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Solid support for grain and soya trade

Further indications of weakness in import demand for commodities have been seen recently. Despite some positive elements, a substantial global seaborne dry bulk trade decline during 2020 as a whole looks set to result. An upturn next year depends on the progress of measures controlling the Covid pandemic.

A new update on the outlook for the world economy, published at the end of June by the International Monetary Fund, underlined the severity of the downturn unfolding.

Global GDP could fall by almost 5% in 2020 (after a 3% rise last year), with the advanced group of countries — mainly USA, Europe, Japan and Korea — experiencing a larger 8% reduction, and China seeing only 1% growth. Revival prospects in 2021 are surrounded by "pervasive uncertainty", according to IMF economists.

Grain & soya

One part of dry bulk trade still providing solid support is grain and soya movements. Estimates of growth in 2019/20 have been revised upwards. Consumption of these commodities apparently remains well supported, accompanied by buoyant import demand. This positive picture seems set to persist over the twelve months ahead.

Global trade in wheat plus corn and other coarse grains may have expanded by as much as 22mt (million tonnes) or 6%, reaching 386mt, in the crop year ending last month, according to the latest International Grains Council estimates. Large import increases among Asian countries, the Middle East area and African countries boosted the total. In 2020/21 starting this month, a further small 1% world trade increase may occur (as shown in table 1), amid expectations of higher imports into Europe.

Iron ore

Reduced steel demand and production is a prominent theme affecting global trade in the main raw materials this year. The principal exception is China, where activity is holding up. Elsewhere, especially in European countries, Japan and South Korea, the background for iron ore imports is much weaker.

Estimates for 2020 published recently by the World Steel Association emphasize the huge extent of steel demand destruction evolving. Based on measuring finished steel products demand, a reduction of 16% from last year's volume is indicated in the European Union, while Japan and Korea could see 19% and 13% falls respectively. By contrast in China a 1% increase is indicated. The WSA suggests that the "recovery path will be slow".

Coal

Lower seaborne coal movements this year are expected to be a major contributor to the downturn envisaged in global dry bulk trade. Both steam and coking coal segments look set to see large declines, amid reduced energy consumption and (for steam coal) greater proportional usage of other energy sources.

Updated forecasts published by the Australian Government a few weeks ago showed world steam coal trade falling by 97mt or 9% in 2020, to 1,046mt, a figure which includes land movements but is mainly sea trade. A similar percentage fall for metallurgical coal trade, down by 32mt to 309mt was suggested.

Expected reductions in China and India comprise a substantial part of the envisaged declines, together with reductions in Japan, South Korea and Europe.

Minor bulks

Among minor bulk commodities which could be affected by some weakening influences this year, is the fertilizer trade segment (comprising phosphate, potash, sulphur, urea and other types). These components appear to have totalled around 180mt in 2019, and signs point to a flat or lower volume in the current period.

Bulk carrier fleet

The Handysize (10–39,999dwt) fleet's enlargement may be slower than seen in other bulk carrier size groups during 2020. As shown in table 2, lower newbuilding deliveries and higher scrapping than seen last year is likely to result in the handysize fleet growing by about 1%, half of last year's increase.

TABLE 1: GLOBAL WHEAT & COARSE GRAINS IMPORTS (MILLION TONNES)

	2015/16	2016/17	2017/18	2018/19	2019/20*	2020/21*
Asia (excluding Japan)	95.0	99.7	99.3	89.9	101.7	102.7
Japan	22.1	23.1	23.6	23.7	23.9	24.2
Middle East	55.8	54.0	61.5	61.4	65.4	60.7
Africa	76.3	75.4	76.9	72.0	80.3	83.0
Others	96.5	100.6	108.5	117.0	114.3	119.7
World total	**345.7**	**352.8**	**369.8**	**364.0**	**385.6**	**390.3**

*source: International Grains Council, 26 June 2020 *forecast July/June crop years*

TABLE 2: HANDYSIZE 10–39,999DWT BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2015	2016	2017	2018	2019	2020*
Newbuilding deliveries	6.5	4.6	3.4	3.0	2.9	2.0
Scrapping (sales)	5.2	3.4	1.7	0.5	0.8	1.0
Losses	0.0	0.0	0.0	0.0	0.0	0.0
Plus/minus adjustments	0.1	0.0	0.0	0.1	0.0	0.0
World fleet at end of year	**97.3**	**98.5**	**100.2**	**102.7**	**104.7**	**105.7**
% change from previous year-end	+1.3	+1.3	+1.7	+2.5	+2.0	+1.0

*source: Clarksons Research (historical data) & Bulk Shipping Analysis June 2020 forecast *forecast*

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US moves to oust China as Brazil's main trading partner

The US and Brazil are negotiating what is being called a "mini trade agreement", which is expected to enter into force by the end of the year, irrespective of what happens with the coronavirus.

Reports suggest that, on the table, there is a possibility that this will lead to the US buying more minerals from Brazil for use in technological products, including computers and mobile phones.

Previously, President Trump had imposed controversial export tariffs on Brazilian aluminium and steel; however the new deal could see more mining taking place on indigenous lands and border regions. It is being argued that this would help local inhabitants and stamp out illegal mining operations.

In fact, the appointment of a new American ambassador, Todd Chapman, is being seen as a significant move, given that among his first public pronouncements has been a desire for the US to double trade between the two countries in the next five years. Were this to happen, the US could conceivably displace China as Brazil's main trading partner, which would suit US trading policy. *Barry Cross*

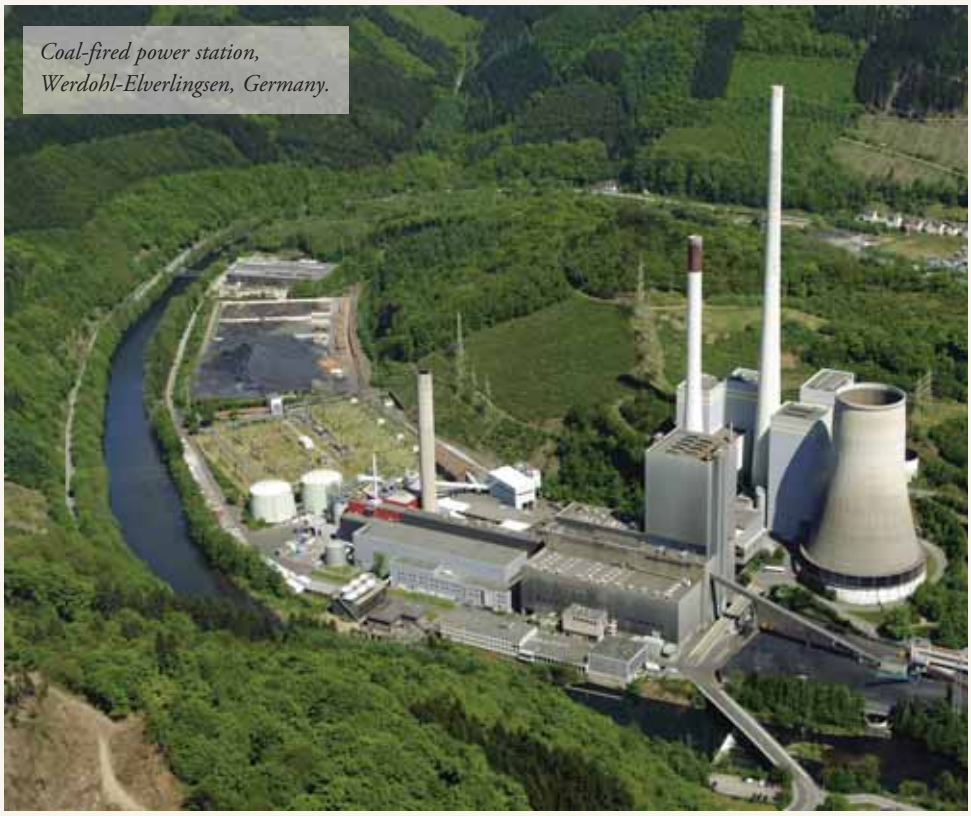
Germany to stop using coal by end of 2038

Germany has taken a major step forward in phasing out the use of coal in its power plants.

The government appointed a commission which has now agreed that Germany will stop using coal in its power plants by 2038, in a bid to slow climate change.

Although Germany has the third-largest installed base of wind and solar power after China and the US, it currently relies on coal to supply 40GW of energy. Incentives are being built into the coal retirement plan, so generators that switch off earlier than 2038 will be rewarded with significant compensation payments. These payments will decline as time goes by, falling by about 50% between now and 2024.

Even before the closure plan — or news on compensation — coal's share of the energy market had already fallen significantly, with solar and wind increasing market share dramatically.



Coal-fired power station, Werdohl-Elverlingsen, Germany.

The major coal-producing regions in Germany — North Rhine-Westphalia, Saxony, Saxony-Anhalt and Brandenburg — will be helped with a €40 billion fund to restructure regional economies and retrain workers.

"The fossil age in Germany comes to an irrevocable end with this decision," said Economy Minister Peter Altmaier. Environment Minister Svenja Schulze called it a "great political success for all those who care about the climate-friendly future of our children and grandchildren."

Bauxite & alumina trades

Covid-19 exacerbates an already difficult market

Hopes pinned on 'green shoots' from China as it emerges from pandemic

Industry does not work in a vacuum, *writes Kunal Bose*. Demand, which is decided by how the economy is faring and disposition of industrial and individual consumers to spend, will have a decisive influence on the working of individual industries. Aluminium makers across the globe and alumina and bauxite producers in the upstream had to cope with demand fall in 2019 when many feared that a global recession was already at work. Come 2020, the novel Covid-19 pandemic travelled from China's Wuhan to the rest of the world forcing countries to enforce comprehensive lockdown over various lengths of time. The world as a result, according to the World Bank, is experiencing the "most widespread economic crisis in 150 years."

In this context, it can be said straightway that the aluminium industry would be a victim of low prices on London Metal Exchange and Shanghai Metals Market, further demand setback in China and the rest of the world, production squeeze and postponement of capital expenditure programme (Capex) to a better day. What is happening to aluminium is also the fate of other non-ferrous metals and steel. Analysts and industry officials are making guesses of recovery from the demand and price slump but all forecasts will be conditioned by how long the pandemic will last to claim victims of humankind and if there will be a second wave of the virus and its severity.

Emerging from a difficult 2019 when global aluminium consumption decelerated by 1.6%, the worst since the 2008/09 financial crisis, triggering a 800,000 tonne squeeze in production, the silvery white metal industry had to contend with a demand contraction of as much as 9.3% in the 2020 first quarter. Aluminium demand in China was flat in 2019 compared with a 4.1% rise in 2018. Ex-China demand contraction was 3.5 per cent against a growth of 2% in 2018. Culling of aluminium demand was because the user segments from automobile to construction to electrical equipment in all regions fared poorly. As for fall in 2019 production, it was because Chinese output was down 3% caused principally by outages at two major smelters. In the rest of the world, however, aluminium production was up 1%. For the first time in a decade in 2019, Chinese production suffered a setback to 35.1mt (million tonnes) from 36.2mt in the previous year. The global market deficit last year was about 1.1mt against 1.3mt in 2018.

An industry official reacting to demand squeeze in the first quarter says: "It could not have been otherwise since this year's first three months saw economies of the US, China and European Union contracting

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5%, 6.8% and 3.3%, respectively. As if all these in the midst of Covid-19 crisis were not enough, we have to remain on the watch out on the course of trade related skirmishes between the world's two mightiest economies — the US and China — and collateral damages the outcome might cause to aluminium and other metals in the current and also the next year."

What is the working environment for the aluminium industry? The World Bank has forecast a global economic contraction of 5.2% in 2020. In three months since April, the International Monetary Fund (IMF) has found that the world economy will shrink by 4.9% and not 3%. IMF chief economist Gita Gopinath foresees economic fallout from the Covid-19 pandemic causing "significant scarring" worldwide with the outlook for recovery remaining highly uncertain. Some of the sectors such as transportation and construction to suffer considerable damage from global spread of the pandemic are big users of aluminium. The feared shrinking of the world economy stands in contrast to a growth of 2.9% in 2019 when demand recession started becoming increasingly evident. All economies and as a natural corollary all industries, including aluminium are getting hurt because of the pandemic crushing demand. The impact will, however, be more in developed economies.

In attempts to lower the pandemic impact, governments across the globe have announced stimulus programmes claiming 10% to nearly 20% of GDP. Aluminium industry officials have, however, started noticing "some green shoots" in China, which provides stimulus to industries, particularly construction and house building, both overtly and covertly even in better times.

Like in other metals, in aluminium too, China occupies a highly elevated place in global ranking. Defying its growing dependence on imports of bauxite and also the intermediate chemical alumina, China had a share of 35.1mt in global aluminium production of 63.1mt in 2019. Not only did the country's aluminium production dwarf that of any other country, its consumption of 35.8mt out of a world total of 64.2mt last year goes to show that even when the economy grew at 6.1% against 6.6% in 2018, the appetite for the metal finding application in sectors from construction to automobile to machinery and electrical stayed virtually flat. Aluminium in China had better times in 2018 when

consumption recorded a healthy growth of 4.1%. Production was also higher at 36.2mt. What must not be lost sight of is China's economic growth in 2019 was the slowest since 1990.

China in bauxite imports

Last year saw China importing for the first time over 100mt of bauxite, registering a rise of 21.91% over 82.57mt in 2018. China's bauxite imports have nearly doubled since 2016. At the same time, the country imported 1.37mt of alumina last year against 510,000 tonnes in 2018 in indications of tight domestic supply.

According to China Nonferrous Metals Industry Association, the country is not a keen exporter of alumina with overseas sales steadily in decline. Incidentally, there was a marginal fall in global alumina exports to 37.5mt in 2019 from 37.7mt in 2018, according to Statista. The bauxite-rich Republic of Guinea — where China has made substantial investments in infrastructure building, specially rail and road links between mines and ports and opening of resources — was the source of bauxite imports of 44.5mt in 2019, up 16.49% year-on-year.

Imports from Australia were up from 21.08mt to 36.4mt, aided by growing demand from refineries in north-west China such as Chongqing. Analysts hazard a guess that despite Beijing reacting strongly to Canberra wanting an inquiry into the origins of coronavirus, China will be left with no alternative but to keep on importing large quantities of bauxite from Australia. Beijing did, however, say Canberra joining the US campaign to besmirch China for the Covid-19 pandemic bears risking long-term damage to Sino-Australian bilateral relationship and trading partnership. Indonesia, which favours local value addition to resources from copper ore to bauxite, surprisingly boosted bauxite exports by over 91% to 14.41mt. At the same time, Chinese groups are investors in alumina refineries in Indonesia and Guinea and suppliers of refinery technology and machinery.

Carl Firman, principal analyst with Wood Mackenzie, believes that the "interplay

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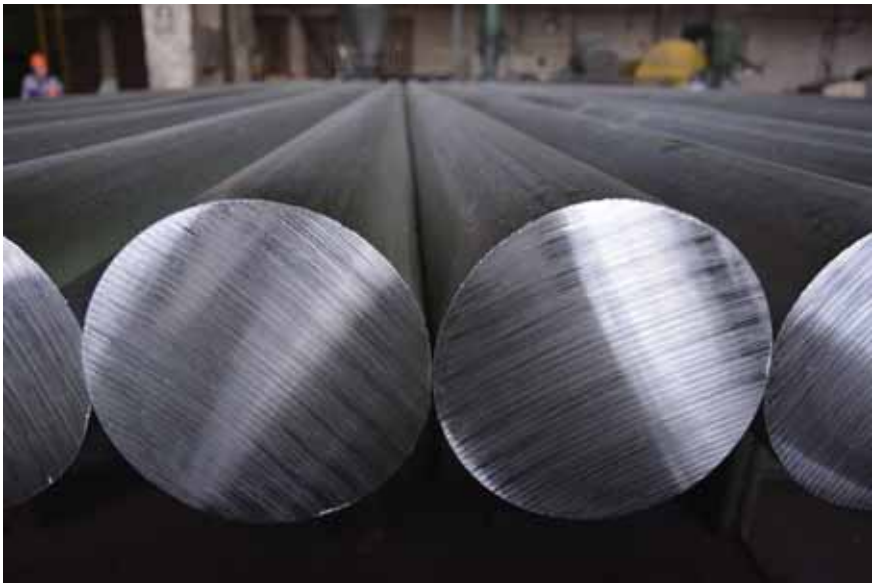
between domestic and imported ore into China" will ensure seaborne trade in bauxite becoming "increasingly important" over the decade. The three reasons Firman gives for this are: (a) Size of local bauxite reserves and the quality will not be up to the demand from refineries in Shandong and growing demand from central China. Add to this, Beijing remaining firm to shut down illegal mining of bauxite on environmental grounds will put the spotlight on imports. (b) Restrictions on ore exports in Indonesia led China to buy bauxite from other countries, including Guinea and Malaysia. (c) In attempts to keep its air clean, China will set up more refining capacity abroad, including building a second refinery in Guinea.

While the three countries mentioned here had a share of 94% of bauxite shipped to the world's largest producer of alumina and aluminium, the remaining 6% of the seaborne trade in the commodity is shared by nearly a dozen other countries including Brazil, Malaysia, Vietnam, India and Jamaica. According to a survey by SMM, 47% of China's alumina capacity was run on imported bauxite in 2019. This year too, China will be using more than 100mt of bauxite of foreign origin. Whether it is aluminium or steel, when a country (read China) creates such huge capacity and produces metals in enormous volumes, it becomes unavoidable that output in excess of domestic requirements will be shipped out.

In the case of aluminium, China's exports are in the form of semi-manufactured products (semis). Last year saw a marginal fall in semis exports. But these were still large at 5.2mt, that is, over 1.52mt more than total aluminium demand in India. Manufacturers of the white metal in India never stop complaining about arrivals of China made semis and scrap in large quantities either directly or via south-east Asian countries thereby compressing their domestic sales. For the first time since 2007, when an export duty stood in the way of export of primary metal, China sold a small quantity of primary aluminium in 2019. The riddle that China is in many ways manifests itself in aluminium also. Analysts are befuddled that when demand is down and LME and Shanghai prices are low, China raised its annualized aluminium production in the first five months of 2020 by 718,000 tonnes (estimate by International Aluminium Institute) to bring its share of world output to 57% in May. This is also the period when annualized production in the rest of the world coping with the demand destructive impact of



Covid-19 was down by 612,000 tonnes.

Looking back, since President Xi Jinping launched the blue sky, clean air campaign in April 2014, the country got rid of several million tonnes of polluting, illegal and old technology based smelting capacity. At the same time, however, new capacity commissioning has more than compensated what was shuttered. Yunnan Aluminium has recently announced the commissioning of a 500,000 tonne smelter at Wenshan in the south of Yunnan province bordering Vietnam, thereby bringing the company's total capacity to 2.5mt. Wenshan, which is rich in hydro electricity, is emerging as an important aluminium smelting hub. Smelters based on hydro power are a lot more cost efficient than the ones based on thermal electricity or even gas based energy. Cost efficiency apart, hydro power is the cleanest energy source. Drawn by the two positives China Hongqiao Group among others had moved capacity to Wenshan.

Excepting March, when the pandemic related lockdown was as its strictest, the Chinese annualized monthly production till May had remained above 36mt. China's share of world production rising to 57% in May in a falling domestic demand scene has raised concerns in industry circles in India and also other importing countries that the producer will be under pressure to export the surplus wherever it can. Even while the US and China remains at daggers drawn on trade issues, Washington has chosen the present time to "vent its frustrations on aluminium" on Canada. The US move will at least for the time being stand in the way of multilateral action against China.

There is long-standing demand by Indian aluminium makers that New Delhi should raise import duty on scrap and primary aluminium to 10% from the present 2.5% and 7.5%. Their demand is based on the premise that while the industry has made huge investments over the years to create smelting capacity of over 4mt with excellent upstream bauxite mining and alumina refining facilities to fully meet domestic demand, imports taking advantage of low duty have cornered a major share of local aluminium market. During 2018-19, imports had a share of 2.318mt of Indian domestic aluminium use of 3.972mt. In the following year, Indian demand was down to 3.72mt so also imports to 2.170mt.

At a recent earnings conference, Satish Pai, managing director of Hindalco Industries, which also owns Novelis and more recently Aleris, said the overall economic damages being caused by the dreaded virus would be the principal reason for the likely sharp fall of 8% in global aluminium demand in 2020. Exclude China where a 4% demand slump is forecast, the rest of the world will see a 13% drop in aluminium use "due to a severe slowdown in manufacturing, particularly in the auto sector and overall weak customer sentiment." Industry margins globally came under pressure, specially for smelters that use coal-fired electricity, because of 15% fall in white metal prices to $1,791 a tonne in 2019 from $2,100 a tonne in 2018. In the first quarter of 2020, aluminium quoted still lower at $1,690 a tonne. At this writing, the LME three-month aluminium price remains around the same level.

From Hydro in Norway to Alcoa in the US and producers elsewhere, their margins came under pressure because of lower realized prices for aluminium and alumina. Lower raw material costs, however, gave some relief to aluminium makers who will continue to operate in an environment of low demand that will keep LME prices under pressure and within a limited band.

Brazilian aluminium recovery stymied by Covid-19

A hoped for recovery in demand for aluminium in Brazil this year, has been frustrated by the outbreak of coronavirus, *writes Patrick Knight.* But changes which will take place when an economic recovery occurs, may greatly benefit the aluminium complex.

It seemed likely early this year that the Brazilian economy would grow by at least 2% in 2020, so manufacturers of primary aluminium — as well as extruded products — anticipated selling 5% more in 2020. Output of the metal has declined from 1.3mt (million tonnes) in 2013, to about 600,000 tonnes last year, as numerous smelters have shut down.

Although demand for aluminium has fallen slightly in the past few years, when Brazil's economy has stagnated, imports of primary aluminium, most coming from China, have shot up. Rather than bringing idle capacity back on stream, companies have preferred to sell the electricity they can generate. During a period when metal prices were low but those of electricity were high, selling energy had become more profitable than making metal.

Brazil's exports of bauxite and alumina have remained stable, with exports averaging about 9mt of the ore and 8mt of alumina each year. Production of alumina fell sharply in 2018, however, following an enforced shutdown of output at the leading Alunorte mill, the largest in the world. This was because of an interruption in the electricity supply, although output has since recovered.

Exports of bauxite and alumina now earn Brazil about $2.5 billion a year, which is considerably less than what imports of primary aluminium now cost. In addition to the imports of primary, increasing amounts of all types of finished products, previously mostly made in Brazil, have been imported in the past couple of years, again mainly from China.

An estimated 300,000 tonnes of manufactured products, 40% of what is consumed and destined for the motor, packaging and civil construction industries, were imported in 2019. China's share of the domestic market for products is

estimated to have risen from 9% in 2014, to 57% last year, as a result of companies such as Votorantim's CBA slashing production and also because of subsidies given by the Chinese government to many of the goods sold to Brazil.

The outbreak of coronavirus has changed prospects for industry dramatically. The Brazilian economy is expected to shrink by 6% this year, with the production of motor vehicles, the largest single market for aluminium products, has virtually ceased, as factories are closed.

Unemployment has soared, causing demand for consumer goods, including beverages, a leading market for aluminium sheet, to fall sharply as well. The hoped-for recovery of the civil construction has also petered out. The effort by the governors of the country's leading industrial states, such as Sao Paulo and Rio de Janeiro to enforce a lockdown, in a country which has now become one of the world's leaders in terms of numbers of deaths from the virus, has largely failed.

On the one hand, the president, Jair Bolsonaro, is calling for the economy to return to normal as soon as possible. He believes that a continuing shutdown will cause more damage to the economy as the virus itself. The state governors, on the other hand, are attempting to continue with the lockdown, which has never been nore than 50% efficient anyway.

The risk is that Brazil will end up having the worst of both worlds. No economic growth, and a continuing high number of deaths from the virus. The fact that Brazil's currency, the real, has fallen by more than 30% against the US in the past three months, the greatest fall of any currency, means imported goods now cost much more than they previously did in local currency terms.

In theory, the manufacturers of primary aluminium, which include Norsk Hydro, Alcoa, and Novalis, could re-start some of the 400,000 tonnes capacity which is now mothballed. But for this to happen, a clear formula for the return of investment by industry, involving government backing and help, would be needed, and few in Brazil are talking of this.

The cost of electricity in Brazil was subsidized when the establishment of a large scale alumina and aluminium industry was given priority in the 1970s. One power station, the 4,000MW capacity Tucurui, was built adjacent to where bauxite is mined. This allowed alumina and aluminium to be made nearby.

However, subsidies have now been phased out, which has resulted in most manufacturers, notably market leader the Brazilian Aluminium Company, CBA, part of the Votorantim conglomerate, to prefer to sell electricity than to make the metal. CBA, which for many years exported a third of the 450,000 tonnes of primary it produced at the peak each year, has now ceased exporting the metal.

More recently, the CBA has also reduced output of the wide range of extruded products it once made, as it cannot compete with subsidized imports from China. The Votorantim company, previously Brazil's leading producer both of primary aluminium and extruded products, has in the past couple of years not only reduced its participation in the aluminium complex, but has also sold its interests in the pulp and paper industry, in which it was the leading producer, to rival producer, Suzano.

Most of the proceeds of this sale are now being invested in alternative sources of electricity, notably wind power. The *per capita* consumption of primary aluminium, which a decade ago averaged about 7.5kg a year, has now fallen to 6kg. Even before the present fall in economic activity, the share of aluminium products used by the construction industry had fallen from 37% of the total consumed, to 15%, and a hoped-for recovery of the construction sector, after a period when a large amount of unsold property weighed on the market, had been one of those where growth was expected to return.

It is too soon to say what the long-term prospects for the industry will be in Brazil. Much depends on whether China, where the surge in production and export of aluminium in the past few years has destabilized the world production pattern of the metal, continues to subsidize the production and export of primary aluminium, as well as products.

The prospect of trade wars involving China, and the United States and some other countries as well, may result in one of the reasons for Brazil having emerged in the 1960s and 70s as a major producer of the primary metal, as well as of bauxite and alumina, becoming valid once more. The reason so many companies invested in Brazil 40 years ago was because the country was relatively stable, as well as ideologically aligned with the western world.

In the early years of the industry, of course, the then state-owned Vale do Rio Doce company, now re-named Vale, was a leading player in the entire aluminium industry, including mining bauxite and making alumina, as well as primary metal. Once privatized, however, Vale decided to concentrate all its efforts in the more profitable mining and exporting of iron ore.

The company disposed of all its assets in the aluminium complex, most of which were acquired by Norsk Hydro, now the leading player in aluminium industry in Brazil. The present Brazilian government seems to have no clear policy for industry

at all. Before the virus struck and the economy entered almost freefall, its policy was to dispose of as many of the assets remaining in state hands as possible. Brazil has enormous reserves of high quality and easily accessible bauxite, the world's fifth largest, and already produces large amounts of low cost hydro-electricity. In recent years, hydro power has been supplemented by substantial quantities of low cost energy produced by wind power. Because of strong prevailing winds, Brazil has great potential for this. Low cost energy could, if the will was there, once again provide the aluminium industry with the cheap electricity it once enjoyed. The leading market for aluminium in Brazil, has in recent years been the packaging, including the ubiquitous cans, used by the beverage industry. 30% of production has been used for this purpose, and more than 95% of cans are re-cycled in Brazil. With the widespread closure of restaurants and bars, the consumption of beer and other beverages has fallen sharply. But given Brazil's hot climate, consumption of beverages will return soon. It is interesting that in some European countries, where huge swathes of industries have virtually collapsed following the fall in demand caused by lockdowns, governments are now considering taking substantial financial stakes in such industries to guarantee their survival. Many are now loss making and future is threatened. Given the present nature of Brazil's government, this seems unlikely to happen there at the moment. But were the United States, the role model for the current government, to embark on such a course, Brazil might follow suit and allow the aluminium industry to make a recovery there.

