply chains.
- ❖ **Resilience through diversification:** investments in modernizing GLS lock infrastructure continue to ensure high operational uptime, positioning the Great Lakes-St. Lawrence Seaway for long-term supply chain dependability.



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Canfornav marks 50 years of global growth, Seaway expertise, and sustainable shipping

Since its inception in 1976, the Canadian Forest Navigation Co., Ltd (Canfornav) has transformed from a niche regional vessel operator into a premier global ocean transportation service. Now celebrating its 50th anniversary, Canfornav stands as a pillar of reliability in the maritime industry, connecting North America's industrial heartland to major global markets.

FROM FOREST PRODUCTS TO GLOBAL BULK OPERATIONS

Founded in Montreal, Quebec, Canfornav initially operated as a specialized shipping line catering primarily to Canada's lumber and forest products export sector. Recognizing the evolving requirements of international trade and dry-bulk logistics, the company quickly diversified its core services.

Over the past five decades, Canfornav has expanded its focus to encompass the full spectrum of dry-bulk commodities — including grains, minerals, steel, fertilizers, and agricultural products. Today, it ranks among the premier Handysize vessel owners and operators in the Great Lakes and St. Lawrence Seaway, while maintaining a vast, worldwide ocean transport network.

SCALE AND OPERATIONAL CAPABILITIES

Canfornav's modern fleet and experienced shore-based logistics team enable seamless navigation through the restrictive lock systems of the St. Lawrence Seaway as well as open ocean lanes across 78 countries.

- ❖ **Fleet strength:** controls a modern fleet of roughly 60 Handysize vessels, uniquely suited to shallow-draught waterways and ocean-going transits.
- ❖ **Global reach:** connects over 675 ports worldwide through approximately 330 voyages every year.
- ❖ **Cargo capacity:** ships more than 8.1 million tonnes of dry bulk and breakbulk cargo annually.
- ❖ **Primary corridor:** functions as a critical maritime bridge linking the North American industrial corridor to ports in Europe, the Mediterranean, the Americas, and beyond.

A GOLDEN ANNIVERSARY BUILT ON PARTNERSHIP

Celebrating 50 years in shipping is a testament to strong commercial relationships and operational flexibility. Canfornav's success relies heavily on



strategic long-term partnerships — such as its three-decade-plus ship-management alliance with Athens-based Navarone S.A. — and the expertise of its mariners and onshore personnel.

Key factors driving Canfornav's longevity include:

- ❖ **Environmental responsibility:** actively adopting sustainable shipping practices, optimizing vessel fuel efficiency, and supporting green maritime technologies to lower carbon footprints across the Great Lakes ecosystem.
- ❖ **Operational versatility:** combining owned and long-term chartered Handysize vessels — frequently optimized for Seaway dimensions — to deliver tailored logistics solutions for complex breakbulk and bulk trade routes.
- ❖ **Customer-centric fleet management:** maintaining short decision-making chains that give charterers and cargo owners quick responses in fluctuating freight markets.

MASTERING THE 'SEAWAYMAX' ADVANTAGE

Navigating the St. Lawrence Seaway requires vessels tailored to strict physical constraints, including narrow lock dimensions and shallow draught limits.

Canfornav specializes in operating Handysize dry-bulk carriers, many of which are designed specifically as Seawaymax vessels.

- ❖ **Lock compatibility:** ships are custom-built to fit within the 740-foot length and 78-foot beam restrictions of the Seaway's 15 locks.
- ❖ **Shallow-draught efficiency:** vessels maximize cargo intake without exceeding draught limitations, allowing seamless transit through rivers, canals, and shallow lake harbours.
- ❖ **Global flexibility:** unlike domestic Lakers confined strictly to the lakes, Canfornav's fleet can load cargo directly in inland ports — like Duluth, Thunder Bay, or Chicago — and sail out to international destinations without requiring intermediate offloading or transshipment.

LOOKING AHEAD

As Canfornav marks half a century of operations, the company remains focused on modernizing its fleet, pursuing decarbonization initiatives, and expanding its global footprint. By blending decades of regional expertise in Canadian waters with deep international dry-bulk capability, Canfornav enters its next chapter well-equipped to support global supply chains for decades to come.



CanforNav

A member of the Canadian Forest Navigation Group

Navigating The Globe



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CSL marks the completion of the first vessel in world-leading transshipment fleet for Simandou Project



CSL is celebrating the design and delivery of the *Wontanara* — the first of five state-of-the-art transshipment shuttle vessels (TSVs) commissioned to service the Simandou iron ore project in Guinea, one of the world's largest mining and infrastructure developments.

Designed by CSL and built at CSSC Chengxi Shipyard, this groundbreaking fleet of TSVs combines a 41,800-tonne deadweight capacity with a dual-boom self-unloading system that can transfer up to

12,000 tonnes of iron ore per hour, making it the fastest and most efficient TSV fleet in the world.

Purpose-built to move large volumes of iron ore efficiently between river terminals and offshore bulk carriers, the TSV design features a shallow-draught hull optimized for river navigation, five azimuth thrusters that deliver exceptional manoeuvrability and precision, and bi-directional navigation capability that enhances both safety and operational efficiency.

“The advanced design and cargo-handling capabilities of this fleet reflect CSL's expertise in transforming complex logistics challenges into practical, high-performance maritime solutions,” said Louis Martel, CSL President and CEO. “Working closely with our customer, we designed an integrated transshipment system that enables safe, efficient and continuous high-volume exports in shallow-water environments.”

CSL led the development of this



transshipment solution from concept design through to engineering, construction and delivery. Leveraging its strong track record in self-unloading vessel design and transshipment operations, CSL established the fleet's technical requirements, led the engineering and design phases, and provided oversight throughout construction.

The *Wontanara* is the first of five TSVs that will enter service in support of the Simandou project, with the balance of the fleet scheduled for delivery over the coming months.

[For more details on the EMS-Tech-designed and -supplied self-unloading system of the *Wontanara*, please see

'EMS-Tech celebrates delivery of world's highest capacity self-unloading system for Rio Tinto SimFer's Landmark Simandou Project' on p44 of this issue.

ABOUT CSL

The CSL Group (Canada Steamship Lines) is a global marine shipping enterprise headquartered in Montreal, Quebec. With roots tracing back to 1845, CSL has grown into one of the oldest and most prominent shipping companies in North America. Today, it stands as the world's largest owner and operator of self-unloading bulk carriers, special vessels equipped with integrated conveyor systems that allow cargo to be discharged directly onto shore

facilities without relying on port infrastructure.

Operating a global fleet of nearly 100 vessels, CSL transports over 50 types of dry bulk commodities each year — including iron ore, grain, coal, aggregate, salt, and cement — across the Great Lakes, the St. Lawrence Seaway, and international ocean routes. Beyond core dry bulk shipping, the company specializes in off-shore transshipment, custom marine logistics, and cement transport. In recent years, CSL has also prioritized decarbonization, investing in alternative fuels, next-generation hull designs, and battery-powered hybrid vessels to lower emissions across global supply chains.

Engineered fabric buildings: bulk commodity infrastructure along inland waterways



The dry bulk trade industry has long relied on inland marine channels as its primary logistical backbone, with major freshwater networks and commercial waterways serving as vital trade corridors. Moving millions of metric tonnes of dry bulk annually — including grain, sugar, fertilizer, road salt, and cement — waterways allow high-volume movement at a fraction of the carbon cost of rail or highway transport.

However, seasonal lock closures, marine air corrosion, and rapid weather shifts create operational bottlenecks at port berths. Bulk commodities often require temporary, high-volume shelter at dockside terminals to prevent supply chain delays during transshipment. Engineered fabric

structures provide port authorities and terminal operators with a rapid, cost-effective, and flexible way to store these goods without interrupting throughput velocity.

Calhoun Super Structure specializes in custom-engineering wide-span fabric buildings designed specifically to withstand marine microclimates while protecting high-value bulk commodities from weather degradation.

COMPANY BACKGROUND & REGIONAL ENGINEERING

With over 30 years of experience engineering and manufacturing fabric structures across North America, Calhoun

Super Structure provides clear-span interiors up to 250 feet wide with unlimited length capabilities.