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ABB Turbocharging has introduced a holistic service package that offers shipowners financial predictability and peace of mind while reducing complexity and enabling greater insight into equipment health.

Turbo MarineCare offers a turnkey solution to maintenance at a fixed price, providing continuous cover from drydock to drydock. Designed for customers with turbochargers for two-stroke engines, the plan covers standard overhaul parts, wear and tear components, unplanned events (including unexpected repairs), labour, waiting and overtime, and intermediate inspection.

Shipowners are traditionally covered by a limited warranty only in the first few years of a new vessel's life. Turbo MarineCare can be applied from new or at any stage of the vessel or turbocharger's life subject to access to its service history and operating data. By offering comprehensive cover, the service brings the peace of mind afforded by big fleet service agreements within reach of all shipowners.

"In challenging markets, it is even more important for companies to reduce and simplify day-to-day costs," said Roland Schwarz, head of Service at ABB Turbocharging. "Turbo MarineCare allows owners and operators to flatten the cost of turbocharger care over the span of an overhaul period, making their outgoings fully predictable while safeguarding access to original parts, the latest technologies and authorized service teams."

Turbo MarineCare allows operators to dramatically simplify maintenance regimes. Unanticipated replacement of parts and repairs during drydocks can cause delays, administrative burden and extra cost. Under the new service agreement, ABB takes on these risks rather than the shipowner or operator. ABB identifies which parts and service will be required at overhauls and takes responsibility for shipping of parts ahead of drydocking and carrying out the service.

Monitoring of operational turbocharger data is a precondition of Turbo MarineCare. This allows ABB to provide a complete health assessment of rotating components as well as enabling early detection of abnormal data trends that can help to avoid potential turbocharger faults.

"From the moment customers sign up to Turbo MarineCare, the financial risk and worry of the extra cost associated with turbocharger service are removed from themselves and transferred to ABB," comments Roland Schwarz. "This will create peace of mind, eliminate unexpected expenditures and reduce bureaucracy in their daily job."

About ABB Turbocharging

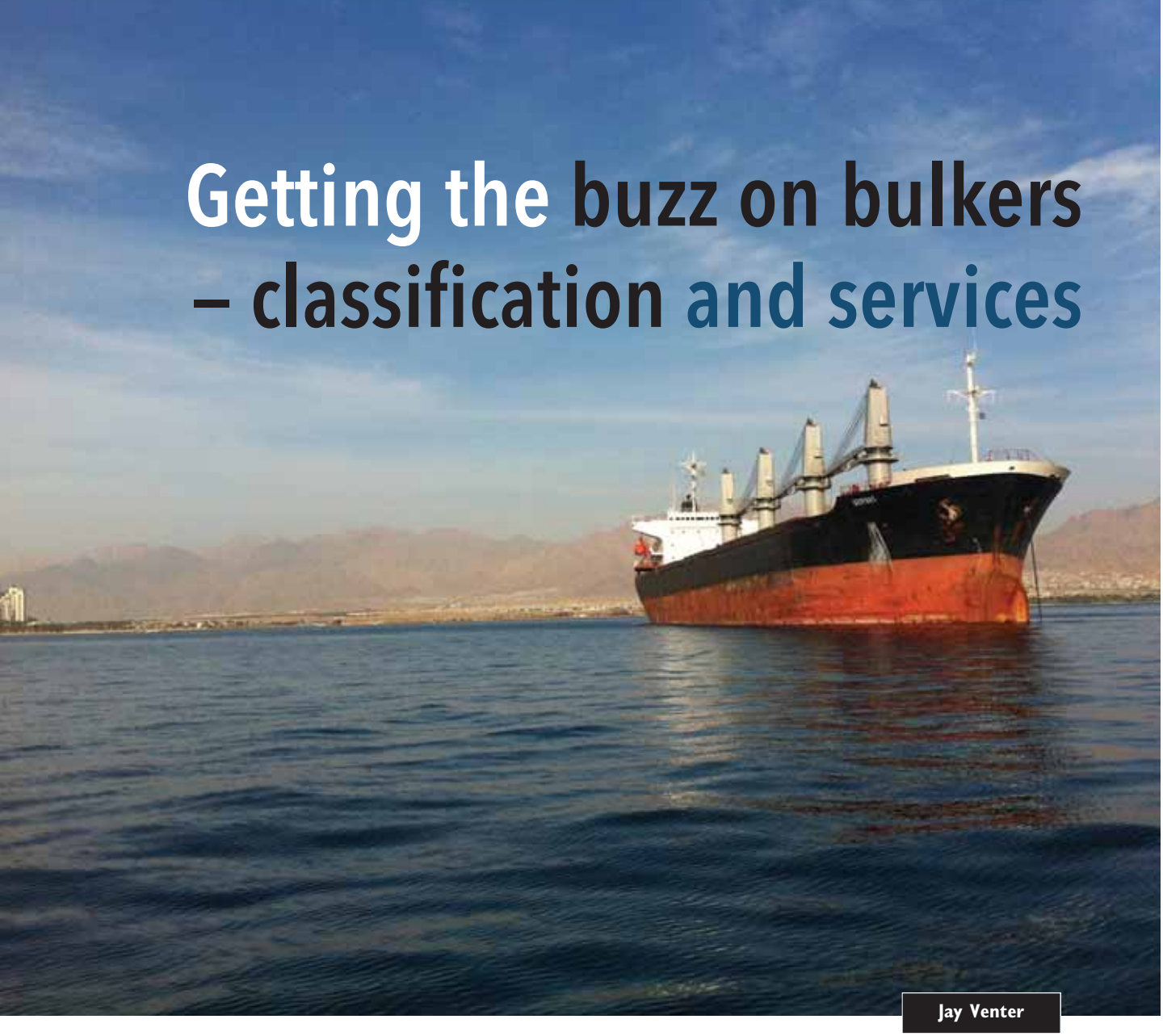
ABB Turbocharging is at the helm of the global industry in the manufacture and maintenance of turbochargers for 500kW to 80+MW diesel and gas engines. The company's innovative leading-edge technology enables its customers to increase their performance; producing lower emissions and improving fuel consumption even in the toughest environments.

Approximately 200,000 ABB turbochargers are in operation across the globe on ships, power stations, gen-sets, diesel locomotives and large, off-highway vehicles. ABB Turbocharging has over 100 Service Stations in more than 50 countries globally and a wide service portfolio that guarantees original parts and original service anytime, anywhere.

About ABB

ABB is a major global engineering company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by 144,000 talented employees in over 100 countries.

Getting the buzz on bulkers – classification and services



Jay Venter

ClassNK releases amendments to class rules

Classification Society ClassNK has released amendments to its Rules and Guidance for the Survey and Construction of Steel Ships issued on 30 June 2020.

ClassNK is constantly revising its Rules and Guidance to make them more rational and transparent based on industry requests, R&D outcomes, and feedback from damage investigations as well as changes in line with relevant international conventions, IACS unified requirements (UR), national regulations, etc.

A total of 48 amendments issued on 30 June 2020, including the following items, have been released.

Regarding 'Oil-lubricated Propeller Shafts Kind 1', the notation requirements to affix '1C' to the classification characters of the ships fitted with oil-lubricated propeller shafts (Kind 1C), which have a reputation for being highly reliable by various means not only to prevent corrosion damage to stern tube bearings but also to facilitate general maintenance and management more easily, are stipulated. The amendment also includes the treatment of periodic lubricating oil analysis carried out for the postponement of the Ordinary Survey of a propeller shaft, etc.

Regarding 'Characteristics of Governors for Prime Movers Driving Generators', the methods for confirming characteristics of governors of the gas-fuelled engines used as prime movers driving generators are stipulated in response to industry requests for clarification.

Regarding 'Watertightness of Cable Penetrations', the clear and uniform test procedures for confirming and approving the watertightness of the cable penetrations of bulkheads and decks are stipulated.

Regarding 'Semiconductor Converters for Power', the requirements for semiconductor converters for power are amended by compressive review based on the expertise from their application and recent technologies, which includes the addition of type test requirements.

On top of them, the following and more amendments are also made at this time:

'High Voltage Electrical Installations', 'Verification of Accuracy of Flow Meters for Oil Discharge', 'Monitoring and Control Systems', 'Handling of Damage Stability', 'Winches for Free-fall lifeboats', 'Exhaust Gas Recirculation Systems', 'Unified Interpretations for MARPOL ANNEX VI', 'Periodical Surveys of Machinery, Equipment and Fire Safety Systems', 'Welding for Independent Tanks of Ships Carrying Liquefied Gases in Bulk', 'Unified Interpretations for the IGC Code', and 'Heat Treatment for Pipe Weldings'

The amendments are available in the 'Rule Amendments for Technical Rules' section of the 'ClassNK My Page' website. Registered users of 'ClassNK My Page' can also access all ClassNK Rules and Guidances on its website.

ClassNK releases 'Guidelines for Designing Cyber Security Onboard Ships' (2nd Edition)

Classification Society ClassNK has released its *Guidelines for Designing Cyber Security Onboard Ships* (Second Edition) for newbuilding designs targeting shipyards and ship-building owners.

In the second edition of the *Guidelines for Designing Cyber Security Onboard Ships*, the control measures and the framework to implement such measures were updated to incorporate the international cyber security standards for industrial control systems IEC 62443 series and the latest recommendation on cyber resilience for new ships (Rec. No. 166) published by the International Association of Classification Societies (IACS) in May 2020. In addition, they introduced requirements for adding class notations to classification codes related to cyber security.

Based on the ClassNK Cyber Security Approach which outlines the Society's basic approach to ensuring onboard cyber security for ships, the guidelines are a compilation of current best practices for newbuilding designs by shipyards and shipbuilding owners from the perspective of identifying computer systems that should be protected from cyber incidents and of building networks to protect them.

ClassNK will carry out cyber security verification during the design and construction stage of newbuildings based on the guidelines and issue a class notation to compliant ships in response to applications for registration inspection during manufacturing by shipyards. The guidelines are available to download free of charge via ClassNK's website.

Marshall Islands Registry scores top rankings by all three major port State control regimes

The Republic of the Marshall Islands (RMI) is ranked sixth on the white list of the Paris Memorandum of Understanding (MoU) Current Flag Performance List 2019. The Paris MoU's "white, grey, and black (WGB) lists are based on the total number of inspections and detentions over a three-year rolling period for flags with at least 30 inspections in the period."

This high accolade follows the top rankings the RMI has already received from the United States Coast Guard and Tokyo MoU earlier this year. The RMI's 2019 rankings by all three of the major port State control (PSC) authorities reflects the fact that the RMI once again clearly outperforms Panama and Liberia in quality and detention records, confirming the RMI's position as the premier quality registry.

Between the years 2017–2019, 4,481 RMI flagged vessels were inspected by Paris MoU members, resulting in only 69 detentions. The WGB list is used for calculating the Ship Risk Profile. PSC is a regime to inspect ships to verify their compliance with international conventions with respect to safety, security, pollution prevention, and seafarers' living and working conditions.

"This ranking confirms our status as the flag of choice for the best quality shipowners whose charterers and investors expect their vessels to be fully compliant and not unnecessarily detained or targeted for inspection," said Bill Gallagher, President of International Registries, Inc. and its affiliates (IRI), which provide administrative and technical support to the RMI Registry.

RMI's status as a top performing flag State is the result of continued investment in people, technology including the technology to vet and monitor its ships, and close communication with PSC authorities around the world.

"We continue to focus relentlessly on providing the global infrastructure of local inspectors and support offices which allow us to provide a first-class service," concluded Bill Gallagher.

About IRI

International Registries, Inc. and its affiliates (IRI), with more than 70 years of experience as a maritime and corporate registry service provider, has a network of offices in Baltimore/Annapolis, Busan, Dalian, Dubai, Ft. Lauderdale, Geneva, Hamburg, Hong Kong (Harbour Road and Gloucester Road), Houston, Imabari, Istanbul, Long Beach, London, Manila, Mumbai, New York (midtown and downtown), Piraeus, Rio de Janeiro, Roosendaal, Seoul, Shanghai, Singapore, Taipei, Tokyo, Washington, DC/Reston, and Zurich, that have the ability to register a vessel or yacht, including those under construction, record a mortgage or financing charter, incorporate a company, issue seafarer documentation, and service clientele.

In order to meet higher expectations, IRI has expanded its worldwide coverage to include representation in Chile, Limassol, and Oslo. IRI concentrates solely on administering the Republic of the Marshall Islands flag and provides a broad spectrum of registry related services for the shipping and financial services industries.

A history of safety in shipping

The question of what safety means in shipping is as old as maritime trade itself. The 20th century saw significant successive improvements to SOLAS regulations, tightening inspections regimes and generally more advanced ships.

However, in the late 1990s, Australia's famous 'Ships of Shame' inquiry shone a light into the general prevalence of poor safety practices and unseaworthy ships. It is this inquiry that prompted the creation of RightShip in 2001.

Over the last twenty years, the industry has continued to make significant safety progress. The latest *State of Maritime Safety* report published in April 2020 showed that total loss incidents have continued to decline over the last five years, dropping from 0.16% of the world fleet in 2015 to 0.09% in 2019.

It is no coincidence that this positive trend has aligned with the industry adopting new technologies and embracing digitalization, as well as the generally increasing professionalism seen within shipping. In order to continue to raise safety standards, we must be innovative in the way we integrate digital technology with the very tangible human factors — such as crew welfare and operational processes — that ultimately underpin safety.

A commercially successful voyage is one that is first and foremost a safe voyage. However, that voyages are commercially successful is key, because this is how to generate further investment in processes and technologies that underpin safety.

Arguably one of the most important contributors to improvements in safety outcomes comes from implementing marine assurance processes like vetting and ensuring that a proper safety culture is implemented onboard the vessel. The later requires clear messages from the top of every organization to ensure all in the company, regardless of their position, understands that safety comes first. Martin Crawford-Brunt, CEO of RightShip, says: "In order to drive continuous improvement however you need to be able to keep the score through good data and leading tools to provide the insight to support best practice. It is for this reason that RightShip continues to invest in new products and services while hiring very experienced vetting officers who are able to interpret the wealth of information we have and offer sound practical advice and support."

When discussing safety and a culture of safety, it is important to acknowledge that

Martin Crawford-Brunt, CEO of RightShip.

the opening months of 2020 have presented the shipping industry with a unique and unprecedented challenge in Covid-19. We can see first-hand that travel restrictions and public health measures have stretched the regulatory framework that keeps our ships, mariners and supply chain safe. In the long term, safety cannot become a casualty of the commercial uncertainties facing shipping. The importance of a robust attitude to safety is more important now than ever before, and it is important that the tools are there to support it.

The bottom line is that the last ten years has seen more than 2,000 incidents and more than 200 seafarers have lost their lives in dry bulk shipping. This number is still far too high for our end goal of a zero incidents shipping industry, so it is important to remember that there is no end to safety improvement. One of the most impactful ways to improve safety is through collaboration, engagement and innovation — all of which have underpinned the development of RightShip's new Safety Score.

A new chapter for safety and due diligence

RightShip's new Safety Score represents the latest development in our mission to support safety and due diligence in the shipping industry.

It has been developed after a period of extensive industry collaboration. Over the past two years, RightShip engaged with a wide and representative cross section of the shipping sector, all of whom were asked what RightShip can do to provide a metric that will help them develop improved safety standards.

The Safety Score builds on a wealth of feedback and the collective experience of RightShip over nearly 20 years. A clear call from the industry for transparency to the model, with owners and operators calling for the methodology to provide a clearer path to improvement. In response to this, the Safety Score only takes into account factors that are directly influenced by the activities of the vessel owner and operators, such as incidents, inspections and more. It does not take into account the size, age, type or builder of the vessel.

By developing a closer relationship between operating practices and a vessel's score, RightShip can drive widescale improvements in safe operating practices.

Maintaining control

The launch of the Safety Score sees the replacement of RightShip's previous Risk Rating. Where the Risk Rating was a predictive model that estimated the likelihood of a vessel having an incident over the next 12 months. The Safety Score will focus more on providing insights into to the operational performance of a vessel, DOC holder, flag and class level.

The Safety Score will also build into its conclusions a greater amount of emphasis on the history of a vessel. By looking back at the previous five years of a vessel's and DOC holder's performance, it fully takes into account any previous incidents including their severity, recency and frequency. Detentions and deficiencies from PSC inspections are including a consideration of recency and frequency.

Crucially, the Safety Score also builds into its methodology a measure of the proactivity of owners in dealing with any incidents, deficiencies and detentions. All of this gives the ship owner a clearer path towards improving their Safety Score.

A new range of insight

RightShip supports the industry's success by promoting and recognizing those who are delivering operational excellence consistently. For owners, the Score provides is a fair and transparent reflection of the factors that they can improve or maintain in their operations as well as providing a good opportunity to showcase their safety performance to their customers or regulators.

Alongside these benefits for owners, the Score also helps other groups within the industry. For example, charterers will be

able to benefit from a more transparent and accurate insight into the performance of their potential charter, kicking off the vetting process with greater clarity.

There are also uses beyond these two groups. For example, ports and terminals will be able to access a quick overview of the history of the vessel including Port State Control information and benchmarking. This will be valuable to other stakeholders including financiers and insurers who want a consistent headline summary to support their processes.

Forging a culture of safety

To support with the industry's transition to the Score, RightShip has kicked off a three-month familiarization window, to ensure that all end users can test and go hands-on with the new metric and platform.

The Safety Score represents a new milestone for RightShip, and is a bold step in its journey to drive continued improvements in safety. It has recognized that collaboration is key, and without the hard work of the company's industry partners in providing their feedback, RightShip wouldn't have been able to develop the Safety Score. Collectively, it is possible to empower the industry with the tools that drive safety and ensure that more groups can realize the benefits of investing in an improved safety culture.

Korean Register celebrates 60th anniversary

The Korean Register (KR), an IACS member classification society celebrated its 60th anniversary on 20 June 2020.

To mark the occasion KR has held a commemorative ceremony at the organization's headquarters in Busan, Korea. However, as a result of the Covid-19 pandemic, the large planned celebration event was replaced with significant donations given to six schools in the local community, two maritime universities and six universities with naval architecture schools.

KR chairman and CEO, Hyung-chul Lee said: "I thank our government for their vision when KR was created back in 1960, and I thank all of my colleagues for their hard work building our organization into the respected, industry-leading centre of expertise that it is today. Today, we are not just celebrating our 60th anniversary, we're looking to the future and the next 60 years and continuing our Mission, to enhance the safety of life and property while protecting the environment."

Looking ahead, Hyung-chul Lee has set digitalization and positioning KR as the leading digitalized classification society as a core goal for the term of his leadership. As a result, KR has already differentiated itself from other classification societies by offering customers a range of options using adaptive technology to deliver conventional surveys.

Now the organization is working on big data platforms, e-certificate systems, an increasing range of remote surveys and virtual reality-based surveyor training simulators. KR is also working with industry to install sensors on essential equipment onboard newbuild and existing vessels to collect data for condition-based monitoring and is well-respected for its innovative and comprehensive cyber security measures.

Mr Hyung-chul Lee, Chairman and CEO Korean Register.

Furthermore, KR intends to deliver ten practical digital technologies before the end of 2020, these already include condition-based monitoring, drone surveys, and a 3D based approval system.

AI technologies are the society's next area of focus, helping KR's customers and the wider industry prepare for the wider introduction of autonomous vessels.

In 1958, the entire Korean fleet numbered just 39 vessels with a combined gross tonnage of just 100,953. KR was formed in 1960 to help grow the domestic fleet, overseeing the building and servicing of the vessels.

KR became an associate member of IACS just 15 years after its formation and achieved full membership 13 years later. In 1989, the general manager KR's London office was the first KR official to chair an IMO special working group. Since then, KR's global network and spread of capabilities have increased and the society has taken on the chairmanship of IACS twice and chaired a range of IMO committees and groups.

Today, the KR fleet is currently comprised of 65% Korean owners and 35% international customers. The international fleet is made up of more than 3,000 vessels totalling 70 million GT (gross tonnage) and is made up of 43% bulk carriers, 22% tankers, 12% containerships, RORO are 9% and gas carriers 7%.

As of June 2020, KR is authorized by 80 flag administrations to act as a Recognized Organization and KR has 68 offices worldwide, 15 in Korea and 53 in other countries.

Korean Register

The Korean Register (KR) was established in 1960 with the purpose of promoting safety of life, property and the protection of the marine environment. KR currently classes an international fleet of 3,000 vessels totalling 70 million GT. It is headquartered in Busan, South Korea with a network of 66 offices around the world. KR is authorized to perform statutory and certification services in 80 countries around the world.

DNV GL launches new infection prevention & control certification services

To support owners and operators of all ship types and offshore units' in demonstrating proper prevention, control and mitigation of infection risk, DNV GL - Maritime has developed a suite of related services. A selection of the services are addressed below.

Certification in Infection Prevention-Maritime (CIP-M) Programme

DNV GL – Maritime in co-operation with DNV GL Healthcare, offers a Certification in Infection Prevention-Maritime (CIP-M) Programme. The CIP-M Programme is an evidence-based protocol providing a modern, comprehensive and practical certification framework to help companies improve their management of infection risk in the maritime setting. Through annual surveys on board and company audits ashore, DNV GL verifies that a company maintains a detailed operational plan in compliance with the CIP-M requirements. CIP-M certification for a vessel is a demonstration of proper prevention, control, and mitigation of infection.

The expertise

CIP-M builds on the existing Certification in Infection Prevention (CIP) Programme requirements released by DNV GL Healthcare USA, Inc. for hospitals in January 2019. CIP is based on leading healthcare standards and guidelines, including those of the US Centers for Disease Control and Prevention (CDC), the World Health Organization, the US Occupational Safety and Health Administration, as well as the ISO 9001 Quality Management System standard. Other related national and local guidelines are considered, where applicable. When developing CIP-M, class requirements as well as statutory regulations were considered, along with the possibility to include emerging international and industry association guidance. CIP-M is customized for a vessel's reality, characteristics, and operations.

Since 2008, DNV GL Healthcare has accredited and/or certified more than 600 hospital facilities worldwide, with teams of experienced healthcare professionals including clinicians, experts in infection prevention, quality management, healthcare operations and environmental safety. Utilizing an alternative to traditional hospital accreditation by incorporating the ISO 9001 quality management system, DNV GL Healthcare has garnered extensive experience in infection risk management.

The value

For a vessel owner or operator, the certification, which is valid for three years, demonstrates an organization's commitment to prevent, control and mitigate infection risks vulnerabilities. It also supports an organization's efforts to build trust and confidence amongst passengers, crewmembers and other stakeholders. The CIP-M Programme assists a company and its assets to be better prepared to address the challenges of today and any future emerging pathogens.

CIP-M crew and company training

Navigating the dynamic situation when a contagion presents, does involve many changes being implemented concurrently and on a very short timeframe. In order to achieve behavioural change and embed new processes, crews and company representatives must develop new competences. To support companies building awareness and understanding in the fundamentals of infection prevention and control, the existing DNV GL Healthcare training programmes have been adapted by Maritime Academy for use in the maritime industry. The Basic, Intermediate and Advanced Infection Prevention & Control training courses are available for relevant personnel, as well as a specific Covid-19 and Emerging Pathogens training course.

The courses can be delivered classroom style, or via flexible computer-based training (CBT) and short custom-made CBT modules can be created to reference a company's specific procedures, checklists and other assets. The CBT method incorporates psychological concepts such as gratification, reinforcement and gamification, and provides auditable records of successful training completion. The company's involved personnel onshore and onboard can be trained in accordance with their related activities and responsibilities.

Product assurance and certification

The market for infection prevention and control technology at this moment is developing rapidly (e.g., UV cleaning, antimicrobial surface coatings, HVAC equipment, etc.). Vessel owners and operators who choose to procure such items need to ensure that they are selecting the right products (equipment, systems) for the job at hand. Product Assurance and Certification is now available in this space through modified form of DNVGL-RP-A203 Recommended Practice for Technology Qualification, and in cooperation with Business Assurance.

The process involves a screening and categorization of a product performance claims, operational risks and which external parameters are important for proper functioning, followed by a critical review of existing evidence for the product's performance. A risk-based gap analysis is carried out to assess the uncertainties associated with the application of the product in the maritime environment, including an assessment against the relevant Class and Statutory requirements. Product certification on satisfactory completion of qualification or testing activities includes specification of approved service conditions and any maintenance, testing and inspection regime that may be required.

Product assurance and certification applies a systematic and documented approach to product selection for owners, through third party assurance to the decision-making process. It can also help product manufacturers build customer confidence in their products and get them accepted to the market for use.

Inland cargo movements

impact of pandemic affects supply/demand and logistics

Problems causing delays in loading and unloading at ports, as well as the slowing in the movement of goods on roads, railways and waterways, are curbing the flow of commodities around the world, *writes Patrick Knight.*

With the Coronavirus impacting every country in the world, the supply and demand for all commodities, hard or soft, is being seriously affected. Problems with logistics, such as delays to shipping at ports and terminals, warehouses too full to accommodate more products, while the increased cost of using roads, railways, and waterways, are all contributing.

Workers are falling ill, while social distancing is complicating the handling of goods. It has become clear that the economies of every country in the world is set to shrink, cutting overall demand, although the degree of long term impact is difficult to predict at this stage. What will happen in Brazil, for example, is particularly difficult to anticipate.

On the one hand the country's president, Jair Bolsonaro, favours encouraging the economy, now set to decline by at least 6% this year, to return to growth as soon as possible. He is pressing for lockdown restrictions, already only being partially respected, to be lifted completely. But the governors of most of the country's 27 states, who are trying to deal with one of the world's fastest-growing and most lethal outbreaks, are pulling in the other direction.

It is also too soon to be sure to what degree the falls in purchasing power of the populations in most countries will feed through to cause a reduction of demand for goods. Notably for such things as the iron ore, soya beans, maize, meats, coffee beans, sugar, cotton, crude oil and fruit which Brazil exports, but falls there will certainly be. The prices of most commodities are already falling, as many consumers have less to spend. Because the Brazilian currency, the real, has fallen by 30% against the US dollar in the past four months, local producers are getting very little less in local currency terms, then they did before. This means producing and exporting are still attractive.

One consolation for Brazil is that demand in China, which seems to have been able to deal both promptly and effectively with the virus, has started to rebound, after sharp falls in demand in the first quarter. China is Brazil's leading market for many commodities. It takes

more than 40% of all its exports, 65% of which are now concentrated in agribusiness products, led by soya, maize, market pulp, cotton, leather, timber, various meats, coffee and fruits. 35% more goods were shipped to China in May this year, as in the same month of 2019.

There is one piece of very good news to report as far as logistics are concerned. This is that 40 years after a start was made on constructing the important BR 163 highway, which runs north 2,000km from the capital of leading soya producing state Mato Grosso, to the Amazon river port of Santarem, via the riverside port of Miritituba, the last section has now been paved.

This will accelerate the already fast-growing trend, which has resulted in an increasing proportion of Brazil's exports of soya beans and maize, leaving from the North and North East of Brazil, rather than ports such as Santos and Paranagua. River ports such as Santarem and Barbacena, and above all, the deep water port of Itaqui, are benefiting most.

Improved access to all these ports will also mean that more bauxite, pulp, and wood, most of which reach them by barge or rail, will leave from the region in future. In addition, much more fertilizer will be distributed faster, further and at lower cost than hitherto. Until now, most of the several millions of tonnes of fertilizer Brazil imports each year, has arrived at south eastern ports such as Paranagua and Rio Grande. This was because fertilizer was an ideal return cargo for the now falling number of trucks which carry grains south, but would otherwise have returned north empty.

The paving is expected to reduce road journey times between the main soya growing areas in the south of Mato Grosso state, to the riverside port of Miritituba, from 12 to six days during the long rainy season, when most crops are moved. This is making life easier for many of Brazil's 530,000 independent truck drivers and the 150 trucking companies which complement them. Truck drivers are being affected in two ways by the crisis. Many of them are catching the virus, which means that at best they are off the road for a while. On the other hand they are benefiting from the fact that fuel prices have fallen sharply, as a result of the collapse in the price of crude oil, and consequently the price of diesel.

In the past few years, crude oil has headed the list of the commodities exported by Brazil, most of it going to China. Crude oil exports have overtaken those of iron ore and soya beans in the process. If the collapse in the crude price is hurting Brazil's state controlled Petrobras oil company severely, the crude price fall is also affecting demand for all biofuels as well. At the moment, 10% of biodiesel, made mostly from soya oil, has to be added to mineral diesel. But because demand for diesel has fallen, along with economic activity, increasing amounts of surplus soya oil, little of which is normally sold abroad, are now available for export.

Affected much more seriously has been demand for ethanol fuel, which is distilled from sugar cane. A proportion of this has to be blended with all gasoline, the rest is sold neat. But demand for pure ethanol, only competitive when it costs less than 70% of the price of gasoline, has collapsed. The export market for ethanol, now confined mainly to the United States, has also fallen sharply, as less biofuels are being used there as well.

In the past few years, sugar mills, most of which are able to make either product, have preferred to make ethanol, because the world sugar price has been low. Last year, only 13.3mt (million tonnes) of sugar was shipped, compared with the 16.6mt shipped in 2018. The opposite is now the case, and up to 55% of the cane being crushed, the maximum possible, is being made into sugar this year. Domestic demand for the sweetener has also fallen. The industry hopes to export 20mt of sugar this year, almost all through the ports of Santos and Paranagua, to which most sugar now travels by rail.

Fears are growing that operations at all of Brazil's ports may be prejudiced by the corona virus outbreak, which is causing a record number of deaths at all levels of society. The price of cane continues relatively low, so an increasing number of growers in Sao Paulo, the leading cane producing state, are replacing their cane when it has to be grubbed up at five or six years of age, with soya beans, maize or peanuts.

The situation is complicated by the fact that 100 of Brazil's 350 sugar mills, a number 50 fewer than a decade ago, are officially bankrupt. They have been overwhelmed by debts. If on the one hand, demand for most types of the meat

exported from Brazil, beef, pork and chicken, remains reasonably buoyant, alarm bells are ringing for this industry as well.

Demand in the most profitable markets, most of which are in Europe, has fallen following the virtual suspension of demand from restaurants, the main market for the most profitable cuts. As the same time, as has also occurred in the United States, outbreaks of the virus have affected meat packing plants in Brazil. Operatives work in very close proximity to one another in slaughterhouses, and several have had to shut down, after dozens of cases of infections and numerous deaths of packing plant workers.

Brazil will almost certainly benefit from the growing intensity of the US–China trade spat. With unemployment at record levels, the US economy is unlikely to recover in time to allow a high growth rate to return, so as to give a boost to the election campaign of President Trump. Because of this, Trump seems to be resorting to the time-honoured tactic of politicians in trouble, which is to blame their country's difficulties on an enemy — in this case, China. China is being accused of being responsible for the spread of coronavirus.

Brazilian soya will almost certainly gain market share in China, at the expense of that from the US, and that has already been reflected in record exports in the past few months. This is particularly because exports of soya from Argentina have slowed. Again, as the Chinese economy is recovering well, the feared reduction in demand for iron ore, which slowed earlier in the year, when ports in China were closed and stocks were high, which caused prices to fall, now seem to have been reversed.

Australia, normally the leading supplier of ore to China, is also involved in a trade spat with China, so Brazilian ore should do well this year. Supply problems in Brazil itself may interfere, though. A positive selling point for Brazilian ore, is that when Carajas ore is used, less CO_2 is produced during the steel-making process, than when lower quality ore from most other sources is used. But output of Brazilian ore has fallen slightly in recent weeks, partly because restrictions at mines, aimed at reducing the spread of the virus, are restricting operations at the Carajas complex, as well as at mines in Minas Gerais state. This, coupled with the fact that stocks are low in China, has caused the price of ore to rise to more than $100 per tonne in the past few weeks.

Another commodity whose prospects are unclear is coffee. Brazil is by far the world's leading producer of the high quality 'arabica' type. But many coffee bars and restaurants in Europe and the United States, are closed, or operating at well below normal levels. This means demand for beans has fallen significantly, unfortunately in a year of high production. Although much coffee is now harvested by machine, processing, grading and tasting the beans is a labour-intensive process, and so subject to restrictions.

UK rail operator Freightliner: making a real difference to the environment

As an established rail freight operator with 55 years' experience in delivering bespoke rail freight solutions, Freightliner, a subsidiary of Genesee & Wyoming Inc. (G&W), has a proven track record in providing safe, reliable and cost-effective rail freight partnerships.

As well as being a leading UK intermodal rail freight provider, Freightliner has more than two decades' experience in transporting bulk freight. Boasting an extensive network of rail terminals throughout the UK, Freightliner operates an average 400 bulk trains per week, transporting 31mt (million tonnes) of bulk freight annually.

With a dedicated fleet of locomotives, highly trained, safety-focused employees and 99.9% reliability on all services, Freightliner offers rail freight transportation solutions in all the bulk haulage markets including cement, potash, aggregates, waste, petrochemicals, domestic intermodal, hazardous goods, industrial minerals, coal and more.

What sets Freightliner aside from other UK Freight Operating Companies, is the full range of in-house, land-based logistics solutions on offer through its Terminal and Road business platforms, including handling, storage, internal movement vehicles and boasting a 350-strong fleet of the latest in Euro 6 tractor units.

With flexibility and resilience built into its operations, Freightliner has quickly established business continuity procedures to ensure it has been able to continue operations as a critical infrastructure and bulk freight supplier during the coronavirus crisis.

Despite the Covid-19 challenges, which have seen a significant reduction in intermodal and bulk freight volumes across the UK, Freightliner has continued to haul much needed supplies and materials to keep the country running.

As an example, in November 2019, Freightliner commenced a long-term, bulk rail-haulage contract, one of the largest bulk haulage contracts in the UK, with Mendip Rail Ltd, a joint venture between two of the UK's largest aggregate/cement producers, Hanson Aggregates and Aggregate Industries (AI).

Throughout lockdown, Freightliner has continued to haul aggregate to terminals in London and the Southeast of England from quarries owned by Hanson and AI in the Mendips, Northern Somerset to ensure vital construction projects can continue in London and the South East.

"I am delighted with how well the contract with Freightliner is progressing and, in particular, the professionalism, flexibility and resilience demonstrated by their bulk haulage team in keeping vital construction materials moving during these challenging times," said Mendip Rail's Director, Jason Black.

Additionally, Freightliner operates three trains a day on behalf of customer, SUEZ, moving around 1,500 tonnes of domestic waste from the streets of Manchester to the energy-from-waste (EfW) plant in Runcorn where it is recycled into high quality raw materials and renewable energy.

"Everyone in the waste industry is working hard to make sure we are able to maintain essential services for residents across the country during these extremely challenging circumstances", said Communications and Partnership Manager, Recycling and Recovery UK, Mike Nuttall. "Freightliner is one of SUEZ's key partners in the north west, and they are a vital link in the management and transportation of domestic waste in Greater Manchester. We rely on the Freightliner team every day to move tonnes of material from our waste handling and processing facilities across the region to the energy from waste plant in Runcorn, ensuring we are able to maintain the provision of key services to communities and local authorities across Greater Manchester."

Freightliner also has a collaborative, long-term relationship with Tarmac, one of the largest private sector users of rail freight.

After adding the South West to its existing work for Tarmac in Tunstead in Derbyshire, Freightliner now hauls aggregate from four load points in the South West of England to Tarmac construction terminals in the Midlands, East Anglia, London and the South East.

Materials moved include limestone out of Whatley and Bristol, gritstone out of Moreton-on Lugg (Hereford) and recycled steelwork slag out of the Tata works at Port Talbot, using Freightliner's hopper wagons and a new rake of MWA box wagons. Running up to 15 trains per week, the bulk materials are used in regional and national infrastructure projects.

One positive that has come out of lockdown is the improvement in air quality due to reduced road traffic. Moving freight by rail offers many significant environmental benefits and can play a key role in meeting the government's carbon reduction targets. As well as reducing CO_2 emissions by 76% per freight tonne mile moved compared to road and improving local air quality, it helps ease congestion by removing lorries from the UK's busy roads and is proven to be a far safer mode of transport.

Freightliner is looking forward to the decarbonized future of freight movements and is proud to be making a difference. It has many other plans that it is looking at to reduce carbon even further, including running more electric trains and other innovations.

Damen concludes keel laying on 75m crane barge for a project in Panama

On 18 June this year, Damen Shipyards Group successfully concluded keel laying for the Crane Barge 7532 that is going to be delivered in Panama, following the award of the tender in August last year. The barge is being built at Damen Yichang Shipyard in Hubei Province, China. The yard is almost back to full capacity following the recent coronavirus outbreak. Conscious of the need to protect the health and wellbeing of all working at the yard and in the community, Damen continues to take strict safety measures.

The 75 x 32 metre crane barge will succeed, a 77-year-old crane still in operation. Following construction, the new Crane Barge 7532 will be outfitted with a state-of-the-art crane at Huisman's Zhangzhou facility, giving it the capability to lift 625 tonnes at 25 metres.

As the world is facing the coronavirus pandemic, Damen is implementing strict safety controls to deal with the challenges this is putting on the project. For example, engineers on the project are currently working from home and are using digital communication to stay in contact with one another. The same applies to Damen's communication with the client during this time. Additional safety measures include a robust cleaning and sterilization programme, body temperature controls on entering the yard and the observation of safe working distance guidelines.

Damen sales manager Americas Olivier van Papenrecht says, "We are delighted to be part of this important project. It is a real honour for us that this client has placed trust in Damen. We are confident that the Crane Barge 7532, with its Huisman crane, will serve the client's needs. The barge has been designed as a high-quality product with safety and reliability top of mind — the ingredients needed to maintain the flow of trade through this internationally important region."

After the crane installation, the Crane Barge will cross the Pacific on a heavy lift vessel and arrive at the anchorage area of Balboa in Panama where final tests will be conducted before it enters service.

Damen Shipyards Group

Damen Shipyards Group operates 36 shipbuilding and repair yards, employing 11,000 people worldwide. Damen has delivered more than 6,500 vessels in more than 100 countries and delivers around 175 vessels annually to customers worldwide. Based on its unique, standardized ship-design concept, Damen is able to guarantee consistent quality.

Damen's vision is to become the most sustainable and digital shipbuilder in the world. To achieve this, the focus is on going 'back to the core': on standardization and series construction; the traits that have made Damen great and that are essential to make shipping greener and more connected.

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

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

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

Damen Shiprepair & Conversion (DSC) has a worldwide network of 18 repair and conversion yards of which 12 are located in North West Europe. Facilities at the yards include more than 50 floating (and covered) drydocks, including the longest, 420 x 80 metres, and the widest, 405 x 90 metres, as well as slopes, ship lifts and indoor halls. Projects range from the smallest simple repairs through class maintenance to complex refits and the complete conversion of large offshore structures. DSC completes around 1,300 repair and maintenance jobs annually, both at yards as well as in ports and during voyage.

CN to purchase 1,500 new hopper railcars in North America to encourage economic recovery and expand grain export

New grain hoppers can move more grain

On 21 July, CN announced that it plans to acquire 1,500 new generation, high-capacity, grain hopper cars with delivery starting in January of 2021. These new railcars will encourage the economic recovery through job creation in the North American manufacturing sector and help CN continue to meet the growing needs of grain farmers and grain customers.

"This investment, combined with our 2020 $2.9B capital investment programme, will help us move more grain. We are confident in the future of the grain business and its key role in CN's long-term growth. By investing in the construction of these new cars, we want to help quickly stimulate the North American economy by supporting manufacturing and agriculture related jobs," said JJ Ruest, President and Chief Executive Officer, CN

"CN's Canadian grain movements continue to break records, month after month, and these new higher-capacity hopper cars will help perpetuate our growth in this key sector of the North American economy. By purchasing new hopper cars for the second time in two years, we are continuing to deliver on our commitment to grain farmers, grain customers and the overall supply chain to expand our collective capacity through fleet renewal. Through this investment, we will be able to support and expand our movements of grain to international markets as demand continues to increase," said James Cairns, Senior Vice-President, Rail Centric Supply Chain, CN.

About CN

CN is a major North American transportation and logistics company. It is a true backbone of the economy, transporting more than C$250 billion worth of goods annually for a wide range of business sectors, ranging from resource products to manufactured products to consumer goods, across a rail network of approximately 20,000 route-miles spanning Canada and mid-America.

CN — Canadian National Railway Company, along with its operating railway subsidiaries — serves the cities and ports of Vancouver, Prince Rupert, B.C., Montreal, Halifax, New Orleans, and Mobile, Ala., and the metropolitan areas of Toronto, Edmonton, Winnipeg, Calgary, Chicago, Memphis, Detroit, Duluth, Minn./Superior, Wis., and Jackson, Miss., with connections to all points in North America. DCi

Port of Antwerp limits damage during corona crisis

Total goods throughput down by 4.9%; first signs of recovery visible

The total throughput of the Port of Antwerp fell by 4.9% in the first half of the year compared to the same period in 2019. After a strong first quarter, the port experienced a decline in the transhipment of all flows of goods, with the exception of the container sector. Despite the impact of the coronavirus crisis on global production and logistics chains and a pandemic-driven drop in demand, the port remained 100% operational.

Container traffic status quo

Container traffic increased in the first quarter of the year, but felt the effects of cancelled sailings from April onwards. Nevertheless, for the period January-June 2020, container traffic recorded a slight increase of +0.4% in TEUs compared to the same period last year (with April and May 2019 as absolute record months).

Slight recovery in breakbulk sector in June

Since mid-2019, global trade issues continue to adversely affect goods flows in the conventional breakbulk sector. This has culminated in an overall 29% decrease for the period January–June compared to 2019, with inbound and outbound flows being affected to the same extent. The throughput of iron and steel, the most important freight group within this sector, experienced its best month of 2020 in June but a total decrease of 33.1% for the first six months of this year.

Bulk cargo declined due to reduced demand for energy

While the transshipment of coal continued to grow in the first quarter, it came to a standstill in the second quarter. This resulted in a 13.1% drop in dry bulk transshipment in January–June 2020 compared to the same period last year. This decrease is partly attributable to the growing supply of green energy, which reduced the need for coal, partly by reduced demand for coal from the steel sector and partly by a strong second quarter in 2019. Fertilizers, which represent the largest share of dry bulk volumes, grew slightly (+1%) compared to January-June 2019.

Seagoing vessels

Over the past six months, 6,797 seagoing vessels called at Antwerp, representing a decrease of 5.6% compared to the same period in 2019. The gross tonnage of these vessels fell by 7.9% to 193 million.

Port of Antwerp grants postponement of payment

Following discussions with the Antwerp port community about the consequences of the coronavirus crisis, the Port Authority decided to grant a postponement of payment for the shipping and inland navigation dues and for the domain concessions.

Impact of coronavirus and prospects

For the third quarter, while the Port of Antwerp is still expecting blank sailings, it is also seeing the first signs of recovery and an upturn in the European economy. The Port of Antwerp is making every effort to continue to ensure the efficient functioning of the port.

Jacques Vandermeiren, CEO Port of Antwerp: "Port of Antwerp is a world port that follows the pace of the European and world economy. The impact of the shutdown of the global supply chain due to the coronavirus crisis has been felt from the second quarter onwards and will affect the total throughput of goods this year. The Port of Antwerp is holding up well in the Hamburg-Le Havre range because it is active in many sectors, it is not dependent on a single continent and because of its role as Europe's largest integrated chemical cluster."

Annick De Ridder, Port Alderman: "As the port of Antwerp, we are an important link in the chain between producers and consumers, and as such a perfect barometer for the global economy. Much will depend on how quickly industry is able to start up again and consumer confidence to return. As Antwerp port community, we remained 100% operational during this global crisis and our knowledge and experience are well documented as a valued trademark all over the world."

Handling operations continue at the Port of Tilbury following silo explosion

On 3 July, a 'massive explosion' in the grain silos at the UK Port of Tilbury severely damaged the roof of the silo. There were no fatalities, and just one person was treated for smoke inhalation.

Essex Fire & Rescue Service despatched four fire engines to the terminal. Crews found grain on fire inside the plant and were able to remove unaffected grain so it did not ignite. They are continuing to work with site managers to get the site back up and running and are liaising with Port of Tilbury Police to allow businesses back to their premises at the appropriate time. According to fire crew watch manager Dave Bond, "It was a great joint response from the Ambulance Service, Port of Tilbury Police, Fire Service and Port to control the incident and stop it from escalating."

As of 11 July, a number of silos were still smouldering, and the fire services explained: "Essex County Fire and Rescue Services remains at Tilbury Grain Terminal, where there are a number of silos on fire. Our priority is to extinguish the fire, so the affected silos at the grain terminal can be safely taken down and removed. This will require specific firefighting techniques, including using nitrogen and foam.

"Our specialist Urban Search and Rescue (USAR) teams have set up a safe system of work for our crews, meaning our firefighters can work safely at height. We have drones and CCTV thermal imaging cameras, providing details and images to our fire officers.

"The tactics that are being used to control and eliminate this fire have been risk assessed, tested and are fully supported by external scientific advisors and structural engineers.

"The action and activity we are undertaking ensures that we are extinguishing the fires as a priority, which will also protect the remaining assets and products in the other areas of the grain terminal.

At times there may be some visible smoke or steam as we tackle the fire. Rest assured, this is expected as part of our plans and there is no risk to the public."

Peter Ward, Commercial Manager, at the Port of Tilbury, has said: "Following the explosion at the Tilbury Grain Terminal on Friday 3 July, our initial efforts have been concentrated on working with Essex County Fire and Rescue Service to contain and eliminate the fire in the affected area of the silo and to protect the area of the silo which was unaffected by the explosion.

"Operations at the silo itself will be closed until at least 31 July and we will provide a further update on this during the month.

"Grain handling and storage services however are still available from today [9 July] within the Port of Tilbury for our customers. We have complemented this with a significant quantity of offsite storage which has now been secured to back up quayside handling and storage.

"We will continue to service our customer and farming base for both imports and exports of agricultural products to the best of our ability during this period of disruption.

"We thank our customers, port team and the emergency services for their continued support to us at this time."

New Sines ore terminal mooted to help Portuguese Covid recovery programme

António Costa e Silva, the president of the Port of Sines, suggests that a new ore terminal should be built there. This would form part of a more comprehensive national plan to help the Portuguese economy recover from the Covid-19 pandemic.

The recovery plan, which is known as the 'Proposed Strategic Vision for Portugal 2020–2030 Economic and Social Recovery Plan', also includes major investment in the country's rail links as a means of generating employment, with Sines and Leixões ports to be the main beneficiaries.

The proposed bulk ore terminal at Sines would handle strategic export resources, especially lithium, nickel, cobalt, manganese and polymetallic sulphides.

The port is already expanding its existing Terminal XXI container handling facility and is also investing in a new container terminal: Vasco da Gama.

Barry Cross

Galigrain expands facilities at La Coruña's Outer Harbour development

In Spain, terminal operating company Galigrain is to expand and mechanize its facilities in the Port of La Coruña's Outer Harbour development. This will involve investment of €14 million. Once fully implemented, the new Galigrain facility will be the most modern grain unloading terminal in Spain.

Galigrain is already the port's leading agribulk handler, operating a 36,700m² concession at Punta Langosteira, where it has various warehouses for the storage and distribution of different commodities. However, when the mooted expansion is realized, the overall operating area will become 63,600m². Within this, there will be a new 2,600m² storage module, a service corridor and a brand new 17,400m² warehouse.

As part of the same investment package, a mechanized system for the unloading and the transporting of merchandise from vessels to warehouses will be introduced. This will consist of a series of conveyor belts, hoppers and transfer towers. Given the high levels of automation involved, both productivity and efficiency should increase whilst ensuring state-of-the-art environmental monitoring of products.

Since opening, the Punta Langosteira harbour has handled 10 million tonnes of cargo, having absorbed private sector investment totalling €235 million. Seventy per cent of the raw materials to create feed for Galician livestock and poultry are currently moved by logistics companies operating out of La Coruña port. Currently, 330,000m² of area in the Outer Harbour are operational.

Galigrain has port terminals in Galicia, Spain, Portugal and Latin America.

Barry Cross

G3 opens new Vancouver terminal

G3 Terminal Vancouver, which is a state-of-the-art grain export terminal, has opened at the Canadian West Coast Port of Vancouver. According to operator, G3, this modern facility, which is linked to loop track grain elevators on the Prairies by local rail partners, will save producers time and money, given the guarantee that grain can be kept moving at all times.

Don Chapman, President and CEO of G3, notes that the company had concentrated on providing an extremely efficient logistics chain when planning the terminal, which had been built by Peter Kiewit Infrastructure in conjunction with Vancouver Fraser Port Authority.

Indeed, construction began March 2017, with the bulk of the main infrastructure already completed. Prior to official opening, the terminal had been handling grain exports brought in by rail and then loading these onto trial vessels as part of the overall commissioning process.

The main thrust of terminal design is that of high velocity grain reception and shipping, whilst maintaining world class environmental and safety standards.

In terms of rail, it can handle trains with up to a trailing load of 150 wagons on its loop track, which no other Canadian port terminal can match. Unloading is done while the whole train continues to move and no wagons need be detached during this operation. The main berth can handle up to Capesize vessels, with three loaders operating at 6,500 tonnes per hour, which G3 claims is a new industry standard.

As for storage, this amounts to 180,000 metric tonnes for both grains and oilseeds.

Barry Cross

Port of Rotterdam fully operational in first half of 2020, Covid-19 pandemic depresses cargo throughput

The Port of Rotterdam achieved throughput of 218.9 million tonnes in the first six months of 2020, 9.1% less than in the first half of 2019, which was a throughput record at the time. Despite the disruptive impact of the Covid-19 pandemic on the economy, production and logistics, the port of Rotterdam remained 100% operational. The economic impact of the Covid-19 pandemic is the primary factor explaining the decrease in volume.

Highlights of the first half of the year:

- total throughput 218.9 million tonnes (–9.1%);
- significant reduction in throughput of coal, ores and mineral oil products, small reduction in container throughput, increase in throughput of biomass and LNG;
- revenue increased 0.7% to €360.4 million;
- result on ordinary activities fell 4.8% to €128.4 million;
- the Port Authority's healthy financial position makes it possible to continue to invest at a high level (gross investments amounted to €136.4 million), for example in the Theemsweg Route, Container Exchange Route and Maasvlakte Plaza;
- partly at the request of the central government, the Port Authority has reviewed investment projects that can both make the Netherlands more sustainable and accelerate the recovery of the economy (Starter Motor).

Allard Castelein, CEO of the Port of Rotterdam Authority: "The Dutch economy and the port of Rotterdam are dependent on developments in world trade. The negative economic impact of the Covid-19 pandemic is being felt worldwide. It should therefore come as no surprise that throughput volumes in the past six months were considerably lower than in the same period last year.

On the positive side, the throughput volumes in the second quarter turned out to be better than initially expected. Nevertheless, it is not in Rotterdam's nature to sit back and watch. That is why the Port Authority has conducted a review to determine which public–private investment projects can be accelerated. In that way, the government and the port of Rotterdam can team up to further the sustainability of the economy, while giving it a kick-start at the same time."

Bahía Blanca breaks agribulk handling records

The Argentinian Port of Bahía Blanca is posting a whole new series of records for cereals volumes in 2020.

In May 2020, tonnage handled by the port was 6% higher than the corresponding 2019 month, which in itself was a very good month. In the first five months of this year, overall traffic was up 2%. The main growth was in grains, oils and by-products, which totalled 4,293,358 tonnes, up 3% for the year, with May alone 11% up on May 2019.

Corn exports reached 1,930,360 tonnes, an increase of 35.4% compared to 2019, while those of wheat showed no increase over last year, amounting to 1,436,329 tonnes. Soybeans were 623,488 tonnes, an increase of 18.5% compared to 2019.

In terms of grain purchasers, the leading six countries are Brazil, Vietnam, China, Indonesia, Saudi Arabia and Malaysia.

These new record figures are, in part, due to historic low water levels on the Paraná River, which has meant that vessels loading further upstream have not been able to make use of their full capacity, prompting them to top up once they reach the coast at Bahía Blanca.

Previously, a lot of trade at the port had been in soyabeans. However, corn produces much higher yields: nine to ten tonnes per hectare as opposed to just three to five tonnes, so there has been some switching in recent years. Much of the local soya now goes to Rosario, which has become the main hub given its regional milling facilities. This has allowed Bahía Blanca to specialize in corn, which it exports from producers as far south as Santa Fe and also from centrally located Córdoba.

Water levels on the Paraná are not expected to return to normal until October-November at the earliest, so Bahía Blanca should continue to break records this year.

Federico Susbielles, who heads the port's management consortium, also points to the fact that the rising tide of corn exports has also been achieved at the height of the Covid-19 outbreak.

Barry Cross

Paranaguá is having record 2020

The Brazilian Port of Paranaguá is forecasting an 8.5% increase in dry bulk exports in the third quarter of this year. These are expected to amount to 7.6 million tonnes, which is an increase of 600,000 tonnes over the figure for July–September 2019.

The port has no fewer than 12 terminals, which handle soyabeans, grain and bran, corn and sugar.

Soya is expected to remain the port's main commodity in the third quarter and should reach 4.97 million tonnes compared to 3.8 million tonnes in the third quarter of 2019 i.e. growth of 30.8%.

Much of the growth is down to record harvests, the rise of the US dollar and good overall weather, says Luiz Fernando Garcia, president of Portos do Paraná. Demand from China also remains high, especially for oilseed.

Bulk sugar exports are forecast to hit 1.45 million tonnes in July – September, which is 74.74% higher than the corresponding 2019 period, when 829,791 tonnes were exported. Again, sugar has benefited from competitive interest rates, and has also been helped by crop failure in Thailand, the world's second largest exporter. Significantly, the collapse in oil prices means that ethanol is less competitive, so mills in Brazil have switched to sugar.