To survive the extreme environmental conditions of heavy regional trade corridors — ranging from heavy lake-effect snow to coastal gale-force winds — every Calhoun building is engineered site-specific using 3D Non-Linear Finite Element Analysis (FEA). This advanced modelling simulates localized wind patterns, snow drifting off open water, and seismic factors to ensure absolute structural safety. Structural integrity is achieved through:

- ❖ **Hot-dip galvanized (HDG) steel:** all steel trusses and hardware are fully immersed in molten zinc post-

fabrication, providing 360° interior and exterior barrier protection against saltwater and corrosive commodities for generational use.

- ❖ **High-density polyethylene (HDPE) fabric covers:** durable, non-corrosive, and UV-stabilized fabric membranes that resist rot, rust, and salt degradation under harsh ultraviolet and moisture exposure.
- ❖ **Versatile foundation options:** engineered to anchor securely into diverse port-side geotechnical environments, including pre-cast concrete blocks, cast-in-place walls, or helical pile systems, minimizing costly sub-grade excavation.

SYSTEMS SUPPORTING PORT & WATERWAY OPERATIONS

Ports and waterways demand specialized buildings with robust corrosion protection and spacious interiors to efficiently serve as vital transportation hubs. Calhoun offers durable, worry-free solutions tailored specifically to the ports and waterways industry. Structures are deployed across critical nodes in maritime logistics, including:

- ❖ **High-volume bulk storage:** dedicated dry cover for grain, sugar, fertilizer, road salt, aggregates, and mineral ores.
- ❖ **Enclosed logistics bays:** weather-protected transfer zones for barges, trucks, and rail load-out operations.
- ❖ **Conveyance infrastructure:** covered conveyor runs and dockside transfer stations that protect moving materials from wind-loss and moisture contamination.
- ❖ **Processing & packaging enclosures:** on-site refinery, screening, blending, and bagging facilities that keep operations moving regardless of external weather conditions.

The wide-span interior design eliminates load-bearing internal pillars. This provides



unimpeded room for heavy front-end loaders, high-dumping trucks, and mobile conveyance systems to manoeuvre freely, maximizing overall bulk volumetric throughput per square foot while minimizing accidental machinery collisions with structural supports.

PROVEN IN THE FIELD: MAJOR CLIENT PROJECTS

1. SUGAR STORAGE: BULK SUGAR PROCESSING FACILITIES

At major regional bulk import terminals handling cane sugar processing, operations manage bulk sugar imports arriving via water vessel. Bulk sugar handling requires rigorous climate and moisture management; high humidity or condensation causes sugar to clump, harden, or spoil, rendering it unusable for food processing.

To safeguard throughput, Calhoun designed and manufactured a massive VP Series fabric structure measuring 180 feet wide by 352 feet long. Constructed with 35-foot vertical steel legs to maximize

deep bulk commodity stacking, the structure is engineered to handle 23psf snow loads and wind speeds exceeding 63mph. Integrated mesh ventilation and large 14-foot by 14-foot side entries ensure optimal airflow, steady temperature moderation, and rapid machinery access.

2. SPECIALIZED BULK CEMENT STORAGE

Expanding its footprint in maritime infrastructure, Calhoun designed an 80ft x 312ft-foot-long cement storage structure in Toledo, Ohio to shelter dry cement storage. Cement handling requires immediate, absolute protection from rain, coastal mist, and atmospheric humidity to prevent premature hydration and hardening.

The custom-engineered design features high clearance for conveyor discharge, total dust-containment properties to meet stringent local environmental standards, and a hot-dip galvanized framework engineered to resist the severe abrasive conditions inherent to fine cement loading.

MOISTURE CONTROL & ENVIRONMENT ADVANTAGES

Moisture control is a core element of quality assurance along commercial waterways, where wide temperature fluctuations between water and land create challenging humidity gradients. Rigid steel or concrete structures often suffer from surface sweating, dripping condensation, and severe structural rusting over time.

- ❖ **Condensation reduction:** translucent HDPE fabric covers are thermally non-conductive. They moderate ambient interior temperatures, significantly reducing internal sweating and keeping dry bulk commodities dry, loose, and free-flowing.





- ❖ **Daylight energy efficiency:** high-grade HDPE covers transmit 16% to 19% of natural daylight into the building. This brightly illuminates large storage interiors during daytime operations, drastically reducing electricity costs for artificial lighting and improving worker visibility.

LOOKING AHEAD: FUTURE PLANS FOR PORT INFRASTRUCTURE

As dry bulk trade flows shift and port authorities invest in modernizing berth space, infrastructure agility is paramount. Conventional concrete and rigid steel builds require multi-year planning cycles and heavy piling foundations that permanently lock up valuable apron space.

Calhoun's fabric structures offer port operators a future-proof strategy:

- ❖ **Phased growth & scalability:** buildings can be extended lengthwise seamlessly as terminal throughput

increases or new trade contracts are secured.

- ❖ **Speed to revenue:** structures are manufactured and erected in weeks rather than months with minimal disruption, allowing terminal operators to begin generating revenue immediately during peak shipping seasons.
- ❖ **Decades of lifecycle value:** replaceable fabric covers allow terminal operators to refresh the building's exterior cover decades down the line without dismantling or replacing the core hot-dip galvanized steel framing.

As port terminals along major commercial waterways push for smarter, more resilient bulk handling systems, Calhoun Super Structure continues to deliver site-engineered fabric infrastructure designed to protect assets, maximize throughput, and withstand the harshest maritime conditions.

ABOUT CALHOUN SUPER STRUCTURE

Calhoun Super Structure is a prominent manufacturer specializing in the design, engineering, and production of high-performance fabric building solutions. With over 30 years of experience, the company provides versatile, clear-span fabric structures that serve a diverse range of sectors — including agriculture, warehousing, mining, aviation, sports, and waste management. Calhoun's buildings act as durable, cost-effective alternatives to traditional construction, offering quick installation timelines and high energy efficiency.

Built to withstand demanding environmental conditions, Calhoun structures feature heavily engineered, hot-dip galvanized steel trusses protected against rust and deterioration. Their signature fabric covers allow natural sunlight to illuminate the interior workspace while maximizing free-span storage space up to 250 feet wide. By combining rigorous site-specific engineering with customized architectural flexibility, Calhoun delivers reliable, low-maintenance facilities designed for long-term operational performance.

Calhoun Super Structure is based in Ontario, Canada (with corporate and manufacturing roots associated with locations such as Tara and Goderich, Ontario).

The company also has local representation and dealer networks extending across North America, as well as internationally in regions like Oceania, Europe, the UK, and Japan.



Port of Saguenay drives bulk growth with major infrastructure upgrades



In 2025, the Port of Saguenay handled 883,000 metric tonnes of dry bulk cargo at its marine terminal. The Port of Saguenay also handled 48,300 tonnes of liquid bulk.

This growing performance highlights the terminal's significant handling capacity and its recognized expertise in dry bulk operations.

The Port of Saguenay is strengthening its role as a preferred marine terminal for dry bulk transshipment along the St. Lawrence Seaway and Great Lakes corridor. This position is supported by its naturally deep-water terminal, which remains accessible year-round.

The main dry bulk commodities handled through the port's facilities in 2025 included wood pellets, iron ore, iron slag, iron ore pellets, coal, kaolin, and road de-icing salt.

The Port of Saguenay anticipates sustained growth in dry bulk volumes over the coming years. This outlook is driven by its strategic location relative to critical and strategic mineral deposits in northeastern Ontario and Quebec, the evolving needs of its customers, and the continued development of its 12km² industrial-port zone, one of the largest in Canada.

To support this growth, the Port of Saguenay is currently undertaking major

infrastructure projects, backed by the Governments of Quebec and Canada, aimed at increasing its dry bulk handling and storage capacity.

One of these projects involves the installation of an electric conveyor system specifically designed to transport dry bulk commodities between the marine terminal and the intermodal storage areas available on site. This enclosed, bidirectional conveyor extends over a distance of 1.8km and will start operating in 2026.