Sugar traffic in Paranaguá has also benefited since mid-March from a deeper draft at its dedicated sugar berth, prompting many customers that had migrated to other ports to return.

Corn, which is traditionally a second half crop, is expected to generate 1.2 million tonnes in the third quarter, although the overall growth projection is skewed by atypical trading conditions in 2019. Indeed, this figure is just 50% of what was exported in Q3 last year, although harvests in both Paraná and Mato Grosso do Sul are expected to be good. Iran, South Korea and Japan are expected to remain the main destinations for this commodity.

Barry Cross

MacGregor wins order for cargo handling cranes

MacGregor, part of Cargotec, has secured an order to provide cargo handling cranes for four 62,000dwt general cargo ships to be built in Asia.

The scope of supply includes installation of the MacGregor OnWatch Scout condition and predictive monitoring system to support maximum operational availability and performance of the cranes once in service.

The order is booked into Cargotec's second quarter 2020 order intake, with deliveries planned to commence during the second quarter of 2021 and completed during the fourth quarter of 2021.

"We are very pleased that our customer has trusted our quality, knowledge and expertise during this tough market situation through placing this significant contract with us," says Magnus Sjöberg, Senior Vice President, Merchant Solutions Division, MacGregor.

About MacGregor

MacGregor is a major provider of solutions for in intelligent maritime cargo and load handling with a strong portfolio of MacGregor, Hatlapa, NMF, Porsgrunn, Pusnes, Rapp, Triplex and TTS products, services and solutions, all designed to perform with the sea.

Shipbuilders, shipowners and operators are able to optimize the lifetime profitability, safety, reliability and environmental sustainability of their operations by working in close cooperation with MacGregor.

MacGregor is part of Cargotec. Cargotec's sales in 2019 totalled approximately €3.7 billion and it employs around 12,500 people worldwide.

STARCLEAN® Seal – an ideal way to keep spillage under control

Conveying bulk material automatically results in dust emissions, which can mean that operators fail to meet PM_{10} air quality standards. These standards define limits for inhaled dust so that no serious health issues or other dust-related problems can arise.

One way to achieve a dust-free material transportation process is to use the STARCLEAN® Seal from Schulte Strathaus. The seal guarantees an optimum sealing and guidance of the conveyed bulk material. The STARCLEAN® Seal consists of a combination of material available in different hardness degrees. There are options for two different attachment variants: either bolted or with quick-release lever. Some of the advantages of the STARCLEAN® Seal are:

- optimum reduction of dust emissions and contamination;
- efficient material guidance;
- wear-resistant dust seal;

- simple installation; and
- optimum belt protection.

Especially today, it is very important to ensure the efficient and considerate use of limited resources and raw materials. All STARCLEAN® products safeguard the environment, and meet the

increasingly stringent regulations relating to spillage control. This means:

- optimization of the entire plant system;
- increase in plant profitability;
- prevention of dust emissions that are harmful to the environment and to health; and
- loss-free material transport.

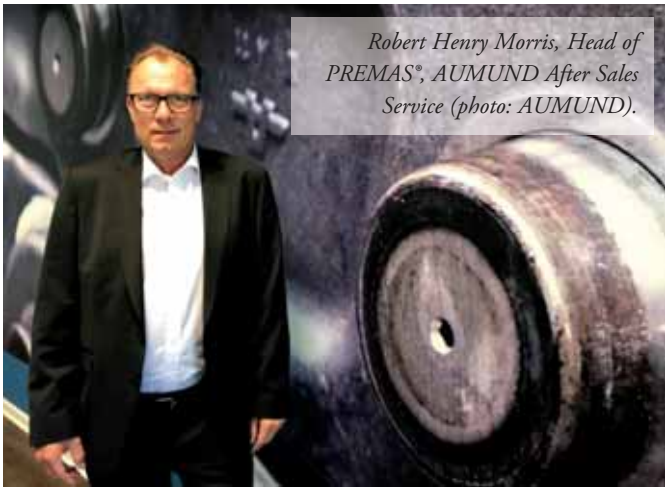
Schulte Strathaus always offers solutions, that are clean and green — right from the beginning.

PREMAS® inspections by AUMUND keep machines fit for the future

PREMAS® Preventive Maintenance Service is becoming an increasingly important milestone in the lifecycle of bulk materials conveying and storage equipment all over the world. The AUMUND Group of Companies carries out PREMAS® inspections internationally for machinery and equipment of AUMUND Fördertechnik, SCHADE Lagertechnik, SAMSON Materials Handling, Besta & Meyer, WTW and LOUISE, as well as for plants and machinery made by other manufacturers supplying in bulk materials industries.

Since April 2020 Robert Henry Morris has been head of the PREMAS® department at AUMUND After Sales, focusing on the countries in Europe, the Middle East and Africa. R.H. Morris has years of experience, in particular with complex capital equipment, and has worked in the EMEA Region for companies connected with the mining industry.

The most significant aspects of the preventive maintenance service are on-site inspections, documentation of the condition of the machines and advice to customers by appropriately trained and certified inspectors. The objective is to minimize maintenance costs, to increase the service lifetime of the machinery, to make recommendations for spare parts, and from time to time also to advocate conversions of equipment in order to improve performance.



Robert Henry Morris, Head of PREMAS®, AUMUND After Sales Service (photo: AUMUND).

About the AUMUND Group

The AUMUND Group is active worldwide. The conveying and storage specialist has special expertise at its disposal when dealing with bulk materials. With their high degree of individuality, both its technically sophisticated as well as innovative products have contributed to the AUMUND Group today being a market leader in many areas of conveying and storage technology.

The manufacturing companies AUMUND Fördertechnik GmbH (Rheinberg, Germany), SCHADE Lagertechnik GmbH (Gelsenkirchen, Germany), SAMSON Materials Handling Ltd. (Ely, England), as well as AUMUND Group Field Service GmbH and AUMUND Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. The global conveying and storage technology business is spearheaded through a total of 19 locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.

Portable wind fences

the solution to dust-control challenges?

20ft high modular wind fence partially assembled.

Most people have some familiarity with the large fences that are the go-to dust control solution for large outdoor stockpiles. They can be over 100ft high and the largest are miles long. Their 'always working' presence is very reassuring for the managers of those stockpiles as they know their dust problem is contained — whatever the weather.

But what about smaller piles that might shift location around your yard from month to month? Or equipment that shifts almost daily? Or dump areas that continually change shape? There are also those areas that are being remediated and need temporary protection while the remediation is completed. All of these are situations where a portable wind fence should be considered as an economical, flexible and effective method of control.

There are two basic types of portable wind fence.

1. Modular wind fences

The first are modular fences that fit together a little like the rental security fence panels that are commonly used around building sites and community events. The security panels are typically 6ft high and 10ft long and made of wire mesh. Of course, as soon as you attach anything to them that interrupts the wind, they blow over. Modular wind fences such as the type made by wind fence specialists WeatherSolve Structures are considerably stronger and heavier.

The WeatherSolve modules are from 6ft to 30ft high and are usually in panels 20ft to 40ft long. To keep them from blowing over they have a steel sled (normally 8ft wide) as a base which is weighted down with large concrete blocks. To move them, there are a few options.

- the smaller ones can be simply lifted one module at a time with a forklift and carried to the new spot;
- the entire fence can be towed like a train; or
- the fabric on the fence can be temporarily furled, the weights removed, and the entire module put on a transport truck.

Modular fences are most common in yards where they are arranged in a semi-circle around a dust source like a stockpile or a piece of equipment such as a crusher. They can also be used to create temporary loading bays.

20ft modular wind fence nearing completion.

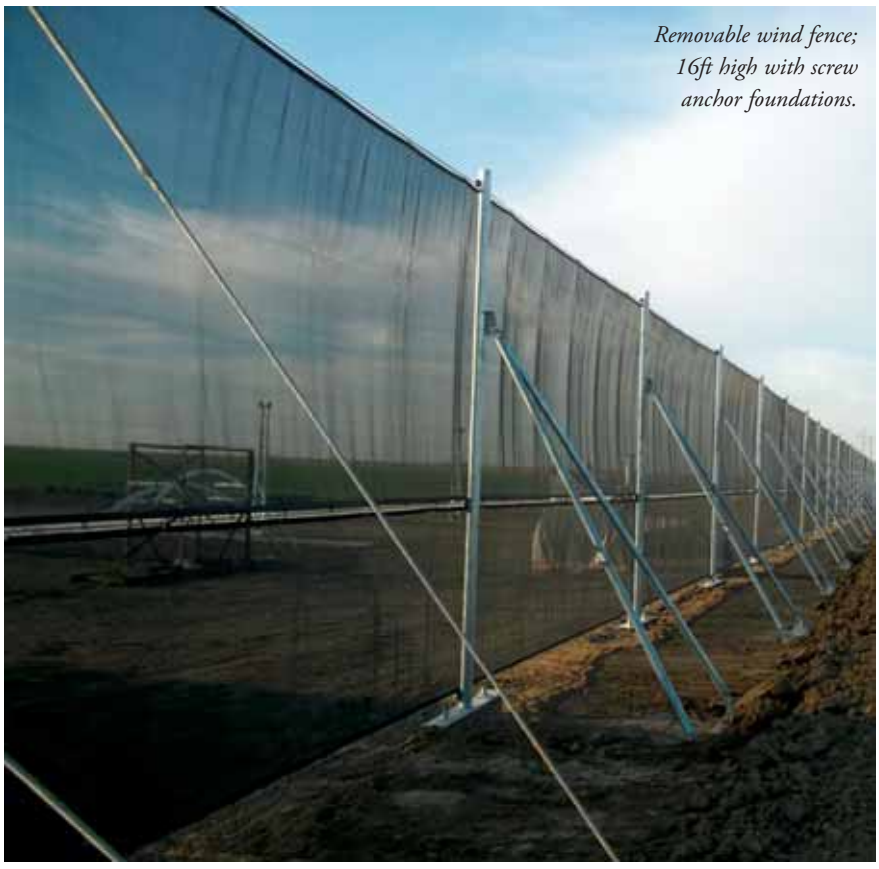
2. Removable wind fences

These are wind fences that are set up for easy removal. The two most common forms of support are frames with screw anchors to stop them blowing over, and free-standing poles driven into the ground.

In theory such fences could be any size, but practically the normal range is up to 40ft height for the frame type and up to 30ft height for the free-standing poles. Lengths are usually hundreds of feet and can be thousands of feet.

Removable fences are very suitable for land remediation situations, long-term construction projects, and protection of temporary stockpiles that are expected to not be needed in a year or so.

To move them, the fabric is demounted from the fence, the cables holding the fabric disconnected, and the poles either unscrewed (screw anchor foundations) or jacked out of the ground (driven poles). This obviously takes more work than the modular wind fences.



Removable wind fence; 16ft high with screw anchor foundations.

How to choose

To choose between them, the main decision points are number of moves and shape changes.

Modular wind fences — say 20 or 30ft high — are about twice the cost of removable wind fences in terms of the first deployment. Shifting them though, is a very minimal expense. By comparison, shifting a removable fence will cost around 20% of the initial cost, so if you intend to shift it more than five times then the modular option makes sense.

The modular option also makes sense when the shape of the wind fence needs to change with the moves. For example going from a semi-circle to a straight line is easy to do with a modular fence, but more problematic with a removable fence as some of the components will need to be changed.

A secondary decision point is height and length. For low (12ft and under) and long (over 200ft) fences, the differential between modular and removable fences increases to a multiplier of three or more so in those circumstances simple economics may prevail.

Whichever fence you choose, the most important discussion is the one with the fence designer to make sure that the wind fence will provide the level of wind and dust control needed. WeatherSolve provides these discussions at no charge. DCi

One-armed giants

bulk handling cranes and material handlers in all their glory

All-round view guaranteed: operators can keep everything in view in the SENNEBOGEN port cab.

Jay Venter

SENNEBOGEN 895 E-Series material handling giant: moving material on a grand scale in the port of Iskenderun

If Jurassic Park were not just a movie and we were able to walk among peaceful brontosaurs in real life, it would probably feel something like being close to the 895 Hybrid E-Series. There is no need of either a time machine, or a ticket to the Hollywood film studios to have this experience, a visit to the port of Iskenderun in Turkey is all it takes. Since October 2019, a gentle giant from SENNEBOGEN has been moving masses of old scrap every day and in the shadow of the enormous port machine, one simply remains a small, impressed observer of what is happening. The largest material handler in the world, launched at bauma 2019, is now an integral part of port operator Tosyali's green fleet.

Everything about this machine is big and record-breaking. Following its smooth transportation in sections on a total of 16 trucks and successful installation and commissioning by Turkish sales and service partner Forsen Machinery in just a few days, the largest material handler in the world is now setting new standards in terms of size and efficiency in the loading and unloading of ships up to Panamax and post-Panamax size. The environment in operator Tosyali's port is perfect for the machine. Tosyali Holding's transshipment port, located in one of the largest metal producing areas of Turkey, supplies the local steelworks with scrap, among others. Boasting a net weight of around 420 tonnes and a 500kW electric drive, the SENNEBOGEN 895 E-Series is the central linchpin of the specialist port's fleet. Despite its remarkable size, the machine works quickly, efficiently and without emissions.

"Our experience with SENNEBOGEN machines has shown us that using electric material handlers does not mean compromising on flexibility or speed," explains Harun Karaarslan, Technical Port Director at Tosyali. "Quite the opposite. The machines cover a large work area as they can move up and down the pier quickly and easily. By not using diesel we also save a lot of money every year." Tosyali

has been relying on green support in the large machinery sector for the past 12 years. Amongst others, the specialist port's fleet includes two 880 EQ Balancers with crawler tracks, both electric versions. The 895 Hybrid E-Series joined the ranks as the seventh and biggest material handler on site, fitting seamlessly into the port's processes.

Gentle giant: the sensitive and precise control of the 12 t grab being used to safely and efficiently load trucks.

Energy Recovery System – simple and effective

The unique Green Hybrid system also contributes to the machine's efficiency and reduced operating costs. In the case of the 895 E-Series this means a maximum energy saving of up to 55%. How is it possible for a machine weighing 420 tonnes, itself as heavy as two adult blue whales, to operate so efficiently? The port giant's boom has two in-built hydraulic systems that compensate for the dead weight of the 53-tonne steel structure. Along with the hybrid storage modules installed on either side of the machine right next to the boom pivot point on the uppercarriage, they make up SENNEBOGEN's Green Hybrid energy recovery system. Like a spring, gas is compressed in separate gas cylinders, storing energy that can then be used during the next lift. This subsequent lifting motion is just like the spring being released and the energy from the compression being let out again. Just a brief look at the annual volumes handled by the Tosyali port shows how important the energy and cost savings from using the giant machine really are.

"We handle 10,000,000 tonnes a year in this port alone, our machines are in constant use. We are reliant on the machines in our fleet working constantly, downtime would be fatal," explains Harun Karaarslan. In this context, he mentions further decisive advantages of the electrically driven material handlers in his port. On one hand, there is the constant availability and not needing to interrupt the work flow to refuel. On the other hand, maintenance frequency is significantly reduced and the overall wear and need for replacement parts including transport costs is significantly lower on electric machines than on their diesel counterparts.

Precision is what it takes!

What skills are looked for when hiring an 895 E-Series operator? Quite simply, a head for heights. In order to have the best possible view of everything in the surrounding area, the operator can raise the large port cab up to a height of 22m thanks to the Skylift cab elevation. This helps with the placing of bulk goods and cargo in ships' hulls and makes unloading freighters much easier, not to mention the fantastic panoramic view of the port. The operators are supported by additional cameras at the rear and on the right-hand side of the machine, conveniently observable via a screen in the cab. There is also the option of installing a camera on the stick of the 40m-long equipment which makes placing or grabbing materials in ships' loading areas much easier.

Tosyali is currently using the machine to unload scrap. A 12-tonne orange peel grab with a capacity of 10m³ is installed on the stick. In the future, a wide range of bulk cargo will also be handled with a clamshell grab. Thanks to the green giant's sensitive controls, the grab moves gently over the hopper and loads up the waiting trucks in a cycle time of around 40 seconds.

The electric version of the 895 Hybrid E-Series material handling giant in the Tosyali Liman port, Iskenderun, with a 40m-long port attachment.

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MAIN FEATURES

MAX LOAD ON THE GROUP	36.000 kg
TRACTION RATIO	1 : 163
MAX TRACTION OUTPUT PEAK TORQUE	2x45.000 Nm
MAX SPEED	4 km/h
ELECTRIC TRACTION MOTOR	2x25 kW 400V AC
ELECTROMAGNETIC PARKING BRAKE	2x200 Nm
ELECTRIC STEERING MOTOR	2x4 kW 400V AC
STEERING GEARBOX RATIO	1 : 178
PINION/CROWN RATIO	1:8.57
TOTAL STEERING RATIO	1 : 1526
MAX STEERING OUTPUT PEAK TORQUE	2x5.000 Nm
TIRE	Pneumatic 16.00-25
TILTING ANGLE	±6°
LIFTING CYLINDER	Bore Ø140mm. Rod Ø90mm
STROKE OF LIFTING CYLINDER	400mm
LIFTING WHEEL STROKE	Total 200mm (±100mm)
PRESSURE AT STATIC PAYLOAD	120 bar

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ITALY

New remote service app developed by Liebherr

Real-time and effective assistance through Remote Service from Liebherr.

Liebherr expands its digital product portfolio for crawler cranes, deep foundation equipment and maritime cranes with the development of a Remote Service tool. This improves assistance through visual information and so leads to faster and easier troubleshooting. As part of an extended test phase, all customers will have free access to the new app until the end of 2020.

New tool for improved remote service

Liebherr has developed a Remote Service tool that improves assistance through visual information, so leading to faster and easier troubleshooting. Audio and video calls, a chat function, screen sharing, image and document exchange, as well as whiteboarding functions are some of the features that have been integrated in the tool. These enable real-time, fast and effective customer support from Liebherr experts worldwide.

Throughout the last 12 months, Liebherr has tested the tool in remote locations and challenging situations in order to meet and adapt to customer requirements. During this phase, a lot of experience has been gained and a high level of positive feedback has been received.

High customer satisfaction in Mormugao

External factors such as the current pandemic have proven how indispensable the Remote Service tool can be. In April this year, Liebherr's major customer Adani Murmugao Port Terminal Pvt. Ltd. required immediate assistance for one of their Liebherr machines; however attendance on site was not permissible. Using Remote Service the Liebherr engineers instructed the Adani staff how to remove the defect pump, inspected the condition of the gearbox remotely, and then guided the site staff through the installation of the new pump. Manguesh Sangodkar, Head of Engineering at Adani Murmugao Port Terminal Pvt. Ltd. wrote in appreciation of the new tool, "The way you plan the job through Remote Service, communicate and execute with your highly professional and technically efficient engineering team is great. In light of your impeccable services, we would like to continue our association with you for the years to come."

Maintenance: never been easier

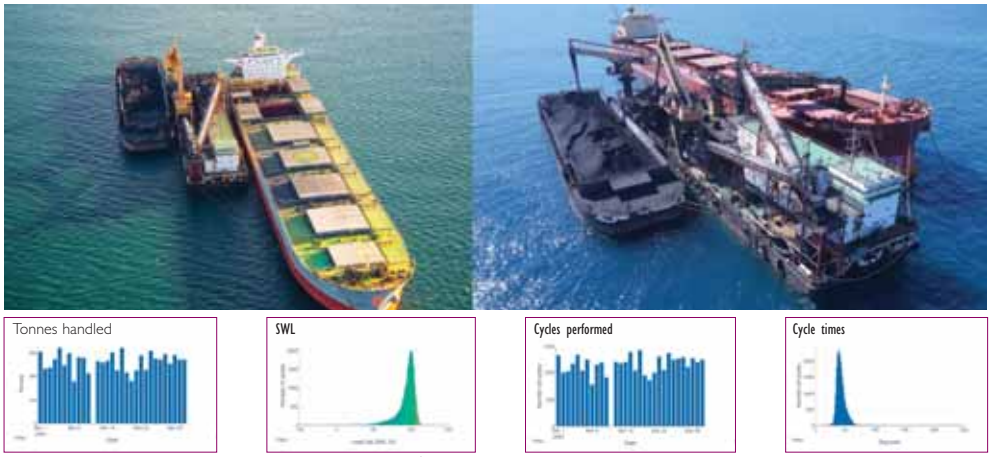
Due to the current pandemic situation worldwide, Liebherr has decided to accelerate the market launch of Remote Service in terms of an extended test phase. This means all Liebherr customers now have the opportunity to use the Remote Service App free of charge until the end of 2020. A laptop, tablet or smartphone and an internet connection are all that are needed.

In addition to Remote Service Liebherr offers a number of digital solutions that make the daily jobsite planning, operation and service considerably easier. Amongst others, these include the fleet and fleet management system LiDAT, the crane data analysis tool LiDAT smartApp and the online portal MyLiebherr.

1.5mt handled in March – 'Magdragon II' picks up the pace

Magdragon II is a floating transfer station — operating close to Cape Preston in the Pilbara Region of West-Australia — with two 3000B series E-Cranes designed to unload magnetite from ocean going barges into hoppers, which feed a conveyor system and shiploader.

The transfer station mainly loads Mini Cape vessels destined for China. The *Magdragon II* handled close to 1.5 million tonnes of magnetite iron ore in March 2020.



A capture of the E-CARE (E-Crane Analysis & Reporting) data for one of the E-Cranes on board Magdragon II for March 2020.

Konecranes to deliver mobile harbor crane to new terminal in Trieste

In the second quarter of 2020, Piattaforma Logistica Trieste S.r.L. (PLT) ordered an eco-efficient Konecranes Gottwald mobile harbour crane for a new terminal in the Port of Trieste in north-eastern Italy. After delivery in September and commissioning in October, the crane will handle containers, general cargo and heavy project cargo.

PLT is a partnership formed by local companies to build and operate in a public private partnership (PPP) with the Trieste Port Authority, a new marine terminal in the Port of Trieste, at the very north end of the Adriatic Sea. The port has been a key regional transport hub for centuries but has experienced a marked increase in intermodal shipping traffic in recent decades as it provides a gateway to growing trade with central and eastern Europe. The new terminal needs a flexible crane for all types of cargo vessels and PLT feels that Konecranes fulfills their requirements exactly.

"Our partner companies have had very good experience with Konecranes Gottwald mobile harbor cranes at their other terminals," says Matteo Parisi, a Member of the Board of Francesco Parisi S.p.A., main shareholder in PLT. "Konecranes' renowned reliability and flexibility, together with their advanced, green technology make it the right choice for a new terminal like ours in Trieste."

The new crane will be a Konecranes Gottwald Model 5 mobile harbour crane in the G HMK 5506 variant. This order includes two twin-lift spreaders with 60t capacity for containers, a good example of the high versatility of the crane. Its working radius of up to 51m gives the reach needed for ships up to post-Panamax class and a maximum lifting capacity of 125t allows both general cargo and heavy project cargo handling. The crane can also lift bulk materials with a motor grab if necessary.

Smart crane features, including a hoisting height assistant, and a landside lowering function, make the job of the operator easier and safer. The cranes will have built-in readiness for an external power supply, so conversion to electric operation will be easy when resources allow. Web-based reporting and a remote desktop provide relevant crane data to increase both performance and serviceability. Local service technicians and operators will receive customized Konecranes training as part of the package.

"An order like this demonstrates the strength of our customer relationships and our cranes," says Gino Gherri, Regional Sales Manager for Konecranes Port Solutions. "Our versatile Konecranes Gottwald mobile harbor cranes are perfectly suited to beginning operations at new terminals like this one."

Konecranes is a group of Lifting Businesses™, serving a broad range of customers, including manufacturing and process industries, shipyards, ports and terminals. Konecranes provides productivity enhancing lifting solutions as well as services for lifting equipment of all makes. In 2019, group sales totalled €3.33 billion. Including MHE-Demag, the group has around 18,000 employees in 50 countries.

Konecranes Gottwald Model 5 mobile harbour crane.

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Konecranes receives order from Louisiana for two portal harbour cranes

In the second quarter of 2020, Port of South Louisiana in the USA ordered two Konecranes Gottwald Model 6 portal harbour cranes for its public facility, Globalplex Intermodal Terminal (Globalplex). With commissioning planned for September 2021, the cranes will increase capacity for bulk materials and add flexibility for future handling of containers and project cargo.

The Port of South Louisiana is America's largest tonnage sea gateway for international trade. With increased throughput tonnage and the need for efficiency, Globalplex, located in Reserve, Louisiana and on the east bank of the Mississippi River, saw the need for new, updated equipment. Konecranes will be providing the required high-performance and extremely robust port equipment that would handle the large cargo volume and years of continuous use.

"Acquiring these cranes is an important addition to our port" said Paul Aucoin, Executive Director for the Port of South Louisiana. "The Port of South Louisiana is committed to maintaining and expanding our infrastructure capabilities to keep the port competitive and efficient in the global market."

Their two new cranes will be Konecranes Gottwald portal harbour cranes in the G HSK 6548 B four-rope variant, with a maximum lifting capacity of 125t. These flexible machines offer the potential for continuous-duty bulk material handling or heavy project cargo, but the order also includes a boom-top cable reel to operate electric spreaders for container handling. Included are smart crane features such as hoisting-height and working-range assistants and cargo-hold totalizer. Further, web reporting and remote desktop control utilize the latest technology that add ergonomics, efficiency and safety to crane operation and performance. Mounted on customized portals, the cranes will use the existing rail infrastructure. In order to minimize downtime, the order includes a large spare part package so that maintenance and some repairs can be completed quickly by their own technicians.

Konecranes Gottwald Model 6 portal harbour crane.

"We've taken the time to build a good customer relationship, and you can see the results," says Alan Garcia, Sales Manager, Americas, Konecranes Port Solutions. "After two years working on this challenging project, it's very satisfying to achieve what we set out to do. We hope to continue working with both Port of South Louisiana and Globalplex long into the future."

SENNEBOGEN machines work as a team 355 telehandler and 818 E series material handler

Wood is a component part of many products and one of the most important renewable resources of our time. It is far too valuable to be left unsorted and sent to landfill. According to the Wood Recyclers Association, 4.5mt (million tonnes) of waste wood are generated in the UK every year. One customer of the SENNEBOGEN dealer Molson Group in England has taken on this problem and recycles waste wood with the help of two SENNEBOGEN machines: the 818 E and the 355 E. The mobile material handler and the telehandler work seamlessly hand in hand.

It is early morning and on premises, near to Coventry in England, work is already under way. One truck after another drives into the delivery area loaded up with valuable cargo. It is waste wood, presorted for further processing. With the help of a shredder, different sizes of valuable raw material will be created from the discarded pieces.

The mobile material handler 818 E from SENNEBOGEN is used to load the shredder with bulky pieces of wood that are brought over by the 355 E telehandler. Equipped with an elevating comfort Maxcab, the 818 E's operator has a great view of the shredding plant at a viewing height of 5.50m. "Thanks to the elevating cab I can see straight away if the material is building up in the shredder filling shaft and I can intervene if necessary. The cab is also

The elevating cab means that the operator has a perfect view into the shredder.

very spacious and comfortable," says the operator. The non-slip platform and the railings by the entry provide additional safety on the way up to the cab and on the way back down. An additional protective guard on the windshield and floodlights on the equipment also contribute to a safe environment for the operator.

While the material handler is loading mountains of waste wood into the shredder in a fast work cycle, the SENNEBOGEN 355 telehandler carries out various other tasks. These include moving the wood supplies to within the reach of the material handler and keeping the yard tidy. However, its main job is transporting the chopped wood pieces to the storage area and stacking them up there. There are three stacks, sorted by the size of the material. They range from coarse woodchips to fine sawdust, which,

amongst other things, is reused in pellet form as bedding for house pets. The large bucket, which has a loading capacity of 4m³, means the operator can get the job done quickly and with fewer trips.

The standard reversible fan ensures a consistent performance in a dusty environment.

Dusty environment: consistent, reliable performance

You cannot shred without creating dust. Anyone who has worked with wood will know how very fine sawdust is and how it gets absolutely everywhere. The risk it poses to humans and machines in day-to-day work should, therefore, not be underestimated. On the one hand it is not healthy for humans to, for example, breathe in the particles, and on the other hand a buildup of deposits in filters or engines can pose a fire risk.

To best protect not only the machine, but primarily the people too, SENNEBOGEN machines have series standard equipment that provides benefits for both. The SENNEBOGEN 355 E telehandler has a series standard reversible fan which means that the engine area can be regularly freed of dust and dirt by means of a strong blast of air from the outside. This ensures the engine maintains its optimal cooling capacity and protects it from overheating, keeping it productive and reliable.

The operator is protected from various environmental influences by the Multicab on the 355 E telehandler and the Maxcab on the 818 E material handler. Whether it is raining, cold, hot or dusty, thanks to the series standard air-conditioning, the operator can concentrate on their work without distractions in a cab adjusted to the temperature that suits them best. The telehandler's elevating cab also provides a bonus when it comes to visibility. "When I'm loading and stacking material, I have a great view of what's going on both in front and behind, and I can adjust my angle of vision to my requirements without cricking my neck. When travelling, the elevated cab remains stable and doesn't judder. The air suspension does a really good job," says the operator of the 355 E.

These and other features, such as the large steel design and the telehandler's large breakaway torque at wheel loader level, ensure smooth operation when processing wood even in multi-shift operations.

The SENNEBOGEN sales and service partner Molson Group and its customer are delighted that the 355 E and the 818 E make such a good team. DCi

The strong telescopic boom of the 355 E is perfectly suited to piling up material.

The growing finesse

of equipment used to handle bulk cargoes by rail and by barge

Louise Dodds-Ely

Extensive reach meets dry bulk handling demands: barge unloading

A growing demand for food, energy, infrastructure, and environmental sustainability means that dry bulk unloaders must deliver enclosed, efficient material handling, and also meet an operator's specific requirements; not all systems can do this equally well, *explains Per Karlsson, President of Siwertell AB, part of Bruks Siwertell Group*.

Worldwide, dry bulk terminals receive and discharge vessels of all sizes and have hugely varying infrastructures and downstream equipment configurations including conveying to storage, or transferring material directly to rail wagons or trucks, or any combination of these. The most cost-effective way to meet the vastly different demands of every terminal is to have a system that offers flexibility, without sacrificing efficiency.

Regardless of vessel size, with the right

technology, it is possible for one or two high-capacity, totally enclosed machines to minimize vessel unloading times and maximize a terminal's operational profits. They can also ensure no material is wasted through spillage, positively impacting the environment and profitability.

Unrivalled hold reach

Working to this brief is the Siwertell ship-unloader. It is a state-of-the-art screw-type dry bulk handling machine; all its movements, slewing, travelling, pendulum and luffing, can be done at the same time, delivering maximum flexibility and reach into a ship's hold during unloading operations. This, together with a counter-rotating inlet device, ensures a continuous flow of material through the conveyor, guaranteeing both a high rated and average through-ship capacity.

A Siwertell unloader can operate in huge vessels as well as in small barges without compromising on capacity. It is also designed to withstand immense digging forces, which is essential when handling difficult materials such as salt, soya meal, coal and other types of non-free flowing materials. Furthermore, the totally enclosed conveyor system meets all current, and potential future, regulatory requirements for fugitive dust and spillage.

The Siwertell unloading programme covers everything from road-mobile unloaders, which accommodate vessels up to about 15,000dwt, including the fixed operation of barges, port-mobile unloaders, which can discharge vessels up to 60,000dwt, and stationary and travelling unloaders, serving all vessels from small barges at around 1,500dwt, all the way up to 205,000dwt bulk carriers.

Outstanding capabilities

Through different screw conveyor sizes, Siwertell unloaders can offer capacities from 150tph (tonnes per hour) up to 3,000tph, with every system matched and optimized according to operator needs.

Siwertell barge unloaders are offered both as stationary or rail-travelling units. A notable example of highly efficient rail-travelling grain unloaders is in Brazil. Here, three Siwertell ST 790-M unloaders and one Siwertell ST 790-F barge unloader and shiploader configuration, run for about 3,500 hours/year for four privately-owned competing grain handling operators. They are located deep into the Amazon River, which is relatively inaccessible to large vessels. The operators handle barges between about 3,000 and 10,000dwt, discharging them at a continuous rated capacity of 1,500tph when unloading soya beans. The unloaders are also so lightweight, that they can be barge-mounted themselves.

NEW Port-mobile unloader delivers a competitive edge

Our new Siwertell port-mobile unloader offers unrivalled rewards. Grain handlers can benefit from the highest average efficiency rates on the market, extremely low cargo degradation rates, quick truck-filling times, close to zero dust emissions and rapid switches between all kinds of grain cargoes including soya been. Quickly stowed and deployed, the new unloader is an agile asset for any port.

- Ship unloading
- Ship loading
- Conveying
- Stacking & Reclaming
- Truck unloading
- Chipping
- Milling
- Screening
- Wood residue processing

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A Siwertell ST 790-M unloader also handles grain at Peel Ports' Seaforth terminal in Liverpool, UK, at an amazing capacity of 1,800tph for vessels up to 70,000dwt. This unloader has the highest capacity for grain handling in the world and admirably showcases the capabilities of Siwertell technology. Peel Ports also operate two Siwertell 790-D biomass ship unloaders. With rated capacities of 1,200tph, they supply the Drax power station in the UK by directly feeding material to a rail network and supplying up to ten train wagon loads of pellets per day. This accounts for up to 40% of the total biomass consumed by Drax each year.

In Westhafen, Germany, a stationary Siwertell unloader works to unload coal from barges up to about 2,500dwt at a rate of 200tph. The unloader itself is located centrally in the town, with cafes positioned less than 50m away from the unloading operation. It meets extremely strict regulations for noise emissions as well as dust and spillage.

Siwertell unloader flexibility also extends to different materials, and changing operations. For example, in the US, a travelling Siwertell unloader was originally delivered to unload coal at 1,800tph from vessels up to 120,000dwt and today it is used for discharging barges of about 10,000dwt at the same capacity. Only through its unique design and flexibility was this possible.

Technology in context

To put Siwertell technology in context with other systems, today, no other continuous unloader can offer the same kind of hold reach and flexible operation, as well as being totally enclosed to ensure no dust emissions and spillage. For example, although enclosed, pneumatic unloaders are limited to luffing motions and achieve a pendulum motion by moving the whole horizontal arm system. Travelling during an operation is impossible as the steel structure is not strong enough to support it. The combination of these limitations mean that a pneumatic unloader cannot withstand any digging forces or reach under the hatch coamings.

Looking at bucket chain unloaders, these also have very limited pendulum movement and cannot travel because their pick-up point is not sufficiently strong enough to compensate for the digging forces that are

created during slewing and travelling motions. A grab-type unloader also has a limited reach due to the size of the hatch opening; it is also not uncommon to lose between one and two percent of a load through spillage, let alone the dust emissions.

The sustainable face of dry bulk

Globally, more than 400 Siwertell units for almost every type of bulk material have been delivered. In terms of their environmental protection, through-ship efficiency, and total lifetime investment cost, including maintenance requirements, Siwertell unloaders out-perform every other dry bulk handling system on the market. They are ready to meet the demands of a rapidly growing population in the most sustainable and efficient way possible.

Metso to deliver a rotary railroad car dumper system to CSX Transportation in the USA

Metso has been awarded a contract for the design, supply and installation of a railroad car dumper system for CSX Transportation in the USA. The new twin cage tandem rotary car dumper system will be used for the unloading of coal from railroad cars at the CSX Curtis Bay Export Terminal, located in Baltimore, Maryland. The dumper system is expected to be operational in October 2021.

The delivery includes two complete dumper barrel assemblies, a complete hopper system with grizzlies, a unit train positioner operation, and installation. The order has been booked in Metso's 2020 Q2 orders received.

"We have a long-standing business partnership with Metso. We selected them for this project because of their technical expertise and for providing the best long-term value for our company," says Larry Gelo, Director of Equipment Design, CSX.

Thanks to its innovative design, the new dumper system to be delivered to CSX will not only allow for the rotary dumping of loaded railroad cars but also the unloading of bottom dump cars. Overall efficiency of the dumping operation will be improved via the use of Nolan™ car movers that are mounted on the dumper barrels to spot the loaded cars as well as eject the empty cars.

"We are very pleased about this order. As the leading supplier of rail-based freight transportation in North America, CSX is a very important customer to Metso. We have provided them equipment, parts, and services throughout their network in the USA. The new dumper system to be delivered to Maryland will enable CSX to significantly improve the overall efficiency of their dumping operation," explains Bob Kaib, Vice President, Bulk Technologies at Metso.

World-class material handling solutions

Metso is a global expert in dumper technology with over 400 dumper system deliveries throughout the world, bringing the best available technology to the customers to enhance their operations though efficiency and availability. Metso's line of dumpers, positioners and holding devices form a package which provides the customers with efficient operation and high availability for many years of operation.

Metso is a highly respected industrial company offering equipment and services for the sustainable processing and flow of natural resources in the mining, aggregates, recycling and process industries. With its unique knowledge and innovative solutions, it helps its customers improve their operational efficiency, reduce risks and increase profitability. Metso employs over 15,000 people in more than 50 countries.

Flexible barge solution at the Harbor of New York

Most powerful floating mobile harbour crane in the United States with a maximum capacity of up to 75 tonnes in four-rope grab operation.

At New York Harbor, NY, USA, Sims Metal Management uses a Liebherr mobile harbour crane type LHM 600 to load scrap and unload salt. The crane is placed on a floating barge and can be moved to another terminal of the port if required.

With a maximum lifting capacity of 75 tonnes in four-rope grab operation, the crane is the strongest floating mobile harbour crane on a barge in the US in four-rope grab capacity.

A new Liebherr LHM 600 Mobile Harbour Crane has been in operation in the Port of New York and New Jersey since November 2019. Sims Metal Management, one of the world's foremost metal recyclers, places its LHM 600 on a floating barge. This intelligent solution offers the company various advantages. Firstly, the barge solution offers enormous flexibility in terms of location. The company operates two different terminals in New York Harbor. In addition to a terminal in the Port of Newark Sims Metal Management also operates the terminal of Claremont in Jersey City, NJ, which is about 10km linear distance. Depending on requirements, the

LHM 600 on the barge allows Sims Metal Management maximum flexibility by shipping the crane to different terminals.

floating mobile harbour crane can be towed by sea to the appropriate terminal and is thus ready for operation in the shortest possible time.

Secondly, the Liebherr mobile harbour crane can move along the barge to reach further hatches without having to move the barge. On the other hand, operation from the barge means that no adjustments to the port infrastructure are necessary. The space gained at the quay edge can also be used as storage and operational space.

LHM 600 with innovative features

Thanks to many years of experience and customer-oriented engineering, Liebherr mobile harbour crane technology sets new standards in innovation and quality. The Liebherr LHM 600 mobile harbour crane from Sims Metal Management is equipped with a 750kW diesel engine that complies with the latest Tier 4 final emissions standard. The crane is equipped with a maximum lifting capacity of up to 144 tonnes. In four-rope grab operation, up to 75 tonnes are available — making the LHM 600 from Sims the most powerful mobile harbour crane on a barge in the US.

The Liebherr Pactronic hybrid system is installed as an additional power booster in the new machine from Sims Metal Management. Its main feature is an additional energy storage device, the accumulator. The accumulator is charged when the load is lowered and by surplus power from the conventional drive unit. The Liebherr Pactronic system is an impressive power amplifier. Both lifting and lowering speeds are significantly increased despite the fact that the primary power output remains the same.

Sims Metal Management also benefits from the Liebherr analysis software LiDAT smartApp. The smartApp is an IT-solution for the analysis and optimization of cargo handling processes. With LiDAT smartApp it is possible to analyse crane data and initiate process improvements.

About Sims Metal Management

Sims Metal Management buys and processes scrap metal from businesses, other recyclers and the general public. With more than 250 processing facilities primarily in the United States, United Kingdom and Australasia, it recycles ferrous and non-ferrous metals. The company also operates a network of processing facilities, many with deep-water port access. As a responsible corporate citizen, the company continuously seeks new ways to broaden its participation in the environmental sector.

About Liebherr-MCCtec Rostock GmbH

Liebherr-MCCtec Rostock GmbH is one of the foremost European manufacturers of maritime material handling solutions. The product range comprises ship, mobile harbour and offshore cranes. Reachstackers and components for container cranes are also included in the product portfolio.

About the Liebherr Group of Companies

The Liebherr group comprises more than 140 companies on all continents and has over 48,000 employees. In 2019, Liebherr achieved a consolidated total turnover of around €11.7 billion. As a global, family-run technology business, Liebherr is not only one of the largest construction machine manufacturers in the world, but is also recognized in many other sectors as a supplier of technically sophisticated products and services with focus on customer benefit. Liebherr was founded in 1949 in Kirchdorf an der Iller in southern Germany.

Bulk/breakbulk barge applications for Konecranes reachstackers

Konecranes is heavily involved in the supply of reachstackers to load/unload containers into and from barges. More bulk product than ever is being moved by container, and Konecranes' reachstackers can also be used to handle wood, paper and pulp products, metal goods (such as billets), coils and large tyres.

Konecranes was the first to build the world's largest barge handler as far back as the 1990s. In just the last three years, the company has delivered a dozen barge handlers around the world.

Konecranes' most recent delivery is to the United States, for reach stackers that are able to stack a four-row container stack on the quay, with 45t capacity in the first row, and 34t capacity in the fourth row, and capable of negative lift when handling barges.

The Covid-19 crisis has hit Konecranes' industrial customers harder, and the company's experience is that food and medical supply have been holding up much of the logistics and port operations. It has also seen that the pulp & paper segment, and also lately the sawmills have been holding up pretty well. The company is, however, already seeing increased activity, and hopes that recovery will come in the autumn.

Taman Seaport: following the award of the major contract, SCHADE now wins one of its largest-ever spare parts orders

In October 2019, in the presence of the Russian President Vladimir Putin, the first of two coal and iron ore handling lines was commissioned at the new Taman Seaport built by the Russian company OTEKO-Portservice, in the Krasnodar Region on the Black Sea. As part of a large order for this project, SCHADE Lagertechnik GmbH of Gelsenkirchen supplied a system which unloads three wagons at a time, with each of the two triple C-Frame wagon tipplers working in parallel. Now OTEKO has placed a very substantial spare parts order with SCHADE.

SCHADE's customer OTEKO attaches great importance to having the wagon tipplers in operation as permanently as possible, and has therefore placed its spare parts order for strategically important components such as gearboxes, as well as for consumables essential for operative requirements, for example the hydraulic systems. Deliveries will be made in various lots from the second half of 2020 to the first quarter of 2021.

The two commissioned triple C-Frame wagon tipplers, with unloading capacities of 60 wagons per hour each, are part of the largest order so far in the history of SCHADE Lagertechnik. The scope of supply also includes four semi-portal reclaimers and three more wagon unloading systems, two of which are C-Frame wagon tipplers for coal and iron ore, and a pivot frame wagon tippler to be used for handling sulphur.

Taman Seaport has been extended in recent years by OTEKO-Portservice to become the second largest freight handling port in the southern part of Russia. By the end of 2021 it is planned that further terminals will be established at this geographically significant freight hub, located between the Sea of Asov and the Black Sea.

About the AUMUND Group

The AUMUND Group is active worldwide. The conveying and storage specialist has special expertise at its disposal when dealing with bulk materials. With their high degree of individuality, both its technically sophisticated as well as innovative products have contributed to the AUMUND Group today being a market leader in many areas of conveying and storage technology.

The manufacturing companies AUMUND Fördertechnik GmbH (Rheinberg, Germany), SCHADE Lagertechnik GmbH (Gelsenkirchen, Germany), SAMSON Materials Handling Ltd. (Ely, England), as well as AUMUND Group Field Service GmbH and AUMUND Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. The global conveying and storage technology business is spearheaded through a total of 19 locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.

Technical innovation in Taman Seaport: two SCHADE wagon tipplers working in parallel each unload three wagons fully loaded with coal — 60 wagons each per hour (photo: SCHADE).

Efficient and cost-effective transshipment crane barge combination

Conoship International and KenzFigee, two ambitious and innovative companies have teamed up to offer stevedoring and/or transshipment companies an efficient, robust and safe dry bulk and breakbulk transshipment solution for floating transshipment operations in harbour and coastal waters.

Conoship International, founded in 1952, is an experienced and innovative ship designer. It has developed a wide range of ships, from general cargo vessels, tankers, dredgers, to ferries and offshore vessels. Over 2,000 ships have been built based on Conoship designs and operating all around the world.

KenzFigee is a prominent supplier and service provider of tailor-made lifting solutions and offshore equipment for the marine, offshore and wind energy industry. Since its establishment in 1836, the company has built and delivered over 4,000 harbour and transshipment cranes and 350 pedestal-mounted offshore cranes worldwide.

The Conoship-designed transshipment barge provides a safe and efficient vessel for worldwide operation in harbours, inland and coastal waters. The tailor-made design ensures 360° visibility from the office/control room amidships, in accordance with ILO-MLC 2006 regulations. The design guarantees easy access for maintenance of all equipment and structural items whilst providing maximum comfort in modern, durable living quarters and work spaces.

Multi-Purpose Vessel on LNG for Wijnne Barends with superstructure and wheelhouse in front to improve open top sailing (Rendering by Sikko Valk ©Conoship International).

The Conoship barge can be equipped with a choice of two different KenzFigee high capacity heavy duty cranes: the Lemniscate crane or the recently designed Bulkbuster™ derrick crane. The combination of a safe and efficient barge for worldwide operation in harbours, inland and coastal waters and the robust and a reliable Lemniscate or Bulkbuster™ crane offers high capacity loading and offloading of ships, whilst maintaining stability and buoyancy of the vessel up to 2.0 metres SWH (significant wave height) in coastal conditions.

The specially designed Lemniscate crane for floating applications cemented KenzFigee's reputation for excellence and is still very popular. This high quality Lemniscate crane offers high capacity transshipment of up to 25,000 tonnes per day, whilst maintaining stability and buoyancy of the vessel. The Lemniscate crane is particularly suitable for companies in need of high-volume transshipment capacities.

The newly developed cost effective Bulkbuster™ derrick crane is a result of years of experience and practical know-

A 36t KenzFigee Lemniscate crane in operation during transshipment activities for the company's client Oldendorff.

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how gained from the successful Lemniscate transshipment crane and the other quality offshore cranes from KenzFigee. The need for a more cost-effective high speed and high capacity transshipment crane with better seaway conditions in more harsh offshore environments, has encouraged KenzFigee to design the Bulkbuster™ crane.

Both cranes are designed for low maintenance because of the long lifespan of the components used. The benefits of the Conoship/KenzFigee transshipment crane barge combination include:

- experienced partners with a proven track record in the industry;
- convenient one-stop-shop concept;
- a cost efficient and environmentally friendly transshipment crane barge combination;
- capable of operating up to 2.0m SWH in coastal conditions;
- Conoship transshipment barge is designed with safety in mind and ease of operations;
- proven high quality high capacity heavy duty cranes of KenzFigee;
- additional services (maintenance, spare parts, etc.) for total care of the equipment during its lifespan; and
- in-house engineering for specific requirements.

PRINCIPAL CHARACTERISTICS

Barge:	GRT 3,000t | lxb: 57.8 x 23.5m | working deck area 800m²
Lemniscate crane:	SWL 36t-40t | 2,000tph capacity
Bulkbuster™:	SWL 45t | 1,000tph capacity
SWH:	2.0m in coastal conditions

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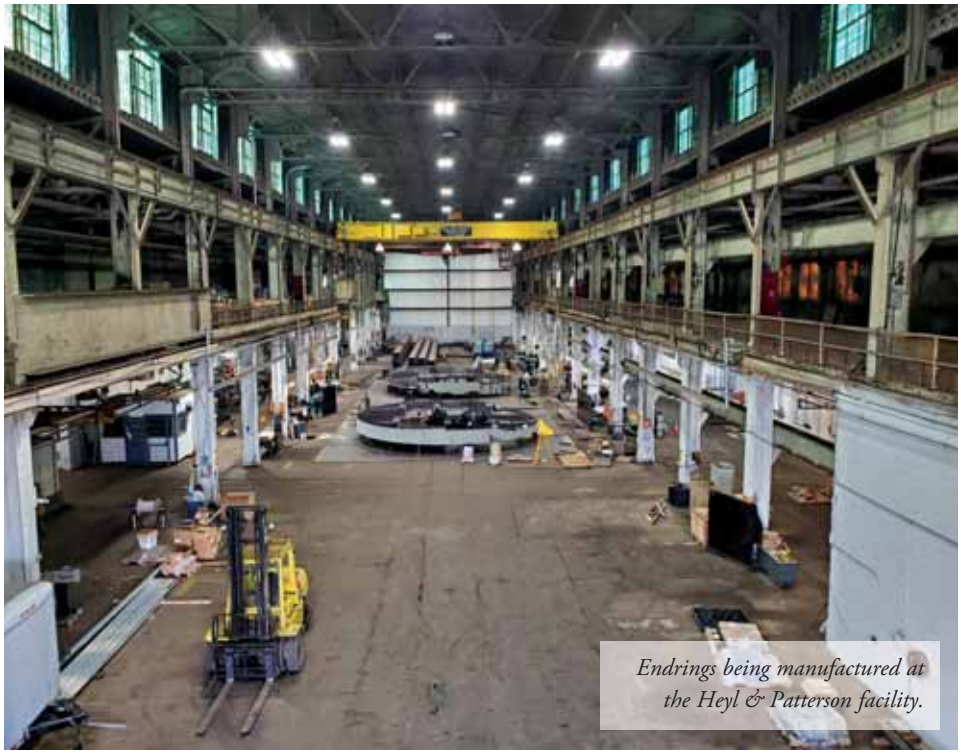
Rail projects supported by high-quality equipment from Heyl & Patterson

The transportation of dry bulk materials via rail is critical. In North America, Heyl & Patterson is working diligently on railcar unloading and positioning projects from coast to coast, handling coal, ethanol, iron & phosphate ores despite the inconveniences created by the coronavirus pandemic.

Heyl & Patterson has been proactive in implementing measures at its manufacturing facilities intended to prevent the spread of the Covid-19 virus. To avoid significant supply chain interruptions, Heyl & Patterson has kept adequate material and supplies on hand, reducing dependency on any material suppliers.



Endrings being manufactured at the Heyl & Patterson facility.

Heyl & Patterson was recently awarded the contract for a tandem rotary car dumper replacement project for an iron ore facility in Quebec, Canada. The scope includes the replacement of a failing tandem rotary dumper, barrel and trunnions. The project is set to be delivered in May 2021.

Heyl & Patterson has proposed its most robust, terminal-duty rotary dumper design, to replace the failing dumper. The end rings include 1" wrapper plates and 1" web plates for extended life. The wrapper and web plates are manufactured with a full penetration weld for optimal structural strength. Rack segments, attached to the end rings are machined for precision, as opposed to flame cut, and are shim-able which allows for easy alignment and precise rack-to-pinion backlash setting.

The new tandem iron ore dumper has been designed for continuous operation, 24 hours a day, 7 days a week, 365 days a year. The design of the unloader will promote high impact discharge, in conjunction with mechanical vibration to easily unload tacky material.

On Canada's west coast, Heyl & Patterson is currently working with an export terminal in Vancouver, British Columbia to replace an existing rotary railcar dumper. Originally installed in 1969, the dumper had surpassed its useful life. This exporter is looking to make improvements to the terminal, that will increase capacity, allowing it to transfer 30 million tonnes — all while maintaining the same footprint. Heyl & Patterson has engineered a rotary railcar dumper that will allow for a dump cycle time of 38 seconds. The design will include a mechanical car clamp system, a railcar positioning system, as well as Heyl & Patterson's holding devices.

The positioner system is a heavy-duty design consistent with a plant life of 25 years and capable of operating in all climatic conditions normal to the install area. The rack and pinion positioning system has been designed to index a unit train with railcars having a gross weight of 286,000 lbs. to 315,000 lbs..

This terminal faces unique challenges in terms of product conditions. Often inbound rail shipments contain various grades of coal, with a moisture content ranging from 8–17%. In frigid temperatures this level of moisture leads to frozen clumps of coal that are difficult to manage. To counteract the frozen coal, the rotary railcar dumper is equipped with a vibrator system.

Heyl & Patterson's experienced team of field service technicians have pre-quarantined to comply to new corona-driven safety standards, and are currently on site for pre-outage, outage, commissioning and training.

In America's Idaho, H&P is currently working on a project that will consist of a new rotary railcar dumper, along with a rack & pinion railcar positioning system for a phosphate ore operation.

The new railcar dumper will utilize an 'end-ring out' design, with a hydraulic cylinder clamp system, powered by an off-board hydraulic power unit.

The new positioning system will accommodate strings of 130+ railcars and allow for the movement of railcars in both forward and backward direction, acting as either an entry or an exit end indexer. The unit train will always be under the control of the indexer arm or entry/exit end chocks. The indexer will be interlocked with the entry/exit end railcar holding chock to ensure immobilization of the train during offloading.

For further improvement to the unloading process, Heyl & Patterson will incorporate a railcar vibrator, that will contact the bottom railcar sill during the dump cycle, aiding in the removal of sticky material in the car pockets, along supports and on the railcar sides.

This project's design phase will be completed in autumn this year.

In Southern Texas, Heyl & Patterson has designed a railcar indexing solution for a plant handling ethanol via rail. The project includes two of H&P's patented CUB™ railcar movers, which will handle a combination of 16 full and empty tank cars; each full car has a gross weight of 286,000 pounds and an empty car weight of 90,105 pounds. There will be one CUB utilized for each line at the facility.

While much of the world seems to be halted by the effects of the coronavirus pandemic, rail projects continue to move forward. Heyl & Patterson is busy with engineering developments and is fielding new rail-based project proposals every day. DCi

IHI Steep Angle Conveyor

successful installation with IHI technology

As one of the most prominent suppliers of coal handling systems in Japan, IHI Transport Machinery Co., Ltd. (IHI) has delivered a wide range of conveyors. This article introduces the Steeply Angle Conveyor, which was developed and adopted for a project at Hirono Thermal Power Station Unit 6 of JERA Co., Inc. (formerly: Tokyo Electric Power Company).