The Port of Saguenay has also acquired a high-capacity hybrid diesel-electric crane to optimize its operations. Together, these major investments enhance operational efficiency while contributing to the reduction of greenhouse gas (GHG) emissions associated with port activities.

ABOUT PORT OF SAGUENAY: NATURAL GATEWAY TO THE NORTH

Strategically located between Europe and North America's heartland, Port of Saguenay



provides unrivalled advantages and the capability to carry out major projects in a diversified business community and a truly exceptional living environment. With its vast industrial sites of more than 1,200 hectares, intermodal logistics hub providing a privileged gateway to global markets, convenient location close to a city renowned for its quality of life, and industrial know-how and dynamism, the port is certainly a promising place to flourish. Port of Saguenay owns and operates the Grande-Anse Marine Terminal, which is located in the municipality of La Baie in the City of Saguenay. This terminal is used primarily for the transshipment of general cargoes, dry bulk and bulk liquids.



PORT HIGHLIGHTS

- ❖ a natural gateway to north-central Quebec, the only navigable fjord in North America;
- ❖ the largest port of call in Quebec for international cruise ships;
- ❖ deep-water port capable of accommodating vessels up to 100,000dwt;
- ❖ accessible and open year round, winter and summer;
- ❖ the Saguenay is the only accessible river for large ocean vessels from the St. Lawrence in Quebec — providing 100km of inland access to the northern areas of the province;
- ❖ direct links to North American rail and highway networks;
- ❖ owner of a port industrial complex more than 1,200 hectares in area recognized by the government of Québec; and
- ❖ one of the 17 designated CPAs (Canada Port Authorities), and the only one in Quebec whose main operations are located away from the urban centres.

Renewable energy, superb logistics, wide-open spaces to thrive, and front-running and end-to-end expertise all support customers' initiatives.

Gateway to the Great Lakes: bulk trade and operational dynamism at the Port of Buffalo

Situated strategically at the eastern tip of Lake Erie, the Port of Buffalo continues to serve as an indispensable logistics hub within the Great Lakes–St. Lawrence Seaway System. Functioning as the primary

US port of call upon exiting the southern terminus of the Welland Canal, the port plays a critical role in bridging manufacturing and agricultural supply chains across the US Northeast, Midwest,

and Southern Ontario.

Over the past year, operational developments and steady bulk trade activity have highlighted the port's evolving role in North American maritime commerce.



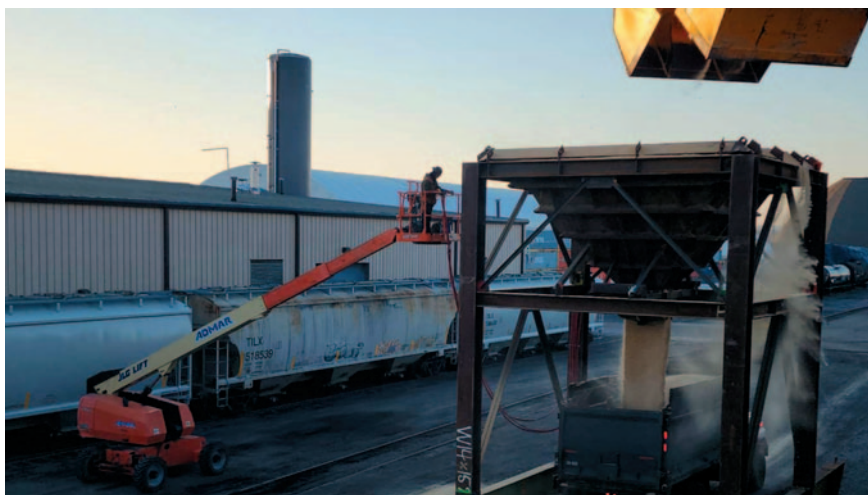
ABOUT THE PORT OF BUFFALO

Waterway access:	3,000ft piers with 27ft Seaway-standard draught depth, accommodating up to seven vessels simultaneously.
Bulk storage footprint:	Nearly 200 acres of paved, outdoor, and indoor storage set aside on or near deep water.
Multimodal rail links:	Direct interchange access to four Class I rail lines: CSX, Norfolk Southern, Canadian National (CN), and Canadian Pacific Kansas City (CPKC).
Specialized equipment:	High-capacity crawler and gantry cranes, heavy-duty loaders, portable conveyor systems, and grab bucket unloaders.
Duty advantages:	Operations within Foreign Trade Zone (FTZ) #23 allow importers to defer or reduce tariff obligations.

KEY CORE COMMODITIES & BULK CARGO TRENDS

The Port of Buffalo's bulk cargo operations handle a diverse mixture of raw materials essential for manufacturing, infrastructure, and winter maintenance:

- ❖ **Construction aggregates & cement:** driven by regional infrastructure projects, incoming shipments of stone, gravel, sand, and cement remain a foundational component of seasonal vessel calls.
- ❖ **Road salt:** as a major distribution hub for Western New York and neighbouring regions, bulk salt imports peak during the late summer and fall shipping windows to prepare for harsh winter road conditions.
- ❖ **Metallurgical coke & iron ore:** serving regional steel processing and heavy industrial operations, these inputs flow steadily through the port's deep-water piers.
- ❖ **Agricultural bulk & grain:** Buffalo's historical identity as a milling powerhouse endures, supported by



certified import capabilities for organic products and specialized grain movement across Great Lakes routes.

INFRASTRUCTURE CAPABILITIES & OPERATIONAL ADVANTAGES

The operational footprint at Gateway Metroport/Gateway Trade Center offers shippers flexibility that few regional logistics centres can match (see table above).

LOOKING AHEAD

With its proximity to major population centres within a 500-mile radius, the Port of Buffalo continues to emphasize multimodal integration. The ability to rapidly transfer bulk commodities directly between lake freighters, railcars, and major interstate corridors (such as I-90) ensures that Buffalo remains a resilient anchor for Great Lakes maritime trade.



Port Milwaukee posts strong first half as dry bulk surges by over 50%



Located on the western shore of Lake Michigan, Port Milwaukee connects Wisconsin and surrounding states with maritime access to a diverse range of domestic and international markets. Port Milwaukee experienced a strong first half of 2026, with total dry bulk up over 50% compared to the first half of 2025.

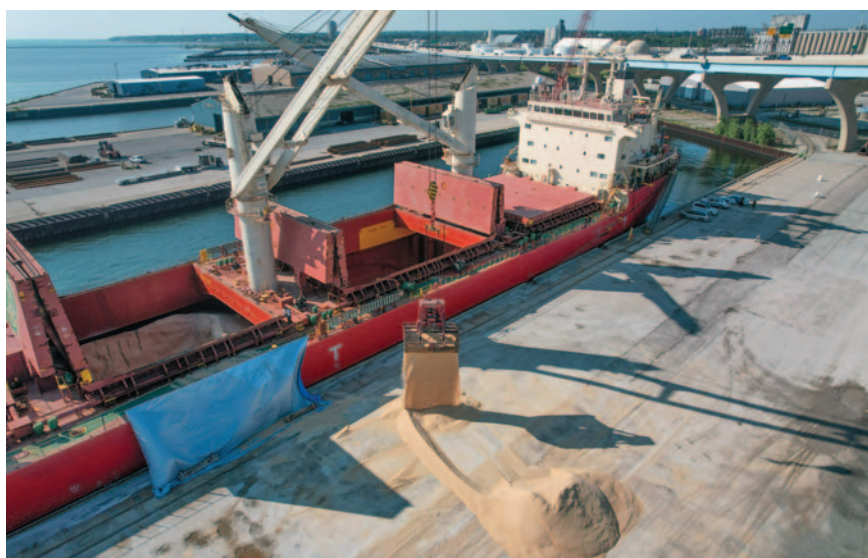
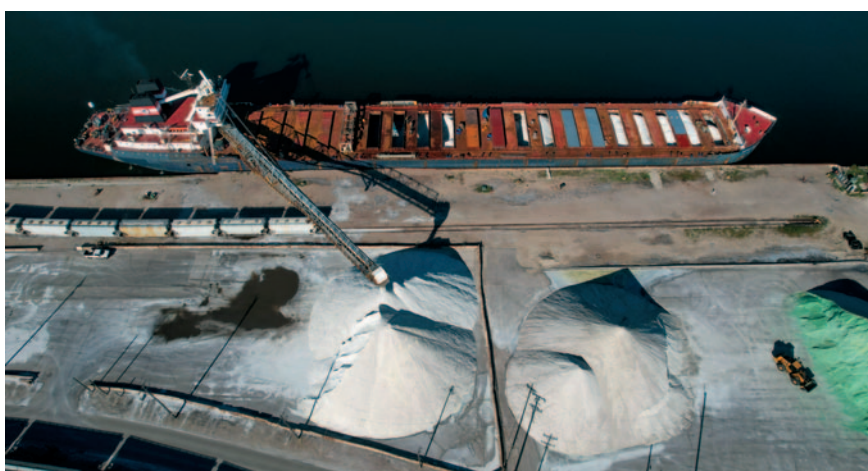
Salt volumes have increased significantly, the result of a harsh winter season. While most shipments originate from American and Canadian ports, limited product availability has led some customers to buy foreign-sourced salt, revitalizing trade lanes that have been unused for some years. Large-scale road construction projects have supported a substantial year-over-year growth in cement shipments to Milwaukee.