Overview of Steep Angle Conveyors

Rapidly inclined conveyors and vertical conveyors are used in large numbers at sites where the difference in height is large and there is limited space due to the constraints of the site and related equipment. In recent years, the carrying capacity of material handling systems has also been increasing, so more advanced technology is required.

In the usual flat belt type conveyor, it is necessary to make the inclination small and for the length to be long, because steep inclines and vertical conveying are impossible from the angle of repose of the transported object. We already know that there are conveyors in which a crosspiece is attached to a belt for steep inclination and vertical conveyance; the problem with these types of conveyors is that it is difficult to increase capacity.

Applying a double-ply conveyor belt system, IHI has devised a system that tucks bulk materials in between two belts and conveys them in a steep slope and vertical direction. By using IHI's research and development plant (see picture on p58), the performance of this system has been verified; there, the steep conveyor achieved a capacity of 4,000tph (tonnes per hour), and the vertical conveyor reached 2,000tph. Even today, IHI continues to research and develop higher levels of technological expertise.

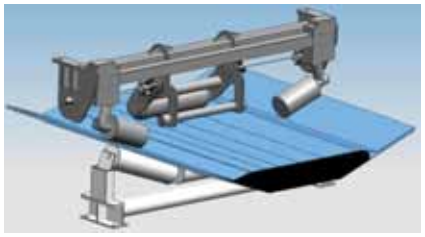
Features of IHI's Steep Angle Conveyor

IHI's steep conveyor adopts a system in which conveyed objects are tucked in by two belts (see the schematic diagram on p58), and conveyed objects can be transported without spilling and breaking the shape. In addition, the structure and the roller position is designed to prevent

TABLE 1: MAIN SPECIFICATIONS OF THE STEEP CONVEYOR FOR THE HIRONO THERMAL POWER STATION

Machine number	Capacity (t/h)	Transportation distance (m)		Belt speed (m/min)	Belt width (mm)	Remarks
		Horizontal	Height			
BC-2C	2000	96.75	58.805	200	2000	Double-ply conveyor belt
BC-2D	2000	100.15	59.1	200	2000	Double-ply conveyor belt

Demonstration plant (left: Steep Angle Conveyor, right: vertical conveyor).



Schematic diagram of IHI's steep conveyor with two belts.

the conveyed object from falling naturally. The main features include:

- it can be flexibly arranged and installed on a narrow site;
- it is possible to use belts of the same specifications as ordinary flat conveyors;
- compared to conveyors with crosspiece and bucket elevators, this system makes fewer drops of conveyed materials and is easy to clean;
- compared to conveyors with crosspiece and bucket elevators, maintenance costs are reduced.

Steep Angle Conveyor for Unit 6 of Hirono Thermal Power Station, JERA Co., Inc.

Using this steep angle conveyor technology, IHI has successfully delivered products with the specifications shown in Table 1 above to Unit 6 of JERA Co., Inc. (formerly Tokyo Electric Power Company)'s Hirono Thermal Power Station for coal conveying. This is the largest steep angle conveyor in Japan, in which two steeply inclined conveyors with a capacity of 2,000tph were installed. Considering the site conditions, a special installation method was also required.

As already mentioned, one of the advantages of steep conveyors is that they can be installed in a narrow site. However, because of the narrow site condition, it is very difficult to plan the arrangement of heavy machinery necessary for installation work, and the situation for the Hirono Thermal Power Station was no exception. Therefore, from the beginning of the project, IHI designed and planned to mount this conveyor with fully assembled condition by a floating crane.

It was extremely difficult to install the conveyors at an angle of about 39.5° with the legs on the ground side (ahead and behind). Work included preparations in advance, and was hampered by the load shaking, caused by wind and swells.

The installation work was completed as shown in photo 2. The installation work

with the floating crane is different from the work on land, and it is also necessary to take into account the sea conditions. Although IHI has carried out many installations of continuous unloaders, etc. by floating cranes, it was the first time installing machines with specially shaped structures like this conveyor, so a great deal of study of the various problems involved in installation was required before successful completion.

Steep Angle Conveyor at JERA Co., Inc. (formerly Tokyo Electric Power Company)'s Hirono Thermal Power Station.

Summary

IHI has contributed significantly to the development of industrial projects by delivering plant facilities such as its steep angle conveyors and many other conveyor facilities. As with the case detailed above, IHI will continuously provide its high-level technology to a wide range of customers and contribute to the development of social infrastructure all over the world as a respected manufacturer of material handling systems. DCi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Louise Dodds-Ely

Wide-ranging expertise from RBL-REI demonstrated by two major contracts

The France-based company RBL-REI is a major force in the design, manufacture and construction of bulk handling systems worldwide. The company continues to prove its skills, particularly as regards turnkey projects, capabilities and innovation expertise for such challenging works. RBL-REI recently received an order for design two automatic big bag bagging lines for one of its port customers in France.

The first harbour company at La Rochelle in France has entrusted to RBL-REI the design and construction of two automatic big bag bagging lines including all the related complexities of this kind of turnkey project. These complexities include: the need for an in-depth knowledge of civil works; electrical/automation operations; dedusting systems; ATEX (Atmospheres Explosibles) design; firefighting systems; commercial weighing systems; and much more.

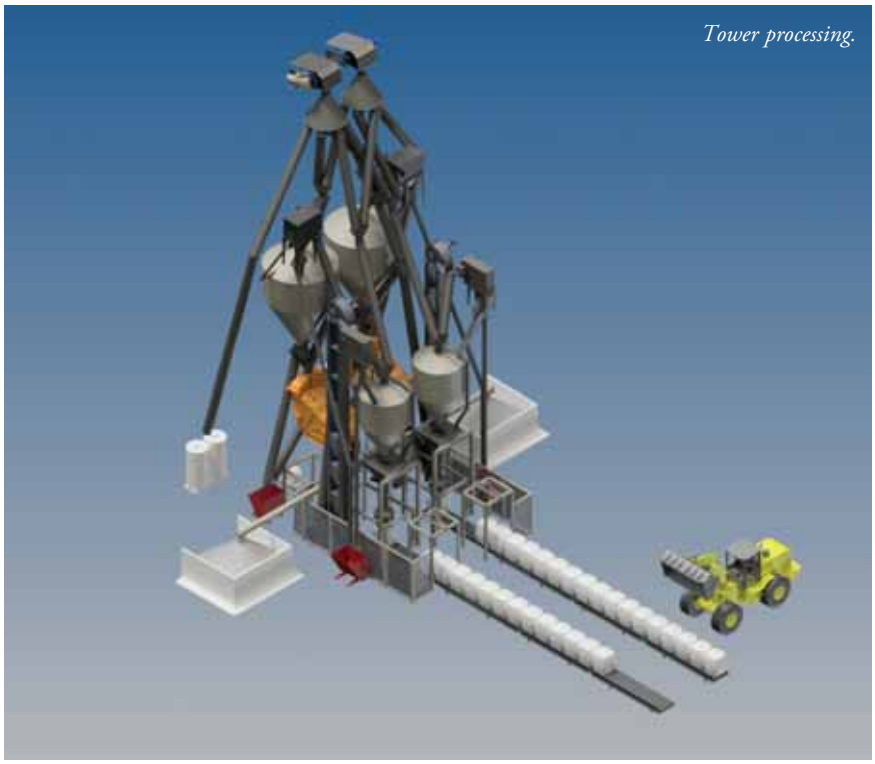
Each bagging line has a capacity of

100tph (tonnes per hour) and has the capabilities to load different sizes of big bags: 500kg, 600kg, 800kg, 1,000kg. Originally designed for fertilizer products, customers also asked RBL-REI to provide a system that can also load cereals, biomass cargoes and so forth. For this, RBL-REI has integrated ATEX equipment, dedusting systems, a good cleaning system and non-retention of product to prevent cross-contamination between the different products. In addition, all equipment has a full redundancy, allowing loading at a minimum capacity of 100tph.

With this kind of installation, the customer has a flexible installation in complete correlation with its markets.

In 2018, for the same customer, RBL-REI carried out a turnkey project for two lines of belt conveyors to provide the link between silos and shiploaders. The complexity of the project lay in the fact that it was necessary to put two conveyors on existing concrete piles receiving a single conveyor, and the impossibility of modifying concrete piles and a distance between two concrete piles up to 50m. RBL-REI designed, specifically for the project, a new structure to reduce loads on the concrete piles.

RBL-REI worked on the aerodynamics of the structure, deflectors sheet, lowered hoods and so forth, to give an 'airplane wing' appearance at the structure. For the long distance between two concrete piles, underlying structure were designed and erected under the principal structure. The capacity of the belt conveyors is 2,500tph, and the length of each conveyor is ±800m.



Tower processing.

With this installation the customer has a system that is in accordance with the latest codes and regulations. There is also redundancy between the two belt conveyors, meaning that it is always possible to load a vessel, and in this way, the loading time of the ship can be optimized.

These two examples are great demonstrations of RBL-REI's abilities to design and build turnkey projects which, as closely as possible, adhere to the needs of the clients as well as the constraints of the site — all while respecting the latest codes and regulations in terms of safety, environmental protection etc.

Shi.E.L.D. Services takes a modular approach to the design of transshippers

Modular design

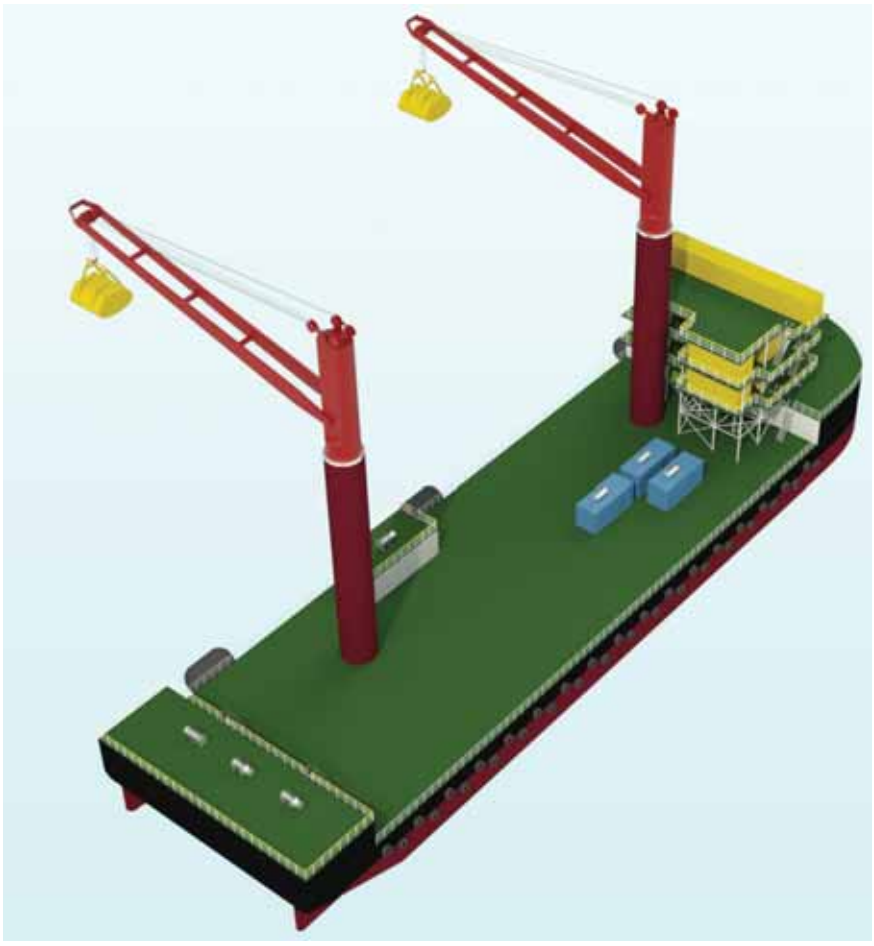
Shi.E.L.D. Services has developed the 'Modular Design' of transshippers, a modern design approach which features innovative solutions to reduce CAPEX/OPEX costs and to increase safety on board, *writes Luca Condini, Technical Director at Shi.E.L.D. Services*.

Transshipment is a smart logistics solution which has helped overcome otherwise insurmountable bottlenecks in the movement of dry bulk materials.

But there have been very few changes in transshipment design since its inception in the last 40 years. Transshippers are still based on design solutions which were fit for purpose in the past but now need to be updated to remain competitive in the today's challenging dry bulk market.

Disrupted supply chains, uncertain government mining and export policies, and volatility in commodities prices mean that there is a demand for solutions which guarantee greater flexibility and cost reduction.

Shi.E.L.D. Services has been working in the transshipment sector for decades and because of the experience it has gained in the field, it has developed a 'Modular Design' which addresses the needs for a flexible response and cost reduction



improving three main aspects of bulk transshipment:

- **flexibility:** with a modern design approach which allows the characteristics of the transshipper to adapt to different project scenarios and reduce capital costs;
- **efficiency:** with innovative equipment which optimizes power management of the vessels and reduces fuel consumption and operating costs; and
- **safety:** with specific solutions focused on reducing the presence of the crew on deck during hazardous operating activities

Modular design concepts

The traditional approach sees the transshipper designed for a specific set of project requirements and to deliver the optimal performance under specific conditions. Shi.E.L.D. Services' new approach means that its vessels can operate more efficiently across a wider range of scenarios and conditions, as many projects have fluctuating volumes or the vessel needs to be deployed on other projects.

Shi.E.L.D. Services' 'Modular Design'

takes into account the various ways the project might develop and depending on the requirements, it defines the future improvements to be applied to the transshipper.

For instance a simple floating crane would be sufficient for a project in the early stages, because of the limited quantity of cargo to be handled. Should the quantity of cargo increase, one additional crane can be installed. The provisions for the second crane, for the additional generators and for the increased accommodations are already taken into account in the transshipper design and the modifications can be carried out in a shorter period of time and at a lower cost (i.e. during a special survey).

The same principle applies in case a conveyor system is added in order to increase the daily transshipment rate and the annual throughput.

The essence of the 'Modular Design' is that the performance of the transshipper and its characteristics can be improved in incremental steps and also modified as to give the ship owners and the operators the opportunity to optimize the logistics part of the project and reduce the costs.

The design is made in such a way that any additional equipment can be installed without limiting the performances of the transshipper.

One more important concept of the modular design is that the hull is based on a traditional 300/330ft coal barge — very easy to find on the market, even second hand if there is the need to reduce CAPEX.

Just to give an idea, the Modular Design can stay in a range of US$7 million (for a floating crane with one crane with loading rate of 20,000 tonnes per day) up to US$12 million (for a conveyor system and two cranes with a loading rate of 55.000 tonnes/day).

The Modular Design is engineered to work offshore with two metres of waves and 25 knots of wind.

Energy recovery system

An innovative element included in Shi.E.L.D. Services' Modular Design is the Energy Recovery System.

Hoisting and lowering heavy loads over continuous cyclical motions happens during transshipment operations, where the cargo is moved by the grab cranes from one ship to another. This process is highly demanding on the power generation system and these cyclical motions generate large and sudden variations in the generator's load.

The cranes absorb energy to lift the grab and emit energy when they lower it. This energy, called 'reverse power', has always been considered a burden to be disposed of and has always impacted the design of the power generation system and the choice of the generator sizes.

On a transshipper the operation of the cranes places the heaviest burden on the generators by causing a wide variation in energy demand over large power peaks. Load variations from 30% to 80% of the generator rated power in a cycle that repeats itself every two minutes are not uncommon.

Keeping in mind that the generator has the highest efficiency and the lowest fuel consumption when working at about 75% of its rated power, it is easy to see that these big load variations make the generator work outside of its operating sweet spot.

Moreover the generators are not always capable of promptly following the sudden power request from the crane. There is always a lag for the generator to go from a low-load to a high-load condition which causes non-optimal fuel combustion further contributing to higher fuel consumption and carbon deposits inside the engine combustion chambers.

The continuous load variations induce an additional stress to the mechanical parts of the generators which could lead to premature breakdowns and which require increased maintenance. The size of the generators is usually chosen based on the load peaks and on the amount of reverse power to be absorbed. This approach leads to oversized generators which have a high purchase price, high maintenance costs and which usually work in a far from optimal operating range.

The energy recovery system introduced in Shi.E.L.D. Services' Modular Design is an innovative technology which preserves energy to reduce fuel costs and lower emissions while increasing operational safety and reliability of the equipment.

During operation, the system captures the electrical energy when the crane slows or lowers the load. This energy, which is usually dissipated as heat using braking resistors, is now stored as kinetic energy and is then recycled and utilized to put

power back onto the electrical grid for the next hoist.

The design of the system is also modular, allowing flexibility to adapt to the equipment installed on board and to different vessel configurations.

Several benefits are achieved by using the energy recovery system:

- the generator purchase cost is reduced by 40%, compared to the purchase cost of bigger size generators;
- fuel consumption is reduced by 20% thanks to the leveling out of the power peaks and the uniform generator load;
- the generators operating and maintenance costs are reduced by 15% as a result of less stressful usage;
- increased reliability of the generators;
- reduced stoppages for maintenance or breakdowns of generators;
- the environmental footprint is reduced; and
- the cos (phi) of the electrical system is almost close to 1.0, the reactive power is reduced to zero.

The energy recovery system smooths the load, levels out the power peaks of the cranes and provides the generator system a uniform load, improving equipment performance, enabling the generators to run at optimal load, and easing wear and tear.

The greatest benefits of the energy recovery system are obtained when the system is installed on a new building vessel when the generators can be appropriately chosen but it is well suited also for retrofit installations.

Increased safety

Shi.E.L.D. Services' 'Modular Design' improves the safety of operations on board.

During offshore cargo handling operations the transshipper needs to be shifted along the ocean going vessel to reach all holds to be loaded. Depending on the vessel size, the loading plan and the transshipper layout, this operation has to be done several times to completely load a ship. Every time a shifting operation is needed the mooring crew has to reach the winches on the deck and operate the machinery locally, taking care of all mooring procedures such as arrange the ropes in a suitable way, engage the ropes on the winch drum, verify the rope tension. It is a rather hazardous operation which requires skilled crew and strict adherence to safety procedures because it is not unusual for a rope to break and pose a risk of injury to the crew.

In order to reduce the physical presence of the crew at the winches during the shifting operations Shi.E.L.D. Services' Modular Design features a specific mooring arrangement and newly designed mooring winches which allow the ropes to be engaged on the drums at all times and that can be remotely operated from a distant safe location, like a higher deck for a good visibility of the entire mooring area.

The mooring ropes are connected only once at the beginning of the operations and disconnected when the operations are over. The mooring crew is no longer needed every time a shifting is done because the ropes are always engaged on the winch drum and limiting the human presence in the dangerous snap-back mooring area will improve the safety.

In conclusion, Shi.E.L.D. Services' Modular Design is the answer to the needs of ship owners and operators to adapt to fast-changing scenarios in the transshipment market and a key component in cost optimization.

About Shi.E.L.D. Services Srl

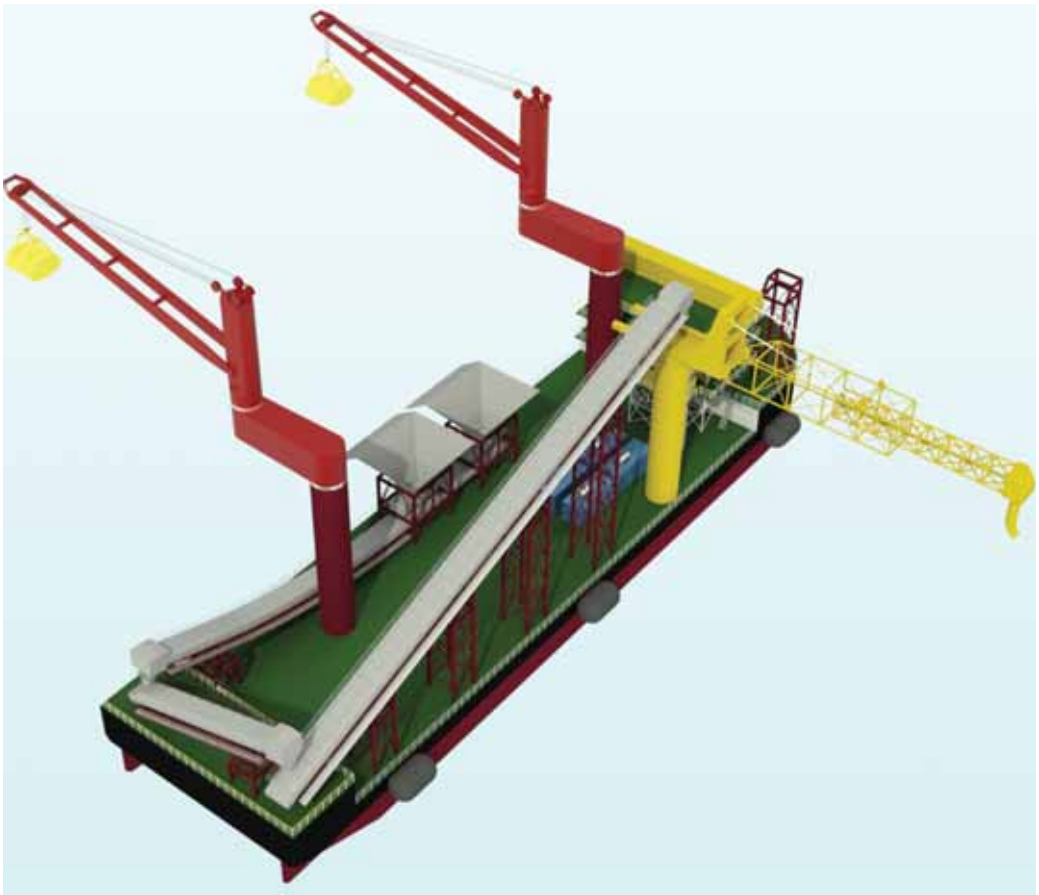
Born as a spin-off of Coeclerici Logistics, Shi.E.L.D. Services provides a complete range of services for the logistics and transshipment sector, including feasibility studies, definition, and development of the most suitable logistics solution, vessel design, supervision of new-building construction and vessel conversion, technical, crew and operational management. The headquarters is in Milan with a branch office in Balikpapan (Indonesia).

Shi.E.L.D. Services is currently the technical and crew manager of five transshipment vessels in Indonesia, owned by major mining and shipping companies in East Kalimantan, and of one transshipper in Guinea.

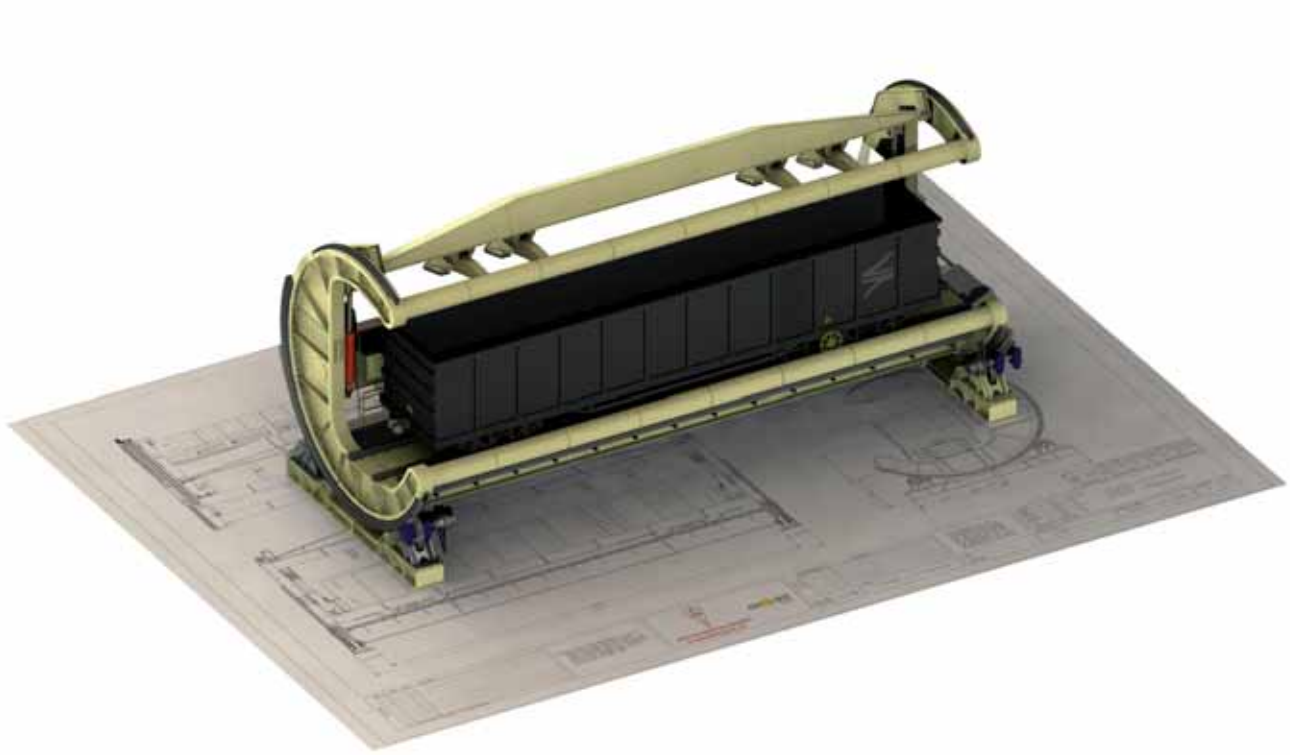
Recent contracts are the design for LDPL, a subsidiary of Louis Dreyfus Armateurs, for the conversion of a Supramax vessel into a transshipper and the feasibility study for Dynamic Mining for the exportation of bauxite from Kamsar, Guinea.

Shi.E.L.D. Services also works for RINA Consulting on a logistic project in the Middle East for the importation of coal for a newly built coal-fired power plant.

Shi.E.L.D. Services is the winner of the prestigious International Bulk Journal Awards 2019 in the 'Bulk Logistics Excellence' category.

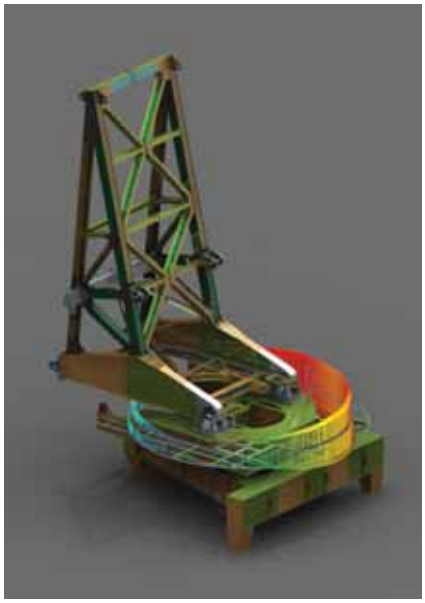


Turnkey projects a speciality of Nine Dot Solutions



Nine Dot Solutions is a consulting engineering firm specializing in mechanical and structural design and analysis, mainly focusing on bulk material handling solutions. Nine Dot offers the following services:

- conceptual, mechanical and structural designs;
- structural and mechanical audits to relevant structural codes;
- upgrades and refurbishments of bulk material equipment, including conveyors;
- failure investigations;
- stress/strain measurements and data interpretation;
- 3D laser scanning of structures as well as data conversion;
- bulk material flow analysis; and
- slew bearing analysis;



In terms of equipment and technological solutions, Nine Dot makes an effort to stay up to date with the latest technology in order to provide its clients with the highest quality deliverables. It therefore makes use of the following equipment to generate accurate engineering inputs:

- 3D laser scanning – FARO Focus S70 Laser Scanner
- wireless stress and acceleration measurements by means of Lord Microstrain Wireless Hardware.