Port Milwaukee tenant, The DeLong Company, completed the Phase II expansion of its Agricultural Maritime Export Facility in the spring. This \$17 million expansion project increases storage capacity with two new silos and allows for the simultaneous handling of multiple agricultural commodities. Exports from the facility have primarily been dried distillers grains with solubles (DDGs), though various meals and whole grains can be shipped directly to international markets around the globe.

Water level fluctuations and extreme weather patterns around the Great Lakes

have highlighted Port Milwaukee's relevance as a regional transportation hub. Milwaukee accepted shipments of gypsum,

limestone, salt, and cement bound for other ports while those areas faced these natural challenges.



From taconite to turbines: the Twin Ports prove their worth as North America's deepest inland seaport

The BBC Genoa arrives in Duluth with project cargo earlier this summer.



Situated 2,342 miles inland from the Atlantic Ocean at the westernmost tip of Lake Superior, the Port of Duluth-Superior stands as North America's farthest inland freshwater seaport and the undisputed cargo titan of the Great Lakes. Known as the Twin Ports, this multimodal navigation hub handles an average of 30 to 35 million short tons of cargo annually, serving as the commercial heartland's direct pipeline to global and domestic markets.

Over the past year, operations across the port's 49 miles of harbour frontage and 20 private bulk terminals reflected a dynamic blend of industrial resilience, trade shifts, and infrastructure modernization.

DRY BULK BACKBONE: IRON ORE AND COAL

Dry bulk commodities remain the financial and operational bedrock of Duluth-Superior, comprising nearly 80% of total tonnage passing through the harbor each season.

- ❖ **Iron ore & taconite:** sourced from Minnesota's Mesabi Iron Range, taconite pellets continue to be the port's single largest commodity by volume. Domestic Lakers — massive 1,000ft freighters built specifically for

the Great Lakes — transport these iron charges downstream to steel mills in Indiana, Ohio, and Michigan. Over the last year, steady steel demand from North American manufacturing and infrastructure development helped maintain strong movement through primary loading docks like CN's Duluth Dock #6 and Burlington Northern Santa Fe's (BNSF) Superior facility.

- ❖ **Coal trade:** coal movement through

the Port of Duluth-Superior unfolded in two acts over more than 150 years — first as an inbound cargo from the east, then as a low-sulphur outbound cargo flowing from the west. As recently as 2008, coal tonnage through the port exceeded even iron ore movement, but that changed dramatically as North American energy generation shifted toward renewables. The port's primary coal transshipment facility — the Koch

The oceangoing vessel Humbergracht, of the Spliethoff fleet, sails under Duluth's Aerial Lift Bridge for a call at the Port of Duluth-Superior.



Industries-owned Midwest Energy Resources Company terminal — shuttered earlier this summer at the conclusion of its 50-year lease with DTE Energy. As a result of that closure, only 215,628 metric tonnes of coal has moved through the port during the 2026 navigation season.

AGRICULTURAL FLOWS: GRAIN AND FEEDSTOCKS

As a primary marine outlet for wheat, beet pulp pellets, soybeans, canola and oats grown across Minnesota, North Dakota and the Canadian Prairies, the port's grain elevators served vital seasonal demand. Through July 30, 2026, grain tonnage through Duluth-Superior topped the 2025 pace by 43%, driven primarily by increased shipments of spring and durum wheat.

- ❖ **Salties & overseas demand:** unlike iron ore, which moves almost exclusively on domestic interlake freighters, a significant portion of Duluth-Superior's grain is exported overseas via ocean-going vessels ('Salties') travelling down the St. Lawrence Seaway.
- ❖ **Seasonal dynamics:** over the past 12 months, grain throughput responded dynamically to global supply chain adjustments, regional harvest yields, and competitive rail freight pricing. Strong late-season exports of spring wheat and durum helped lift international ship counts, reinforcing Duluth-Superior's status as a critical agricultural exporter.

SUPPORTING COMMODITIES: LIMESTONE AND AGGREGATES

Moving 'upbound' into the harbor, limestone represents the port's primary inbound dry bulk cargo. Mined in Michigan's lower peninsula and Ontario, limestone is essential for:

- ❖ Steelmaking fluxes at regional furnaces.
- ❖ Concrete production and road construction across the Upper Midwest.
- ❖ Agricultural soil conditioning.

Consistent construction activity and municipal infrastructure spending provided a stable floor for inbound limestone and aggregate shipments over the past year.

Cement tonnage is also up significantly year over year, as are inbound salt shipments.

BREAKBULK, PROJECT CARGO, AND INTERMODAL EXPANSION

While dry bulk supplies the raw tonnage,



The BBC Genoa discharges project cargo at the Duluth Cargo Connect facilities, while the 1,004-foot lake freighter Mesabi Miner glides past in the background for a load of iron ore at Duluth's ore docks.

general cargo, heavy-lift and project shipments represent the port's fastest-growing operational vector.

Driven by ongoing energy sector development in wind, oil and gas across the Upper Midwest and Canada, the Clure Public Marine Terminal operated by Duluth Cargo Connect continues to set new marks for breakbulk cargo handling.

- ❖ **Wind energy components:** since the first wind energy cargoes moved through Duluth in 2005, the port has welcomed more than 2.6 million freight tons of wind energy cargo, establishing itself as the leading mid-continent logistics hub for renewable energy components.
- ❖ **Intermodal integration:** Duluth is one of only two US Great Lakes ports approved to handle maritime containers, and the Duluth Cargo Connect facilities include an on-dock intermodal terminal with direct road and rail connections. Containerized cargo moving through the port includes various types of machinery, components, and also specialized grains.

NEW PORT INFRASTRUCTURE ON THE HORIZON

Navigating a nine- to ten-month operational window dictates a sharp seasonal cadence at Duluth-Superior.

The U.S. Maritime Administration (MARAD) announced on 28 April that it awarded the Duluth Seaway Port Authority US\$27.5 million through its Port Infrastructure Development Program (PIDP) to fund the Duluth Lake Port pier

redevelopment project. The award, which received bipartisan support from Minnesota's congressional delegation, is the largest MARAD grant ever received by the Port Authority. It will be supplemented by US\$10.8 million in secured state and local funds, bringing the total project investment to approximately US\$38.3 million.

The project will transform the 7.5-acre Duluth Lake Port pier — a strategic waterfront property the Port Authority acquired in 2020 — into a future-ready supply chain asset. Work will include reconstruction of approximately 1,150 linear feet of dock wall, demolition of grain elevators out of service since 2015, and the installation of new water service and stormwater management systems to prepare the site for freight-related redevelopment.

"This MARAD grant represents a major investment in the Port of Duluth-Superior and the region's supply chain infrastructure," said Kevin Beardsley, executive director, Duluth Seaway Port Authority. "It will be the catalyst in revitalizing a strategic pier complex in the heart of Duluth's working waterfront, and positioning it to be a vibrant asset for the port."

The revitalized pier will leverage three strategic advantages: on-dock rail service connecting to multiple Class I railroads, vessel berthing capacity on two docks at Seaway depth, and a location at the heart of North America's farthest-inland seaport.

Construction at the pier can begin once a grant agreement is finalized with MARAD, a process that can take multiple months. The site work timeline is approximately two to three years.



From raw materials to global markets...

...we cover the heavyweights
of shipping.

Inside the Port of Detroit: navigating bulk cargo operations, supply chains, and the push for Net-Zero

As Michigan's largest dry cargo gateway and a crucial nexus along the Great Lakes—St. Lawrence Seaway, the Port of Detroit plays a pivotal role in keeping North American manufacturing, construction, and heavy industry moving. Over the past year, dynamic shifts in Great Lakes industrial supply chains, coupled with aggressive environmental initiatives, have put the spotlight on how the port manages its massive annual throughput of bulk materials.

THE CORE COMMODITIES: WHAT FLOWS THROUGH DETROIT?

The Port of Detroit processes approximately 8mt (million tonnes) to 15mt of cargo annually across its 18 to 22 private and public marine terminals along the Detroit and Rouge Rivers. Dry and liquid bulk commodities make up the vast majority of this tonnage:

- ❖ **Iron ore & steel raw materials:** steel is the port's single most valuable commodity, while iron ore leads overall throughput by tonnage. Shipped in massive Great Lakes freighters (Lakers) from Minnesota and Upper Peninsula iron ranges, ore feeds regional blast furnaces and automotive manufacturing.
- ❖ **Aggregate, stone & cement:** essential for Midwest roadbuilding, commercial real estate, and municipal infrastructure projects. Bulk cement facilities — such as those operated at various docks along the river — handle steady inflows of domestic and imported materials.
- ❖ **Coal & petroleum products:** liquid and solid energy inputs remain core staples, stored and transferred through key marine facilities like the Michigan Marine Terminal at River Rouge.

PORT OF DETROIT AT A GLANCE

Oversight body:	Detroit/Wayne County Port Authority (DWCPA)
Annual bulk volume:	~8.1 million tonnes (dry/liquid bulk)
Top commodity by value:	Steel
Top commodity by volume:	Iron ore
Primary terminal operators:	Nicholson Terminal & Dock Co., Michigan Marine Terminal, private industrial docks
Environmental target:	Net-Zero emissions by 2040 (Green Marine certified)

INFRASTRUCTURE & BULK HANDLING OPERATIONS: KEY HANDLING CAPABILITIES

- ❖ **Self-unloading vessels:** many self-unloading Lakers discharge dry bulk cargo onto open docks or hopper systems at rates exceeding 6,000tph (tonnes per hour) without requiring shore-based cranes.
- ❖ **Specialized terminals:** private operations, such as those run by Nicholson Terminal & Dock Company, utilize specialized heavy-lift cranes, clamshell buckets, and integrated conveyor systems to safely transfer raw scrap metal, steel coil, and mineral aggregate.
- ❖ **Multimodal connections:** bulk handling terminals connect directly to Class I railroads (CN, CPKC, NS, CSX) and major interstate corridors (I-75, I-94), allowing rapid distribution throughout the Rust Belt and into Canada.

DECARBONIZATION AND DUST CONTROL FOCUS

Over the past year, the Detroit/Wayne County Port Authority (DWCPA) and regional terminal operators have faced growing demands to modernize bulk operations while minimizing impact on adjacent waterfront communities like Delray and River Rouge.

GREEN MARINE CERTIFICATION & NET-ZERO GOALS

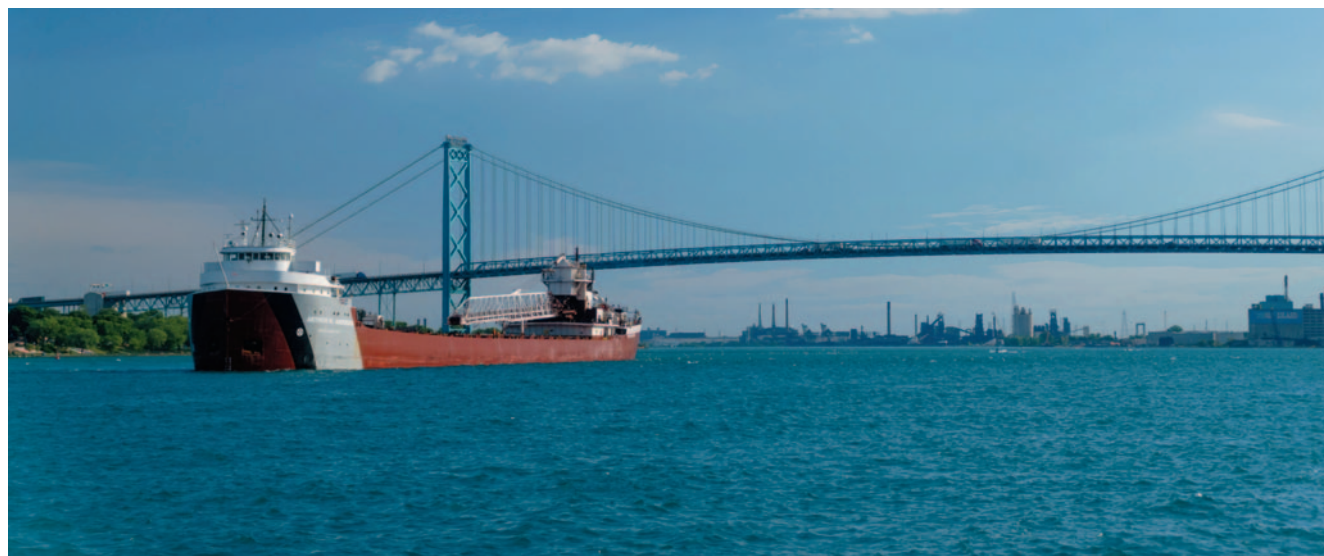
The DWCPA (Detroit/Wayne County Port Authority) has implemented a comprehensive Decarbonization and Air Quality Improvement Plan, setting a pathway toward net-zero port operations by 2040.

For bulk dry material handling, these environmental standards emphasize:

- ❖ **Dust suppression systems:** water-spraying cannons, vacuum sweeping, and enclosed conveyancing to curb fugitive particulate matter during limestone and ore discharge.
- ❖ **Electrification of yard equipment:** transitioning older diesel material handlers, loaders, and terminal tractors toward electric or hybrid power to lower localized emissions.
- ❖ **Shore power integration:** exploring shoreside power installations to enable bulk freighters to plug in rather than idle heavy engines while discharging cargo.

As Great Lakes shipping navigates modern challenges — ranging from economic fluctuations to climate-driven water level swings — the Port of Detroit's bulk sector continues to serve as an indispensable, evolving engine for Midwest commerce.

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North America's East Coast dry bulk backbone

advanced ports and equipment
fortify regional freight routes



Fuelling growth: Port Tampa Bay fortifies Florida's construction supply chain with key terminal expansions

Florida has more than 23 million residents and welcomes more than 143 million visitors annually. The continued population growth, tourism and economic development are driving demand for housing, roads, commercial development and infrastructure across the state.

Port Tampa Bay is a major gateway for many of the raw materials that support that growth.

Dry bulk commodities moving through the port include cement, gypsum, granite, limestone, phosphate, sulphur, grain, salt, fly ash, aggregates and other commodities.

These materials are used in construction, infrastructure, agriculture, manufacturing and other industries.

DRY BULK VOLUMES THROUGH PORT TAMPA BAY

FY 2025:	5,010,642 total tonnes
FY 2026:	projected: 5,295,185 tonnes
FY 2027:	projected: 5,816,000 tonnes
FY 2027:	represents approximately 16% growth over FY 2025.

ADVANTAGEOUS LOCATION/CONNECTIVITY

Port Tampa Bay is located on Florida's Gulf Coast with direct access to Interstate 4 and Interstate 75.