Nine Dot constantly evaluates new technology to expand its service offering based on specific client requirements.

The company prides itself on the use of the latest software, and makes use of the engineering and evaluation software detailed below to complete all services from detailed design, analysis and detailing. It has maintenance contracts in place with all software suppliers to ensure that it has access to all the latest versions of the software in use.

- Siemens NX – Modelling, FEA and Manufacturing Drawings;
- Solidworks;
- Prokon for structural evaluations;
- Faro Scene and Polyworks for scan data registration, evaluation, and conversion; and
- Bulk Flow Analyst, for all bulk material flow analysis.

Case studies

Structural/machinery designs

Nine Dot has completed structural designs for the MMD Africa semi-mobile crushing stations operational at Exxaro Grootegeluk. The Nine Dot scope of work included tender preparation, structural designs, and detailing.

Nine Dot completed the complete mechanical and structural re-design, including a capacity upgrade for the Port Elizabeth Manganese Terminal. The project included the redesign of two reclaimers, two stackers and two shiploaders. During the process the throughput capacity of the export side of the terminal was upgraded from 750tph (tonnes per hour) to 1,250tph, which required upgrade of 40-year-old structures to safely accommodate the upgraded capacity.

Nine Dot completed a detailed design of a C-Frame tippler structure, which was manufactured and installed by ELB at the PPC Herculus terminal in Pretoria. The tippler design included a hydraulic moveable side beam and clamp assembly, which allows for the safe tipping of any 80-tonne wagon in the client's wagon fleet.

Nine Dot furthermore completed the detailed structural designs for two rapid train loading stations for ELB.

Lastly, Nine Dot is finalizing a detailed design for a patented open-top bulk ISO

container tippler, and plans to have the first unit operational within the next year. The system is unique in the way it effectively turns containerized bulk operation into a tippler operation, by reducing the container turn-around times to less than two minutes and therefore significantly reducing wagon turnaround times.

Bulk material machinery audits

Nine Dot has conducted multiple independent structural audits of mobile bulk material handling machinery, such as stacker/reclaimers, shiploaders, ship-unloaders and trippers of various suppliers and are typically conducted to ISO 5049-1, FEM 2.131 / 2.132 or FEM 1.001 or specific client requirements.

The purpose of the audits are to either determine whether a new design will comply with client requirements and achieve the required life and throughput, or to determine whether existing older designs have any areas that must be addressed to extend the life of the structures or operate safely.

Nine Dot assisted the Richards Bay Coal Terminal to develop a remaining structural life and replacement strategy which was successfully followed to identify and estimate structural risks and remaining life of the ageing equipment, procures and audit replacement equipment, and safely retire and break down the aged equipment upon the successful commissioning of the newly installed structures. This complete process was implemented without any unplanned production losses.

Nine Dot is in the process of completing all engineering designs to refurbish three stacker reclaimers, with the purpose of extending the structural life for another 30 years. During this process all structural weaknesses were identified by means of a detailed Finite Element Analysis, and where required, structural upgrades and re-designs were completed. This included the retrofitting of outdated mechanical bucket wheel drives with new generation hydraulic drives to reduce the structural loading on the aging structure.

Equipment capacity increases

Nine Dot is in the process of completing a detailed conveyor throughput study for RBCT, whereby the capacity of current conveyors are increased by changing the belt idler angles and increasing the belt speeds.

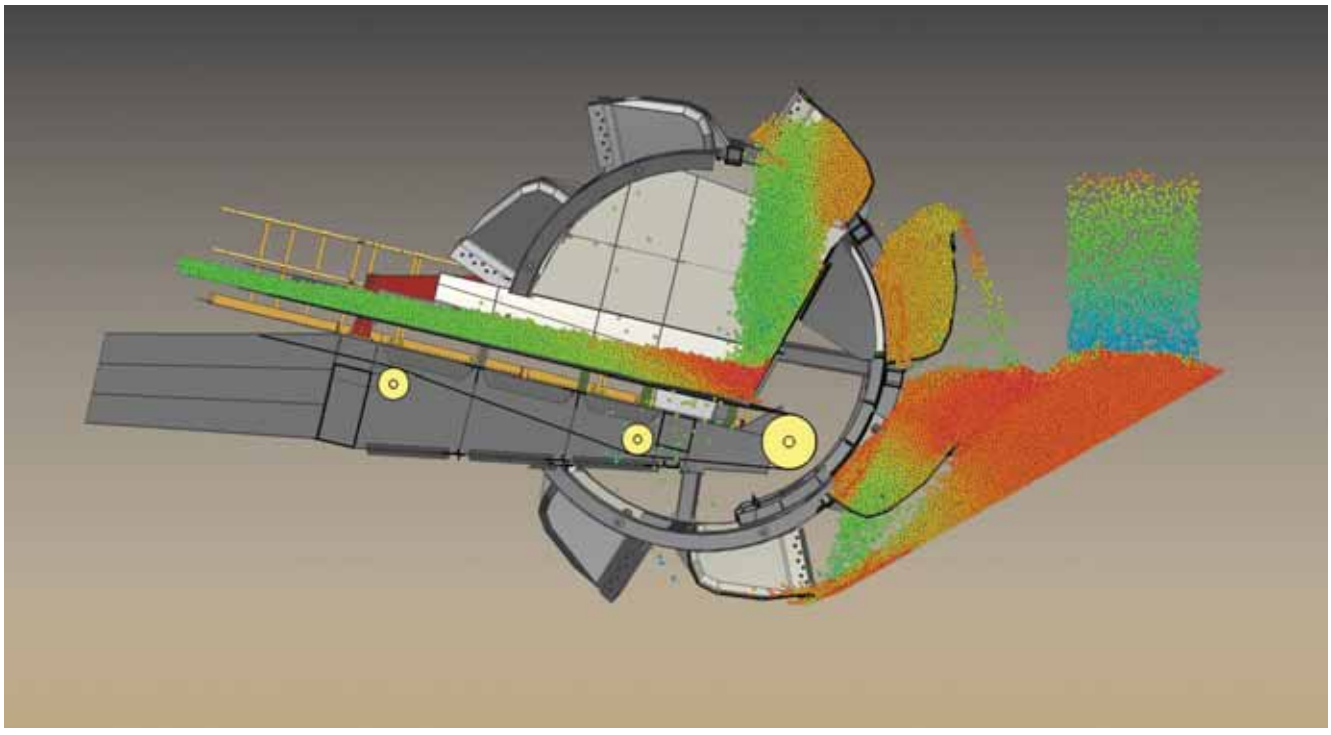
This is being done while evaluating the required conveyor powers, dynamic effects as well as structural loadings. The conveyor support structures and components are also evaluated by means of a detailed Finite Element Analysis, to ensure the upgraded conveyor capacity can be safely accommodated. To ensure the accuracy of the engineering inputs all structures were verified by means of 3D laser scanning and model comparison.

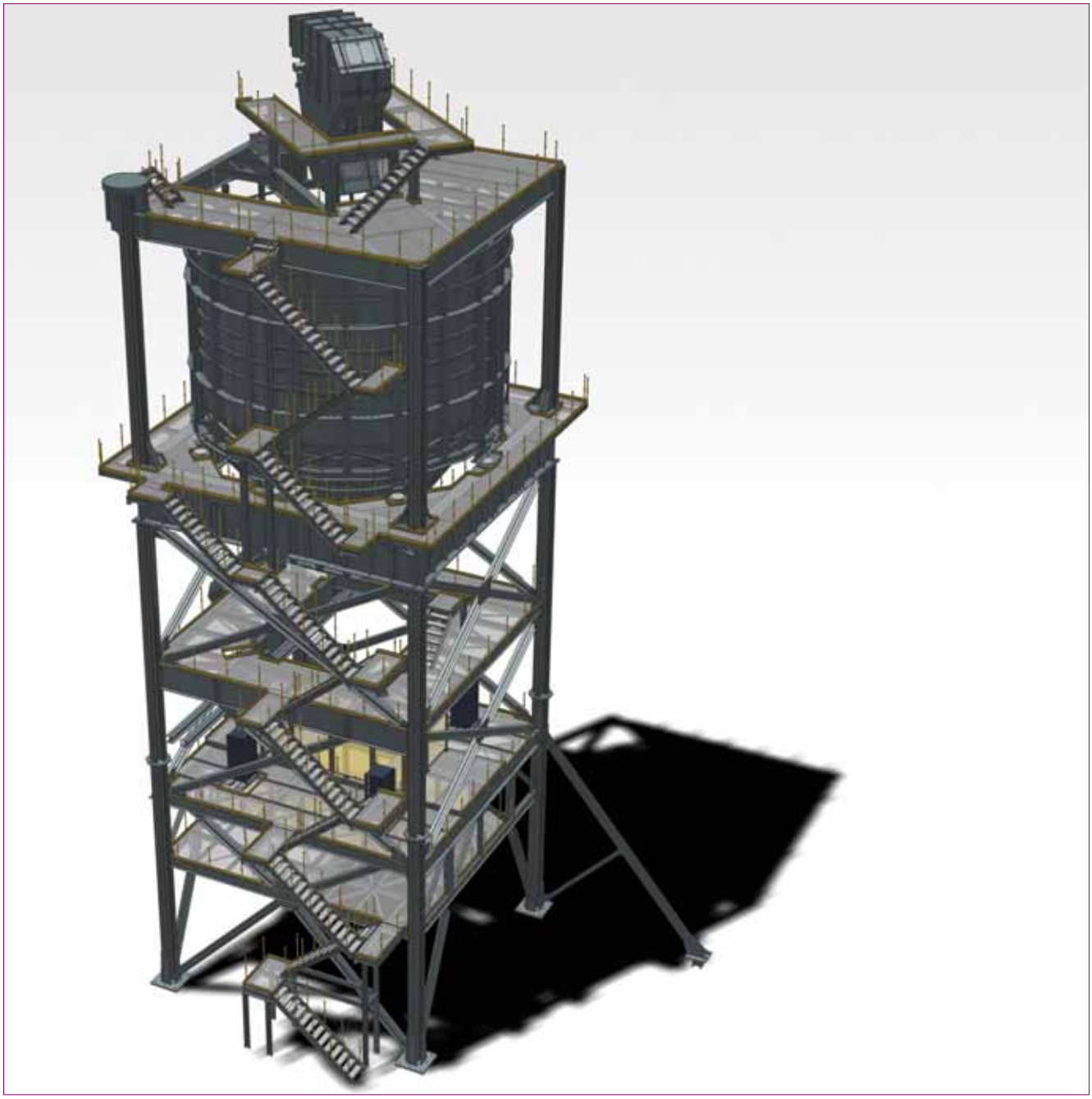
Client base

Nine Dot has a stable client and supplier/partner base. Most of its projects are for repeat clients, but it does regularly receive new enquiries.

The companies with which Nine Dot works regularly include:

- PPro Engineering (Manufacturing and Installation);
- LSL Consulting (Engineering support);
- HYTEC / Bosch Rexroth South Africa (Hydraulic Design and Supply);
- Physmet (Metallurgical Analysis);





- Dynamika (Conveyor Design and Analysis); and
- Roland Engineering (Gear Design)

Major clients for Nine Dot include:

- Richards Bay Coal Terminal;
- Transnet;
- Exxaro;
- Grindrod; and
- Pindulo VDM.

Remaining competitive in the market is a top priority for Nine Dot, and it does so with the quality of its work and services. Nine Dot has vast experience to draw upon with regards to works on general bulk material handling equipment such as stacker/reclaimers, shiploaders, trippers and wagon tipplers. This is supplemented by using class-leading analysis software and always looking for ways to implement new and efficient technology without sacrificing quality. Internal processes are also not bloated, and as such total project costs can be kept lower by eliminating overheads associated with larger engineering houses.

Most of Nine Dot' projects are for clients in South Africa, but it has also successfully completed projects for clients in the UK, USA, India, Sierra Leone as well as Mozambique. The company is always exploring new opportunities as well as the range of services that it offers.

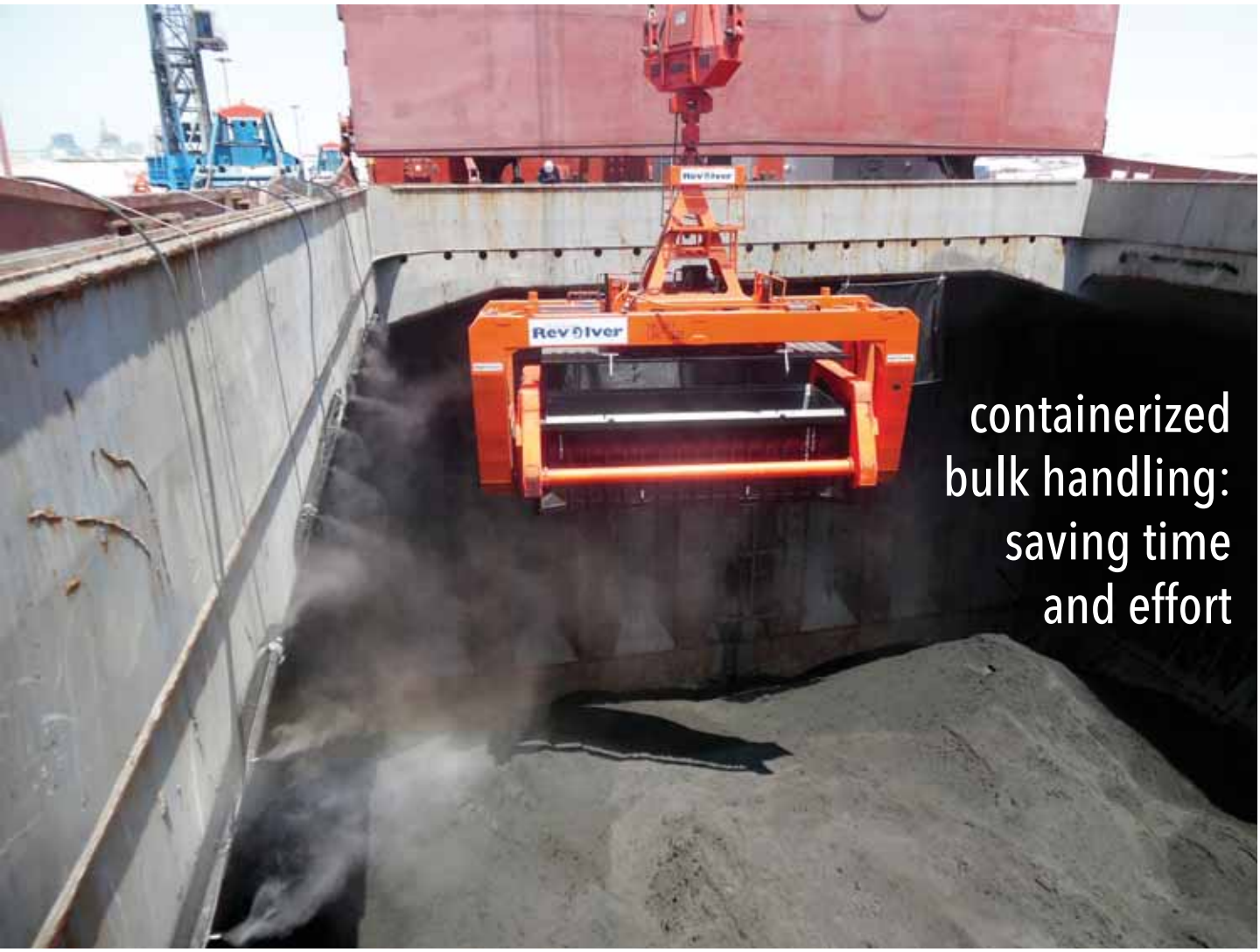
Life in a time of crisis

The Covid-19 pandemic is causing ripples around the world. Nine Dot is fortunate, in that the nature of the services it provides, as well as its network-based software licences, means that all of its engineers have been able to continue with their projects while working remotely. The company mainly makes use of Microsoft TEAMs and e-mail to communicate with its clients and no real business interruption has been experienced. Where required, Nine Dot' engineers did provide on-site engineering as well as manufacturing support, while following all of its clients' specific Covid-19 requirements.

Planning for the future

Nine Dot plans to expand further on the current operational model of working remotely as well as through internet based communication, as this will allow it to more effectively deliver services to clients in other countries. It is of the opinion that the quality of service delivered by Nine Dot, making use of world-class software solutions, means that it will be able to compete in the world market due to the exchange rate differences. DCi

The case for containers



Containerized bulk handling for the mining industry

Conventional shipping containers have been used for decades in the movement of bulk cargoes, *writes Joel G. Shirriff, P.Eng., Global Practice Lead, Terminals & Transportation, Ausenco.* This practice takes advantage of discounted shipping rates associated with the need of shipping companies to reposition empty containers from American ports back to Asian manufacturers. Historically, the loading and discharge of bulk cargoes from standard containers has been time-consuming and labour intensive. While advances have been made recently in self-discharging liner systems for containers, this concept is useful to smaller volumes of specialty materials, and not easily applied to large scale operations due to low handling rates and high costs.

A new option for bulk handling

Mining operations will typically move their finished products to market in bulk. While overseas export on bulk carrier vessels will always be more cost effective than in shipping containers, the use of modern containerized bulk handling technology offers some unique opportunities to optimize the upstream transportation system from the mine to the port site terminal facilities. The containerized bulk system utilizes specially manufactured open top containers with a removable rigid lid, which allows the boxes to be easily filled with bulk cargo from the top with mobile equipment or an automated loading system. The real innovation for this system comes in the discharge of cargo from these containers as a specialty spreader is used to pick the box up, remove the lid and in one motion spin the container on its long axis 360° to dump the cargo to the side. These containers are built with no internal ledges or stiffeners and painted with a high-release coating to ensure that 100% of the cargo (even if it is wet or sticky) is discharged during the rotation.

No bulk terminal — no problem

The primary application of this system is where the containers are loaded at the production source (mine), moved to and stored at the port site, then discharged directly into the open hold of a bulk carrier vessel using the rotary spreader.

The use of this equipment in this fashion provides a very simple and low capital option for moving bulk cargo to export

without the need to develop a conventional bulk terminal logistics option. The containers and the rotary spreader remain mobile assets that provide flexibility to temporarily move the operation to another location, or to have multiple destination options. The equipment can even be leased to reduce capital investments, and for short term operations the equipment can be sold to another operation.

Why use bulk containers?

Aside from the obvious benefit of saving significant capital investment in bulk terminal operations, there are several other reasons to use a containerized bulk system.

The containers themselves provide an extremely flexible storage option to provide segregation between different grades of cargo at the mine site, at the port site or any intermodal facility in between. The locking lids provide security against theft of valuable commodities in transit, and — since the cargo remains sealed in the containers until they are discharged into the ship — contamination and quality issues are eliminated. Conventional open top bulk haul trucks use tarps or hinged lids to contain dust, which don't always seal and can spill the full load if a truck has a roll-over. The bulk containers are fully sealed, eliminating dust emissions while the cargo is in transit by truck or by train, and the lids will stay in place even if dropped on their side.

Logistics system integration

Most mining project developers do not want to be the 'first on the block' to try new technology and, while this system has been proven in many locations around the world, its use is selective and often met with some apprehension. To address these concerns, Ausenco works with the separate equipment vendors as the overall 'logistics system integrator' to ensure that the containerized bulk system is implemented efficiently. This includes considering multi-modal transportation options, making use of existing infrastructure and simplifying the process. The company's holistic 'Mine to Market' approach to the transportation of product from source to destination offers its clients significant value through innovative customized logistics solutions.

Multi-modal case study

A great example of this is the logistics system for the Las Bambas copper mine in Peru, where Ausenco provided an integrated solution that incorporated the benefits of containerized bulk handling into a conventional bulk terminal logistics system.

The original mine development plan expected 1.5 million tonnes of copper concentrate to be moved by open truck over 700km from the mine site at 4,300m above sea level to the port to a new third party bulk terminal being constructed to service multiple mines in the area. Ausenco was contracted to optimize the logistics system and, after assessing several options, recommended that a containerized system be implemented where custom containers are loaded at the mine and trucked 420km to a trans-load facility; here, they are moved onto trains for the continued trip to the port where they are discharged to the conventional bulk system for storage and loading onto ships. This concept was further refined using dynamic simulation modelling to validate the number of trucks, containers and railcars required. The final system was commissioned in early 2016 and established itself as the benchmark for how copper concentrate can be efficiently handled in Peru and Chile.

The new standard for metal concentrates

Modern containerized bulk handling systems offer a safe, efficient and environmentally friendly alternative to conventional bulk handling. The challenge to its application is not just buying the equipment, but developing an integrated logistics solution that is optimized for the geography, existing infrastructure and the specific commodity. Ausenco specializes in providing unbiased advice and delivery of integrated logistics solutions, which includes the implementation of containerized bulk systems. The company's application of a containerized bulk logistics system has been a critical element to improve the financial results in several recent base metal mining studies with concentrate production, and demonstrates the value of a Mine to Market solution.

About the author

Mr. Joel Shirriff is the Global Practice Leader (GPL) for the Terminals & Transportation engineering and consulting capability within Ausenco, a full service multi-discipline consulting and EPCM service provider with a focus on the mining and transportation sectors. He has over 30 years of experience in design, management, and execution of marine bulk terminal construction projects. As part of his consulting practice, he focuses on services to optimize existing facilities, applying his personal experience in managing issues around safety, environmental protection and operational efficiency in multi-modal transportation and ship loading operations.

Liner Filler makes container perfect for bulk transport

Van Beek screw system makes 20ft containers ideal for bulk transport

Twenty-foot equivalent (TEU) containers are in many cases ideal for bulk transport. Their square shape makes them efficient in terms of use of space and they are easy to transport by truck, rail or ship. There was however one disadvantage: how can you fill a container quickly? If this question has held you back from using these containers, read on. There is now an answer.

80–85% filling in half an hour

Van Beek — a specialist in the transportation of bulk materials, notably screw conveyors, as well as other systems — has developed its Liner Filler for fast loading of bulk goods into 20ft containers. It fills a container to over 80% in less than half an hour.

For this, the container is fitted with a container liner; a big bag that lines the inside of the container. Container liners can only be filled via a relatively small hole at the back of the container and that has held lots of logistics companies back from transporting their bulk goods in this way. They simply had no means of filling the container liners quickly.

Reliable and cheap

Thanks to the Liner Filler a reliable, cheap and efficient solution is at hand. The operation is as easy as it is efficient. The machine is a horizontally mounted screw conveyor with an open underside. The inlet can be round or a hopper.

It is filled from a silo, Dino bulk truck loader, shovel, belt or screw conveyor. The installation can as an option be fitted with wheels so that a fork lift truck can move it.

Operation

The liner filler is elevated. A truck with a 20ft container drives backwards towards the liner filler and pushes the opening of the container over the screw until the screw is fully inserted into the container.

As soon as the screw is inserted into the container, the loading process can begin. The cargo falls through the open underside of the screw first into the back of the container and forms a heap there. As soon as it reaches the height of the screw, the cargo automatically falls further forwards in the container. At the end of the screw a filling detector is fitted so that the user knows for sure that all the space in the container is utilized and the screw stops in time.

Proved in practice

The Liner Filler has proved itself in practice for loading pellets (plastic granules), powders (such as flour) and flakes.

About Van Beek

Van Beek is a specialist in the area of screw conveyors. The core activities of the company, set up in 1939, consist of selling, designing and manufacturing screw conveyors. Van Beek customizes every screw conveyor. The company has over 35 employees.

Van Beek is a niche player. The organization specializes in high quality customization of stainless steel screw conveyor systems and it delivers them worldwide. More than 80% of production is exported. Van Beek also manufactures a separate line of bulk truck loaders. Under the trade name Dino, Van Beek is the global market leader in this equipment.

BULK FLOW adapts its Tiltless Liner System to unloading free-flowing and hard-to-flow bulk products from containers

The Tiltless Liner System® from BULK FLOW is a revolutionary, containerized bulk handling system that takes on the key issues with hard-to-flow products so they can be easily transported in 20ft, 30ft, 40ft, 45ft, 48ft, 53ft or 60ft containers.

With the development of an electronically-controlled, mechanical, and horizontal bulk unloading solution, this new game-changing system helps bulk producers minimize the handling, transport, and storage needs of hard-to-flow bulk solids. The Tiltless Liner System® changes existing bulk market rules.

Who should use the Tiltless Liner System?

The Tiltless Liner System is designed and developed to load and unload all kinds of hard-to-flow commodities in containers by:

- large shippers and receivers of high volume hard-to-flow bulk commodities; and
- logistic companies who want to offer more value-added services to their bulk shipping customers.

Containerized transportation of hard-to-flow bulk commodities is an interesting, cost-efficient possibility.

The Tiltless Liner System is an ideal solution.

Potential users of the system should ask themselves these questions:

- does your company have problems transporting hard-to- flow products in sea containers?
- do logistics costs make you uncompetitive in certain markets?
- could unloading hard-to-flow products without the need of a tilting device help your bulk handling protocols?
- would improvements to the loading and unloading protocols make your processes more cost-effective?

If the answer to any of these questions is yes, then the Tiltless Liner System could be the idea answer. It makes it possible for

users to:

- reach international markets;
- become extremely competitive;
- standardize unloading processes;
- considerably reduce transport and packaging costs; and
- reduce CO_2 footprint by less packaging, fewer movements, fewer trucks on the highway.

Top benefits of using the Tiltless Liner System

By using the Tiltless Liner System, it is possible to eliminate tilting devices from operations, and to ship hard-to-flow products in this revolutionary bulk handling system. The Tiltless Liner can help improve operational efficiencies and gain competitive advantage in export markets. Specifically:

- it allows for direct silo-to-silo deliveries;
- eliminates transloading; and
- tilting equipment not required.

Automated System

The Tiltless Liner System includes its own PLC internal control system, completely adapted to the customer's needs. It is user-friendly with graphic representations and high-efficiency process automation.

Includes:

- hardware and software;
- set up;
- training and technical support; and
- proprietary interface.

Additional benefits:

- tracked productive processes; and
- reduced management and time costs.

Bulk case study

Recently, the Tiltless Liner System has been further investigated, and BULK FLOW has carried out a 1:10-scale trial which showed that it would be possible to unload a cargo of 25 tonnes of polyethylene (PE) from a 40ft container.

Usually, polyethylene is loaded and transported in bulk in 20ft DV containers. BULK FLOW has studied the possibility of loading PE in 40ft containers with a total payload of 25 tonnes.

Using the Tiltless Liner System, the low angle of repose of the PE and its free-flowing nature makes the unloading process very easy with the Tiltless Liner System.

BULK FLOW recommends implementing the Tiltless Liner System with PE in 40ft containers to achieve 25-tonne payloads. The consignee can also use the container as a temporary silo unloading the PE when needed.

About BULK FLOW

BULK FLOW is the world's only supplier of a revolutionary Tiltless Liner System®. The company believes that everything is customizable, so its solutions are tailor-made with the needs of the customer in mind. BULK FLOW wants to change the bulk material handling world. Business ethics are a high priority, and the company always preserves privacy and confidentiality with customers, suppliers, and partners.