The I-4 Corridor includes more than 550ft² million of distribution and logistics space. The port's location provides access to major population, construction, distribution and logistics markets

throughout West Central Florida, Central Florida and beyond.

The port's connectivity to I-4 and I-75 supports efficient movement of cargo into Florida and the broader Southeast.

ECONOMIC IMPACT

Port Tampa Bay has an annual economic impact of approximately \$34.6 billion.

FDOT GRANT RECIPIENTS

Awarded Applicant Organization	Project	Funding Award	Local/Private Investments
Manatee County Port Authority	New Aggregate Hopper at Berth 6 — Seaport Manatee	\$3,252,429	\$775,000
Titan Florida LLC and FECR	Aggregate Terminal Capacity Expansion — Melbourne	\$2,945,390	\$1,227,246
Titan Florida LLC and FECR	Aggregate Terminal Capacity Expansion — Jacksonville	\$3,352,917	\$1,397,049
Redwing Terminals, LLC	New Aggregate Terminal — Port Tampa Bay Redwing	\$3,000,000	\$3,000,000
CEMEX Construction Materials Florida, LLC	New Aggregate Terminal — Port Tampa Bay - Berth 150 and Uplands	\$ 7,000,000	\$21,000,000

Port activity supports more than 192,000 jobs.

The port's impact extends beyond the waterfront through trucking, logistics, warehousing, construction, manufacturing, distribution and other related industries.

PORT TAMPA BAY BOOSTS CONSTRUCTION SUPPLY CHAIN WITH MAJOR TERMINAL EXPANSIONS AND GRANT FUNDING

Port Tampa Bay has had some very interesting developments over the last couple of years, resulting in a strengthened offering and improved capacity. These developments include:

KEEPING SUPPLY CHAIN MOVING & CONSTRUCTION ON TIME: RECIPIENTS OF FDOT'S AGGREGATE GRANT PROGRAM

In May last year, the Florida Department of Transportation (FDOT) announced the award of over \$19.5 million in continued investments to further strengthen Florida's supply chain and bolster the state's storage capacity and efficient movement of aggregate — an essential construction

material for asphalt and concrete production.

Port Tampa Bay will benefit to the tune of \$10m dollars in total, with grants for Redwing Terminals' new Aggregate Terminal (\$3m) and Cemex Construction Materials' new Aggregate Terminal (\$7m) [for more details on the now-completed Cemex terminal, please see below].

These grant awards (see table above), which build off of last year's award of \$18 million, are the second round of investments awarded through Governor DeSantis' highly successful Aggregate Grant Program, which provides up to \$20 million each year to Florida's seaport and rail partners for projects that will enhance the movement and storage of construction aggregate across the state. As a major component to the successful delivery of Florida's road and infrastructure projects, the dependable, readily available supply of aggregate is essential to ensure projects remain on time and are not impacted by supply chain disruptions. The five recipients of these grants will expand

existing aggregate materials storage capacity by more than 4.2mt (million tonnes).

"Proactive, solution-based planning is something Florida excels in thanks to Governor DeSantis, and as major construction projects continue making progress throughout the state, these strategic programs and funding opportunities will ensure we're poised for success," said Florida Department of Transportation Secretary Jared W. Perdue, P.E.

These grant awards serve as a multiplier of \$27.3 million in private investments to the selected recipients, resulting in an economic impact of \$116 million to Florida's economy.

With continued emphasis on delivering robust, multi-faceted investments across Florida's various modes of transportation, this year's grant awards are focused on supporting the storage capacity of aggregate at seaports, which serve as major import and processing hubs for these materials.

To maximize the state's aggregate



storage capabilities through the funding opportunities available through the Aggregate Grant Program, FDOT prioritized its project selections to ensure strategic regional coverage for aggregate needs statewide.

Additionally, these identified projects were selected based on speed to which the project would be completed, as the identified projects are expected to have tangible results within the 12 months after the awards. These projects, coupled with the projects funded in the previous year's round of grant awards, contribute to the long- and short-term solutions for the state's storage and movement of aggregate.

CEMEX, PORT TAMPA BAY AND MAYOR CASTOR COMPLETE \$36 MILLION TERMINAL EXPANSION TO SUPPORT REGIONAL GROWTH

At the end of May this year, Cemex US and Port Tampa Bay, joined by Tampa Mayor Jane Castor, celebrated the opening of the newly expanded Cemex Aggregate Terminal at Port Tampa Bay. The expansion, supported by a \$29 million Cemex investment and a \$7 million Florida Department of Transportation grant (see above), significantly increases the terminal's capacity to receive, store and distribute the aggregates used in concrete, asphalt and construction projects across the region.

The expanded terminal moves aggregates from Newfoundland, Canada, into Tampa Bay through Port Tampa Bay's deepwater berths, with a conveying system sized to move 5,000 tonnes of material per hour from ship to storage. Cemex expects the terminal to handle approximately 1.5 million tonnes of aggregates per year, depending on shipping conditions.

Local builders, contractors and public agencies will have reliable access to the aggregates that go into concrete, asphalt and infrastructure work across Tampa Bay. The expanded terminal strengthens regional supply chains, supports affordability and helps ensure that the materials used to build housing, schools, hospitals and essential infrastructure remain available at predictable costs.

"The completion of our Aggregate Terminal at Port Tampa Bay strengthens Cemex's ability to serve one of Florida's fastest-growing regions with the essential materials needed to build and maintain critical infrastructure — from roads and schools to hospitals and housing," said Jesus Gonzalez, President of Cemex US. "By improving supply reliability, we help keep projects on schedule and support cost stability for families, businesses and communities. We are proud to deepen our partnership with Port Tampa Bay and appreciate the support of the Florida Department of Transportation in making this investment possible."

With this expansion, the site becomes the only Cemex location in Florida bringing together an aggregate terminal, a cement terminal and a ready-mix concrete plant in one strategic location. The expansion is one of several investments strengthening Florida's construction supply chain, complementing state and federal initiatives that include Florida's Construction Aggregate Program and Port Tampa Bay's Vision 2030 master plan.

Tampa Mayor Jane Castor said the expansion supports the construction and infrastructure needs of a growing city.

"Tampa is one of the fastest-growing cities in America, and that growth requires

reliable access to the materials that build our roads, schools, hospitals and housing. This expansion at Port Tampa Bay helps keep construction costs in check and supports the affordability our families and businesses depend on," Mayor Castor said.

Paul Anderson, President and CEO of Port Tampa Bay, said the expansion underscores the port's role as an economic engine for the region.

"Port Tampa Bay is proud to support Cemex's growing operations and the broader Tampa Bay economy. This expansion demonstrates the power of partnership and the role our deepwater port plays in keeping Florida's supply chain efficient, resilient and ready for the region's continued growth," Anderson said.

SESCO OFFICIALLY OPENS CEMENT TERMINAL AT PORT TAMPA BAY

On 9 June, SESCO Cement celebrated the opening of its new cement import terminal located on Port Redwing at Port Tampa Bay, officially marking the company's commitment to the Florida construction industry and the Tampa Bay region. The ribbon cutting ceremony was attended by company leadership, state officials, and construction and maritime industry representatives.

The new facility features the largest wheel-mounted cement ship-unloader in operation, storage silos with nearly 100,000 tonnes of capacity, and an advanced mobile conveyor system. Upon full build-out, the terminal will be the largest cement terminal in Florida, positioning the Tampa Bay region as a critical gateway for global construction materials.

"As a key partner in the region's construction and infrastructure supply chain, SESCO Cement plays an important role in supporting continued growth across West Central Florida and reinforcing Tampa's increasing importance as a gateway for global construction materials," said Rick Van Eyk, CEO, SESCO Cement. "Today's opening is the culmination of years of investment, engineering, and collaboration, and we are proud to call Port Tampa Bay our Florida home."

Joining Van Eyk for the ribbon cutting were State Representative Michael Owen (District 70) and Raul Alfonso, executive vice president and chief commercial officer of Port Tampa Bay, along with construction and maritime industry representatives from across the region.

The Port Tampa Bay terminal is strategically positioned to serve Florida's

Leaders and team members from Cemex and Port Tampa Bay joined Tampa Mayor Jane Castor for a ribbon-cutting ceremony celebrating the newly expanded Cemex Aggregate Terminal at Port Tampa Bay.



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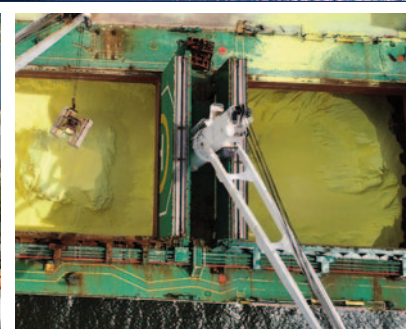
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major construction markets via maritime shipping lanes, interstate highways, and rail networks. SESCO anticipates moving significant tonnes of cement, supplementary cementitious materials, and aggregates through the facility.

The facility's custom-designed ship-unloader arrived in Tampa earlier this year following a 25-day voyage, where it was assembled after nearly two years of engineering and design. The unloader's successful delivery and installation paved the way for the terminal's full-scale operations launch, which begins today.

"Port Tampa Bay is proud to welcome SESCO Cement as an operating partner," said Raul Alfonso, executive vice president and chief commercial officer for Port Tampa Bay. "This terminal strengthens our position as a key hub for construction materials and underscores the vital role Port Tampa Bay plays in supporting infrastructure needs for Florida's more than 23 million residents. The efficient movement of cement and other essential building materials through our port is critical to supporting continued growth and development across West Central Florida and beyond."

SESCO Cement, established in 2014 as a subsidiary of the SESCO Group, operates

Port Tampa Bay and SESCO Cement leadership celebrated the opening of SESCO's new cement import terminal at Port Redwing with a ribbon cutting ceremony marking the company's investment in the Tampa Bay region and Florida's construction industry.



one of the most significant cement terminal networks in the United States. The company's Houston, Texas facility is the largest single-owner cement terminal in the country. SESCO serves customers across construction, manufacturing, and distribution sectors, including ready-mix concrete producers.

ABOUT PORT TAMPA BAY

Port Tampa Bay is a diversified cargo gateway handling dry bulk, liquid bulk, breakbulk, project cargo, containers,

automobiles and other commodities.

As Florida continues to grow, demand for the materials moving through the port is expected to grow as well.

Port Tampa Bay's location, transportation connectivity and existing cargo infrastructure position it to serve the continued growth of West Central Florida, the state and the broader Southeast.

New, additional berths will continue supporting the growth in dry bulk products and the overall growth of the state, too.

Supporting the evolving needs of East Coast bulk and multipurpose terminals

The US East Coast is home to some of North America's busiest bulk and multipurpose terminals, handling everything from agricultural commodities and aggregates to steel, forest products, project cargo, fertilizers, and RoRo freight. As cargo volumes grow and terminals continue to diversify, operators face increasing pressure to improve throughput, maximize equipment utilization, and gain real-time visibility across increasingly complex operations.

Unlike dedicated container terminals, many East Coast facilities must efficiently manage multiple cargo types within the same terminal footprint. This makes operational flexibility and digital visibility more important than ever.

This is where a purpose-built General Cargo Terminal Operating System can make a significant difference.

1. US EAST COAST TERMINALS FACE LIMITED VISIBILITY ACROSS DIVERSE CARGO OPERATIONS

Many terminals simultaneously handle bulk, breakbulk, project cargo, and RoRo cargo.

Managing these operations using spreadsheets or disconnected systems often limits visibility into terminal performance.

Examples include:

- ❖ How much storage is currently occupied by bulk commodities?
- ❖ Which equipment is underutilized?

- ❖ Where are labour bottlenecks occurring?
- ❖ Which vessels are progressing behind schedule?

Kaleris' General Cargo TOS (Terminal Operating System) offers real-time operational dashboards that helps terminals:



- ❖ monitor vessel discharge and loading progress;
- ❖ track truck turnaround times;
- ❖ measure cargo tonnage handled;
- ❖ understand space utilization by cargo type;
- ❖ monitor labour demand;
- ❖ track equipment and machine hours; and
- ❖ compare operational performance across different cargo types.

These capabilities become particularly valuable in terminals where multiple cargo operations are occurring simultaneously, and resources must be constantly balanced across the facility.

Consider a multipurpose terminal unloading steel products at one berth while handling imported aggregates and supporting RoRo operations elsewhere on the facility. Without centralized visibility, supervisors often rely on updates from multiple teams to identify delays, equipment imbalances, or emerging bottlenecks.

With operational dashboards, terminal managers can quickly identify that one operation is falling behind schedule due to equipment constraints while resources in another area of the terminal remain underutilized. This visibility enables better decision-making, better resource allocation, and improved schedule performance across the terminal.

Rather than reacting to issues after they occur, terminal teams can make operational decisions based on frequent data.

2. MANAGING SPECIALIZED CARGO LIKE RoRo AND HEAVY EQUIPMENT IS NOT SIMPLE

Many East Coast ports regularly handle RoRo cargo alongside traditional bulk and breakbulk operations.

Managing roll trailers (MAFI trailers), tractors, storage areas, and associated cargo movements often requires manual coordination.

The latest release of Kaleris GC TOS introduces dedicated Roll Trailer (MAFI) management, including:

- ❖ native roll trailer cargo support;
- ❖ dedicated tractor operations;
- ❖ specialized storage areas; and
- ❖ linked voyage information between trailer and cargo.

The value of this functionality becomes apparent when handling high-volume RoRo operations that require close coordination between equipment, storage areas, and cargo movements.

For example, a terminal handling imported construction or agricultural



equipment may use MAFI trailers to transport cargo from the vessel to designated storage areas before final delivery.

Coordinating trailer availability, tractor assignments, storage locations, and cargo status manually can create inefficiencies and increase the risk of tracking errors.

By digitally associating cargo, trailers, storage locations, and voyage information within a single workflow, terminal operators gain greater visibility into cargo movements and can more efficiently manage equipment utilization throughout the operation.

This improves operational control while reducing manual administration for RoRo operations.

3. MOVING BULK CARGO FASTER WITH LIMITED YARD SPACE

For many East Coast and dry bulk terminals globally, storing cargo in the yard isn't always the most efficient option. Commodities such as grain, fertilizers, minerals, or aggregates are often transferred directly from vessel to truck to minimize handling and maximize throughput.

The upcoming Bulk Direct Delivery capability in Kaleris' GC TOS enables terminals to digitally manage ship-to-truck discharge workflows.

Benefits include:

- ❖ reduced cargo handling;
- ❖ lower yard congestion;
- ❖ faster truck turnaround;
- ❖ improved vessel productivity; and
- ❖ better visibility throughout the direct delivery process.

For terminals handling high-volume dry

bulk commodities, these benefits can have a meaningful impact on both throughput and yard utilization.

During peak agricultural season, a terminal discharging fertilizer may choose to move cargo directly from the vessel to waiting trucks rather than placing material into temporary stockpiles for later distribution. This approach reduces secondary handling, minimizes storage requirements, and accelerates cargo movement through the terminal. Digitally managing these ship-to-truck workflows provides operators with greater visibility into truck arrivals, discharge progress, and cargo accountability while helping maximize berth productivity.

This is particularly valuable for terminals with constrained storage capacity or time-sensitive cargo operations.

MEETING THE NEEDS OF MIXED CARGO TERMINALS

Unlike systems designed primarily for container operations, Kaleris GC TOS is purpose-built to support the operational complexity of mixed cargo terminals.

The platform enables operators to manage:

- ❖ dry bulk;
- ❖ liquid bulk;
- ❖ breakbulk;
- ❖ project cargo;
- ❖ agricultural commodities;
- ❖ RoRo; and
- ❖ containers.

within a single operational environment while also supporting activities such as weighing, bagging, blending, labelling, inventory management, billing, and real-time cargo tracking.

LOOKING AHEAD

As East Coast ports continue investing in infrastructure and cargo diversification, the ability to operate efficiently across multiple cargo types will become an increasingly important competitive advantage.

By combining operational visibility, specialized cargo support, and bulk handling capabilities, Kaleris GC TOS helps multipurpose and bulk terminals adapt to changing market demands while improving efficiency, resource utilization, and customer service.

ABOUT KALERIS

Kaleris is a global supply chain execution software provider that helps organizations optimize mission-critical operations across nodes and modes, including marine terminals, shipper yards, rail networks, and ocean transit.

By combining leading technologies in Terminal Operating Systems (TOS), Yard Management Systems (YMS), Transportation Management Systems (TMS), and Maintenance & Repair



Operations (MRO), Kaleris empowers hundreds of the world's largest enterprises and supply chain professionals with real-time visibility, automated workflows, and data-driven insights. Its unified platform

bridges the communication gaps between ports, terminals, shipping lines, and inland facilities to eliminate bottlenecks, reduce detention and dwell costs, and streamline the movement of goods globally.

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Port of Belledune redefines bulk trade with biomass boom and modern infrastructure

Perched on the northern coast of New Brunswick, the Port of Belledune has long been an industrial backbone for Atlantic Canada, handling raw dry and liquid bulk commodities like minerals, petroleum coke, perlite, and aggregates. However, operations and bulk throughput at the port have undergone a pivotal shift—transitioning from traditional heavy industrial traffic toward low-carbon fuels and sustainable logistics.

Driven by Canada's mandate to eliminate coal-fired electricity by 2030, strategic infrastructure enhancements, and partnerships with local Indigenous communities, the Port of Belledune is actively redefining its bulk operations.

BIOMASS AND SUSTAINABLE CARGO TAKE CENTRE STAGE

Biomass export volume — primarily wood pellets and wood chips — has become a key driver of bulk growth. As European and domestic energy markets shift away from fossil fuels, Belledune has established itself as Eastern Canada's largest biomass exporter.

- ❖ **Surging biomass volumes:** through terminal expansions and automated handling systems, biomass throughput at the port grew to over 450,000 metric tonnes annually.
- ❖ **Belledune Clean Fuel Project:** the nearby 467MW Belledune Generating Station historically consumed roughly 1mt (million metric tonnes) of coal per year — representing about 40% of the port's incoming bulk cargo. With

NB Power running test burns using advanced, steam-treated, and torrefied 'black' wood pellets imported through the port, preparations are under way to convert the power plant to biomass ahead of the 2030 coal phase-out.

❑ **Historical coal demand:** ~1,000,000 metric tonnes/year (Phasing out by 2030).

❑ **Current biomass export:** >475,000 metric tonnes/year (growing rapidly).

INFRASTRUCTURE MODERNIZATION: THE DRY BULK CONVEYOR LOOP

To support higher transshipment speeds and handle diverse dry bulk cargoes, major operational upgrades have moved into active utilization.

- ❖ **\$25 million conveyor system:** co-funded by the Government of Canada through the National Trade Corridors Fund, the planned fixed conveyor loops will connect the port's deep-water terminals directly to staging areas, enhancing cargo handling efficiency and supporting future growth.
- ❖ **Operational impact:** the automated conveyor system and renovated warehouse storage reduce vessel turn-around times, minimize truck transfers, and cut greenhouse gas emissions associated with cargo handling.
- ❖ **Handling versatility:** operates seamlessly across all terminals,

facilitating moving minerals, forest products, perlite, and aggregates between marine, rail, and road transport.

FIRST NATIONS COLLABORATION & STRATEGIC PORT VISION

Operations at the Port of Belledune are increasingly executed through shared economic models with First Nations partners.

The Belledune Port Authority works closely with the Pabineau First Nation and Eel River Bar First Nation on land use, green energy developments, and logistics tenants entering the terminal.

Additionally, through its 30-year Master Development Plan, the port is developing a specialized Green Energy Hub district. Memoranda of Understanding (MOUs) signed with major European ports — such as the Port of Rotterdam and Port of Hamburg — pave the way for future bulk exports of green hydrogen and clean synthetic fuels to European markets.

OPERATIONAL SUMMARY

By pairing deep-water, ice-free advantages with modern automated bulk conveyors and clean energy partnerships, the Port of Belledune has successfully navigated the decline of coal and heavy industrial cargoes. Through biomass growth, liquid fuel storage reactivation, and sustainable cargo routes, the port continues to cement its role as a key logistics engine for North American trade corridors.

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Handling woodchips at the Port of Belledune.

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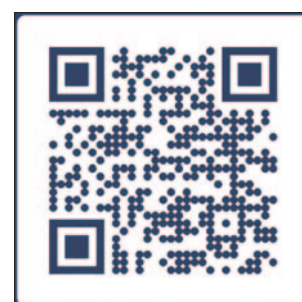
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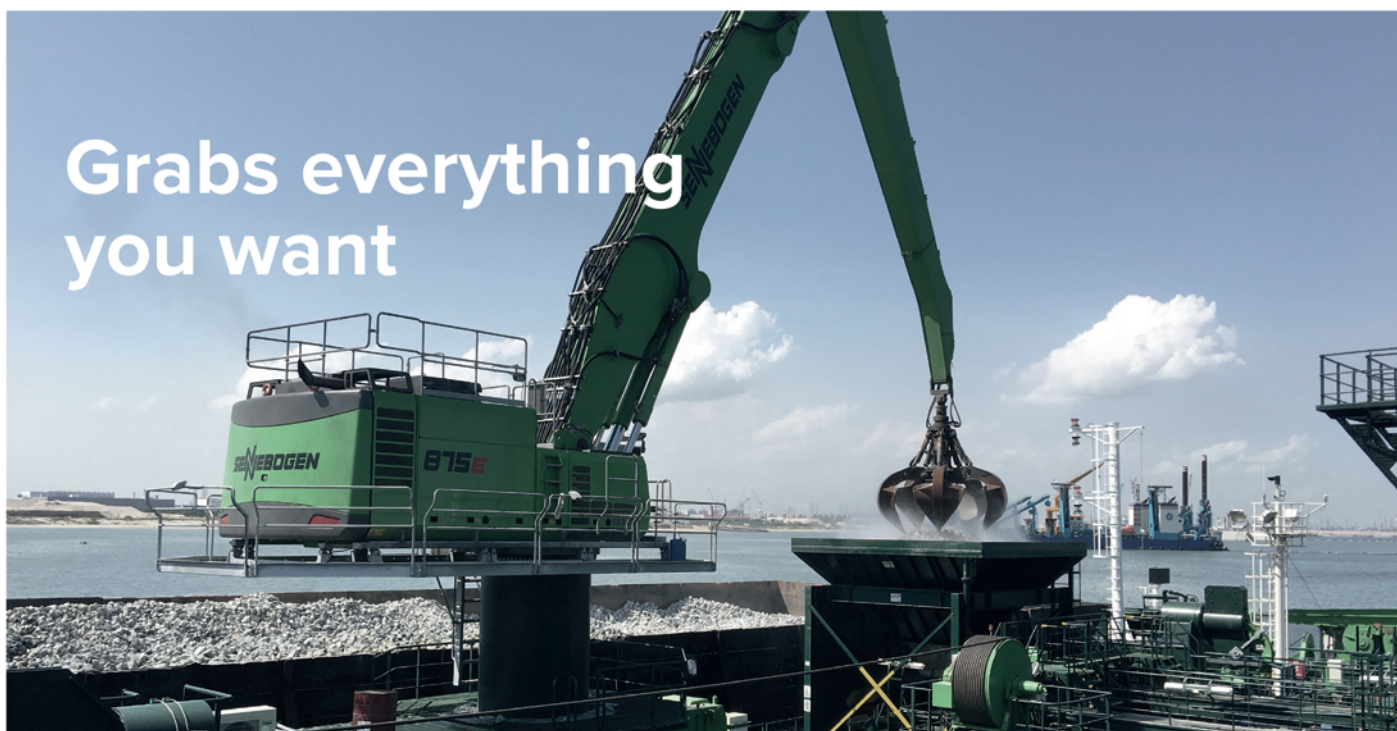
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