BULK FLOW has dedicated the last 13 years of operations to developing bulk handling equipment and packaging for solids and other substances that are hard-to-flow.

BULK FLOW offers innovative solutions and customizes for the needs of chemical, mining and agricultural industries. It specializes in reducing transportation costs for clients by increasing load capacity and improving technical processes.

As well as the Tiltless Liner System®, BULK FLOW offers a wide range of other bulk handling equipment, including:

- **for bulk loading:** screw conveyor loaders; telescopic belt conveyors; and pneumatic loaders.
- **for bulk unloading:** tiltless unloading hopper; straight mass flow hopper; tilting tractor truck; mobile unloading rotary valve; and mobile blower package.
- **for bulk packaging:** tiltless liner (patented; film liners; belted barless moisture barrier HDPE film liner; fluidizing liner system (patented); Single Bar Liner®; Barless Liner®; standard woven liner; containment liners; thermal liners; grain doors; 30° intra-European container liner; 53ft intermodal container liner; over the road trailer van liner; and rail wagon liner.

Rotatable containers – the key to a successful emptying operation

Australian company Container Rotation Systems (CRS) is renowned for its container-emptying system, which offers an efficient solution to the problem of unloading bulk from containers.

This is a concept that is gaining in popularity worldwide, and is in use internationally handling cargoes of vastly different properties, from alumina to coal.

CRS offers a range of customized solutions — among these are its rotatable containers, which work alongside the Rotainer® range to offer optimum emptying of dry bulk cargoes including: coal, zinc, copper, mineral sands, aluminium, iron ore, sugar and grains. Recently, CRS has added a further rotatable container to its already wide portfolio — the 2,900mm 10ft.

CRS's Ezzelid is another innovation, which offers a range of benefits. The Ezzelid is simple and maintenance free, and is available with various lock options. The Ezzelid is fitted to an open container, effectively sealing it and preventing dust emissions, as well as protecting the cargo from the environment. It also has benefits in terms of security, if the cargo is stored for any length of time. When the Ezzelid is used on one of CRS's rotatable containers, and is inverted using a Rotainer, it automatically falls open and releases the cargo contained therein, obviating the need for any complicated lid-opening devices.

The Ezzelid can be used on any container, from 1,450mm half-heights to 2,900mm high cubes. It improves cycle times and equipment reliability.

Containerized for cost effective global delivery

Using systems from CRS guarantees:

- latest Tier 4 engine technology;
- diesel hydraulic — electric hydraulic;
- extremely low noise emissions — perfect for confined space environments;
- high visibility for efficient connection to containers;
- can be used on STS cranes, mobile

40ft high cube 2,900mm Rotorcon container: perfect for lighter cargoes

CRS has also developed its Rotorcon 40ft high cube 2,900mm container (pictured). This is being marketed as the 'multibulker®' 2900. The container also has a rear door so it is certified for 360° rotation by any container rotator and can also be end tippled by a tipping Skel.

This container will be focused on light products such as woodchip, biomass, waste and so forth.

There are various lid options available for use with the multibulker® 2900, including hard lids, soft lids and plastic lids.

Eurospec 38 can achieve up to 38 cycles per hour, resulting in a capacity of 1,200tph (tonnes per hour).

- **zinc:** for zinc, the Rotainer® Eurospec 38, with the CRS low-profile headframe, is ideal. It can be set up for 1,450mm half heights, and 1,800 three-quarter heights. Both are available with automated lid lifting, and can be used in combination with a mobile harbour crane.
- **copper:** for copper, CRS's Rotainer H.D. heavy duty 360 unit can be used. Each container carries a load of 32 tonnes, and the Rotainer HD can handle generic 2,200mm containers. The CRS

harbour cranes, portal cranes, ships' cranes and reachstackers.

The company is now offering customized solutions for a range of specific commodities, optimizing operations for the use — each commodity has different properties and behaves in a slightly different way.

The commodities served include:

- **coal:** for coal, CRS has developed its Rotainer® Eurospec 38, with rotating headframe. Each container carries a load of 32 tonnes, and the Rotainer®

automated lid lifting is helpful, and the unit can be operated using a Gottwald mobile harbour crane, or similar.

Also for copper, CRS can handle 1,900mm heavy duty containers with flat lids and automated lid lifting. The unit has a low-profile head frame, and direct connection.

The Rotainer HD can also handle heavier 2,200mm (38 tonnes gross weight) containers, also with automated lid lifting. This unit is diesel-powered, and can work with, for example, a Liebherr mobile harbour crane.

- **mineral sands:** for mineral sands, the Rotainer HD is ideal in combination with a mobile harbour crane It can handle 2,200mm generic half-heights for 32 gross weight, and can be modified to include the CRS automated lid lifting system.
- **aluminium:** for aluminium, the Rotainer Eurospec 32 is perfect — for more challenging conditions, this can be equipped with CRS's arctic pack for ship's gear.
- **iron ore:** CRS's Rotainer® HD 360 comes into its own when handling iron ore. Container capacities of up to 32 tonnes can be handled, and the unit rotates at 35 cycles per hour, offering a capacity of 1,120tph using one ship-to-shore crane.
- **sugar:** for sugar, the Rotainer® HD 360 is again a good choice, With three ship-to-shore cranes, handling containers of 38 tonnes, it can achieve 350 cycles per hour and a capacity of 2,700tph.
- **grains:** for grains, the Rotainer® Eurospec 38 with low-profile headframe is popular. It can handle 32 tonnes per container, with 35 cycles per hour in combination with a mobile harbour crane.

Pioneering the zero-loss handling supply chain with RAM Spreaders

RAM Spreaders is a pioneer of containerized bulk handling — the zero-loss handling supply chain.

In a traditional supply chain, the cycle includes: shiploading; unloading the cargo from the ship using a grab crane, and depositing it in a hopper; moving it from the hopper to the stockpile — often by conveyor; piling it on the stockpile; unloading from the stockpile to load the a train or truck; and transporting the product to the port.

The whole process can be time-consuming and environmentally challenging. Companies are now seeking ways to reduce levels of contamination, and the container bulk handling (CBH) process offers an excellent solution (see graphic, right).

The containerized bulk handling process.

Bulk handling solutions

There has been a noticeable increase in conventional container terminals handling bulk (with the CBH system) to remain competitive with other terminals.

The **RAM Revolver** is a sustainable containerized bulk system that can flexibly integrate with existing port infrastructure, prevent product loss/contamination and boost productivity. The containers are specially manufactured for rotation with a lid to seal the product. The RAM Revolver locks on the container with Twistlocks, then removes the container lid and rotates the container to empty the bulk cargo. The RAM Revolver can be attached to all types of cranes.

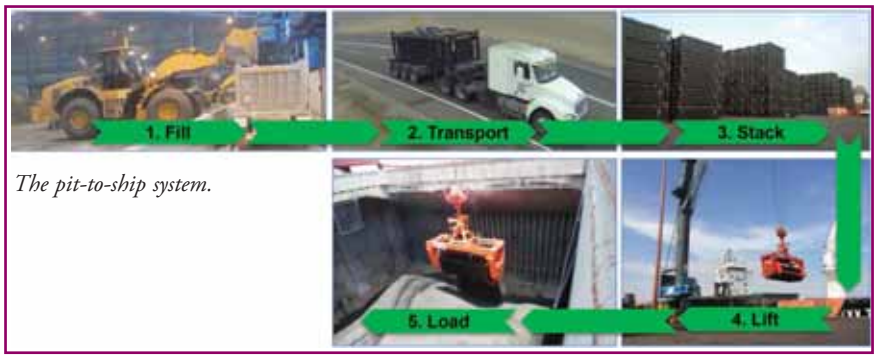
The **Tilting Spreader** is a low-cost system suitable for the transshipment of products that have a high flowability. The spreader can also be used as for traditional handling of 20ft containers. The Tilting Spreader is cable of transitioning from unloading bulk products to handling single conventional 20ft containers. It is designed for mobile harbour cranes or Jib cranes.

Technical details of the RAM Revolver and the Tilting Spreader follow later in this article.

The RAM Revolver and Tilting Spreader are used in a range of systems to simplify cargo operations: the pit-to-ship; pit to shed; internal shed to ship; external shed to ship; pit to shiploader; and ship to hopper (import).

CBH applications

Over the years, the RAM Revolver has shown how it can adapt to any port infrastructure for importing or exporting commodity.



The pit-to-ship system.

The pit-to-shed system.

RAM Revolver was original designed for 'Pit to Ship' operations and for container terminals. Now it is being used for multi-purpose and bulk terminals and various methods:

Type of operations (export):

- PIT to SHIP
- PIT to SHED
- SHED to SHIP
- PIT to SHIPLOADER

Types of operations (Import):

- SHIP to HOPPER to MINE.

These operations show the different types of CBH that have been developed to show how flexible the system is to fit in with any type of shipping terminal.

The **pit-to-ship system** offers a simple and effective way to move bulk cargoes (see graphic, right). The only equipment needed at the port is a RAM Revolver and a misting system (for example, from Blue

Water Misting) operational within the ship's hold to eliminate dust emissions. The mine/bulk producer needs: ISG containers; ISG lid lifters; and skeleton trailers.

In the pit-to-ship system, the benefits include:

- container is used as transport, storage and loading;
- secure and safe end to end — no contamination in or out — cargo integrity;
- sampling can be performed at the yard;
- no need for fixed bulk and shiploading facilities with the use of current berth;
- it is possible to leverage existing port equipment such MHC, STS, RS and ship cranes;
- fast loading rates depending on crane and number of rotating spreaders; and
- portable and expandable.

The **pit to shed system**'s benefits include:

- containers are used as logistics — easy to fill, transport and handle;
- it takes advantage of an existing terminal with warehouse and shiploaders;
- containers can use various forms of transport modes.

The **internal shed to ship system**'s benefits include:

- no need for conveyor belts and shiploaders;
- fast short loop with five to ten containers;
- maximize payload in-terminal;
- clean operation compared with conveyors and grabs;
- barge to ship option; and
- use containers as temporary storage in barge to ship operation.

The **external shed to ship system**'s benefits include:

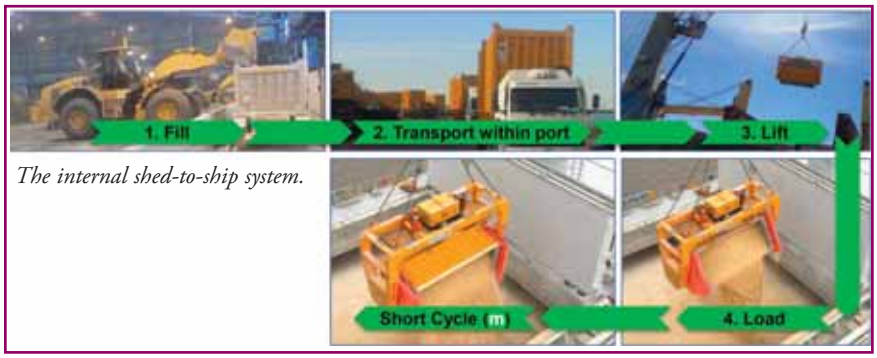
- container used for transport and loading;
- no need for conveyor belts and shiploaders;
- small container buffering allows for full load capacity at dock;
- no truck congestion at gate while loading vessel;
- small fleet of truck and containers required;
- safe and secure if shed is within community.

The **pit to shiploader system**'s benefits include:

- latest version CBH export;
- no warehouse or open stockpiles required;
- fast and seamless operation; and
- containers can serve as storage prior to feeding shiploader.

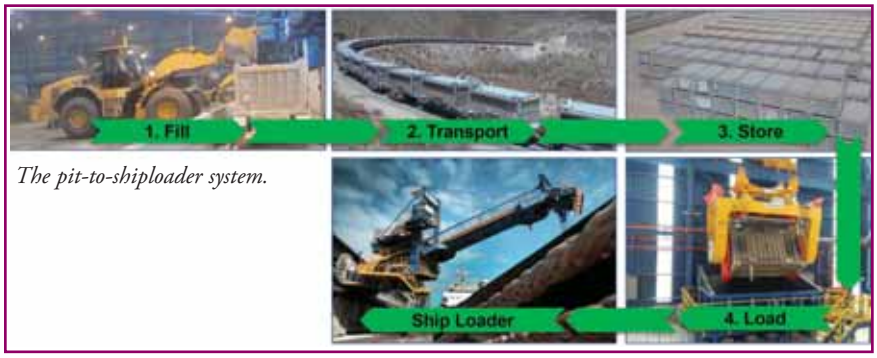
The **ship to hopper system**'s benefits include:

- containers as logistics from dock to anywhere;
- no contamination throughout the logistic process;
- no loss of material;
- can use various modes of transport;
- newer grabs can fill one full 20ft container in one cycle; and
- cargo integrity.



The internal shed-to-ship system.

The external shed-to-ship system.



The pit-to-shiploader system.

The ship-to-hopper system.

The RAM Revolver — technical features

Features

Heavy duty Revolver (for mobile harbour cranes and ship to shore cranes). Up to 44t SWL (safe working load). Tare weight up to 15.5 Tonnes to provide heavy duty robust all fabricated steel structure.

Light duty Revolver (for ship cranes and reachstackers, bridge cranes). SWL of 35t. Tare weight as low as 8.5 tonnes.

RAM provides a **RAM Revolver designed for each application** instead of one-size-fits-all — e.g. STS; MHC; ship crane, reach stacker, bridge crane.

RAM will provide a **tailored solution** if the customer requires an MHC RAM Revolver to fit other applications e.g. STS or reachstacker.

Containerised Bulk Handling

with RAM Revolver

- ✓ Efficient
- ✓ Cost Effective
- ✓ Fast to Market

Containerises the bulk
No contamination, No loss of commodity

Full 360 degree rotation
Expelling all commodity efficiently

Heavy duty construction & components
Robust single unit design

For all types of crane & commodity
MHC | STS | Ship Crane | Bridge Crane | Reach Stacker

RAM SPREADERS
www.ramspreaders.com

The RAM Revolver.

Floating Twistlocks

- allows lateral and longitudinal movement;
- whereas fixed Twistlocks (which are common in competitor models) are prone to jamming; and
- if jamming occurs, operational efficiency impacted.

Large guides

- ensure quick and easy landing;
- can pick the containers direct from the trailer;
- do not require special landing apparatus; and
- they support the container during rotation, preventing sheer load on the Twistlock.

Hydraulic grippers

- Hydraulic gripper installed in large side guide to grip the mid-way of the container during rotation this also prevents a shear load on the Twistlock.

Slew drive assemblies

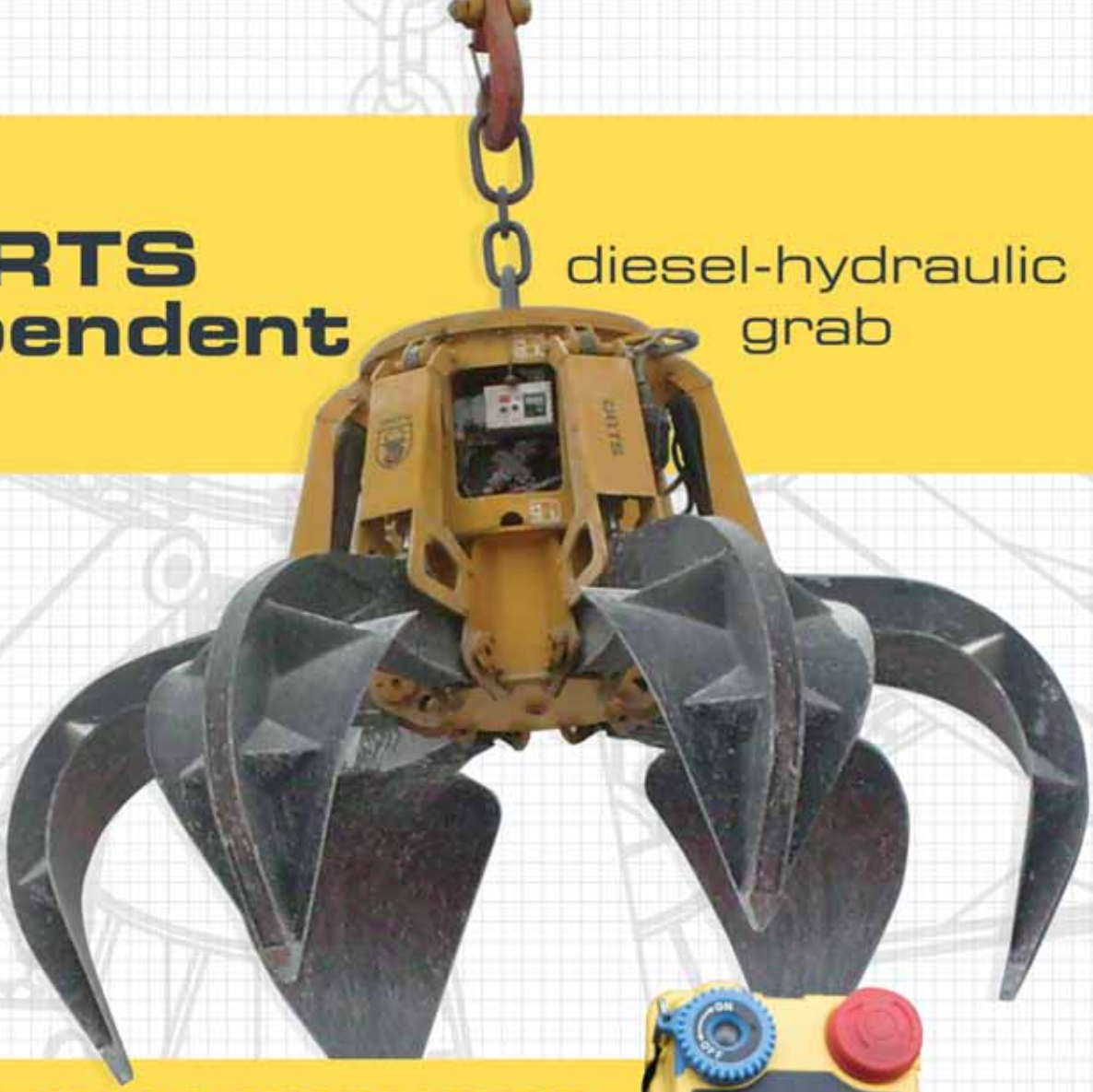
- utilizing slew ring and two slew drive gearboxes with hydraulic motors at each end to provide high torque rotation.

360° rotation (both directions)

- 360° rotation essential for mineral concentrates which have a high moisture content and sticky, ensures all commodity is expelled from container;
- bi-directional rotation which assists in

ORTS independent

diesel-hydraulic grab



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Germany

made in Germany
since 1972

trimming the hatch.

Lid Lifter
- semi-automatic process.
- four Twistlock pin point design.
- allows containers to be sealed shut until the unloading process.

Misting system
- compatible with the Blue Water misting; and
- provides a mist barrier to prevent any fugitive dust escaping the hatch.

Single unit

When the Revolver is delivered, it arrives as a single unit ready for use. Some manufacturing companies opt for a 'flat pack version' delivery, which involves bolting the equipment together on site.

From previous experience of manufacturing flat pack equipment, RAM Spreaders has found the system of delivery to have issues with strength, stability and misalignment of the completed frame when put together.

Tilting Spreader — technical features

- the Tilting Spreader used for handling bulk from 20ft containers can also act as a conventional single lift spreader;
- designed for mobile harbour cranes or Jib cranes;
- electro-hydraulically powered which control the ISO floating Twistlocks, sliding posts, tilting posts, and flipper drives;
- a tilting post on a sliding carriage provides the right tipping angle for product to pour from container;
- a gated arm at the end can be included to open a hatch at the rear of the container.

CBH benefits

Product quality
- protected from contamination as container lid is sealed shut from mine to ship;
- maintains the product value; and
- product is not re-handled and there is no degradation to products like wood pellets or petcoke.

No product loss
- lid is sealed shut; and
- during the re-handling of product during the logistic process then a percentage of the product is lost. This loss can be substantial over 500K tonnes per year times the product per tonne value.

Product protected from theft
- lid can be sealed and locked; and
- the container can be tracked by GPS.

Ability to blend minerals
- minerals can be blended; and
- containers can be sampled at the mine and then loaded in a sequence to the ship to blend the material.

A flexible system
- integrate with any port infrastructure or logistics type;
- this can be implemented in as little as six months; and
- 'Cost effective' benefit.

Improved storage at sea ports
- conventionally, commodities are openly stockpiled, using a lot of space;
- the CBH system increases the material stored per square metre, by stockpiling containers on top of containers;
- allows multiple commodity types to be stored separately without cross contamination; and
- 'efficiency' benefit.

The Revolver can act as a fast contingency
- the commodity can be stockpiled for the arrival of the ship as a buffer; and
- 'efficiency' benefit.

Dust plume prevention
- Revolver lowers the container at the

Tilting spreader in operation.

bottom of the hatch and then rotates the container gently through 360°;
- done at the bottom of the hatch to prevent dust plume; and
- 'environmental' benefit.

Improves environmental footprint
- with the commodities being sealed shut until unloading, this prevents dust escaping or the product seeping into other eco systems; and
- 'environmental' benefit.

Expanded market opportunity for conventional terminals
- allowing conventional terminals to handle bulk expands their operations, increases revenue and throughput; and
- 'business' benefits.

Provides shipper and countries a faster route to markets
- using existing infrastructure allows for a faster route to market; and
- 'business' benefits

Shows a good ethos for the environment
- 'Environmental Best Practice' by protecting the environment and commodity from contamination.
- 'business' and 'environmental' benefit.

CBH References

RAM Spreaders currently has examples of its containerized bulk handling systems in operation in all six continents.

They are especially popular in: Australia, South Africa, DRC (Congo), Mozambique, Mauritania, Saudi Arabia, Bahrain, Oman, Turkey, Latvia, Bulgaria, Georgia, Russia, Argentina, Chile, Peru, Bolivia, Mexico, Cuba, USA.

Commodities handled include:

Iron ore, iron pellets, magnetite, manganese ore, pet coke, coal, copper, zinc, lead, wood pellets, wood chips, potash, urea, soya, grain, rice, sugar,

CBH can handle any type of bulk product as the containers are tailored to suit the product type, density and payload.

Staying competitive

RAM Spreaders retains a highly competitive position in the market by having different designs to suit the application of the customer's equipment

It also works closely with potential clients to show how the CBH system can flexibly integrate into their port infrastructure (in a small-time frame and without unnecessary costs) to boost productivity.

An excellent example of the company's flexibility is a contract for Puerto Mejillones. Recently, Puerto Mejillones adopted two RAM Revolvers for bridge cranes to feed a shiploader direct from the bulk terminal.

In short, once the shipping vessel has docked, the containers, which are stacked at the port side, are transported by truck to the port's warehouse. There, the containers will be lifted in by the Revolvers and emptied into the terminals 'hoppers', which feeds the commodity into the ship.

This solution not only improves environmental standards, boosts productivity but also allows the port to blend commodities and take samples before it enters the ship. This is just one way how the RAM Revolver flexibly integrates into the port's existing infrastructure.

With the Tilting Spreader, to remain competitive, RAM Spreaders is applying its 50 years of experience to maximize customer's bulk unloading productivity.

Moreover, to solidify its relationship with customers, RAM Spreaders aims to provide exceptional customer care before and after delivery. Its support services are there to provide help and guidance throughout the service life of the machine.

About RAM SMAG Lifting Technologies

RAM SMAG Lifting Technologies has been manufacturing spreaders since 1972 for nearly 50 years. The head office is based in Germany and the company is an integral part of Group SMAG.

RAM & PEINER SMAG provide the full range of crane lifting attachments from, spreaders, tandem headblock, grabs, RAM Revolver, tilting spreaders, pipe handling spreaders.

RAM SMAG Lifting Technologies is a global company with offices in Germany, Singapore, UK, India, China. It benefits from a global network of local sales & service representatives. RAM carries out all design/manufacturing in-house and does not subcontract.

Quality systems in place include: ISO 9001, ISO14001, ISO18001, ISO 3834-2, EN1090-2. DCi

USA Engineering

Bulk handling equipment design, manufacture & expertise

Remote Controlled V-500 S creating a massive barrier of atomized mist on the South side of the dock.

Jay Venter

Port of Coeymans upgrades to HKD Blue dust-suppression equipment

Carver Companies — the owner of the Port of Coeymans — can load, discharge and tow just about anything. Its safe and efficient operations, as well as a strong commitment to environmental stewardship have contributed to its continued success and growth in the maritime industry.

This particular facility handles project cargo, break-bulk, and dry bulk products. Dry bulk discharge operations are dusty by nature, and to better control fugitive dust emissions, the company purchased an HKD Blue V-500 S dust-suppression unit to improve the air quality, efficiency and safety of the operation.

HKD Blue V-500 S dust suppression unit mitigates fugitive dust emissions during bulk material discharge.

The unit is mounted on a tower on the South side of the berth. As cranes discharge material into hoppers, dust can escape and migrate with the wind (typically coming from the North). With the Geyser atomizing nozzle, the elevated V-500 S projects a 300ft atomized mist barrier, preventing the dust emissions from bothering the nearby marina.

If the wind shifts directions and comes out of the south, the port utilizes a mobile, self contained V-500 GT equipped with a 91HP John Deere Diesel Powered Generator.

About HKD Blue

HKD Blue's water-atomizing dust suppression technology was born from its parent company, HKD Snowmakers, a pioneer and leader in the snowmaking industry.

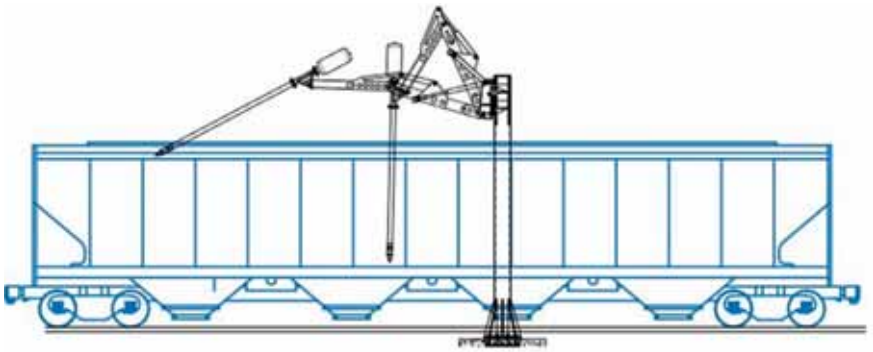
Because HKD Blue knows that every job is different, its team strives to provide local knowledge and industry expertise to help customers execute a dust control or particulate matter (PM) emissions strategy that fits the site's dynamic conditions.

This process includes a customized Dust Control Compliance Strategy that examines relevant local, state, and federal regulations in conjunction with the specs of customers' site to make recommendations based on what they is needed to follow and protect all workers.

The V-500 GT mobile dust suppression unit prevents dust emissions from travelling off site on the northern portion of the berth.

HopperPopper case study: wireless control to speed up hopper unloading

Working with HydraForce and Power Systems, Pneumat System's high-tech truck and railcar unloading system, The HopperPopper, logs data and allows for remote software updates and support. This system is in use at truck and rail unloading terminals across the United States, Latin America, and beyond, helping operators unload soybean meal, dried distillers grains (DDGs), and other difficult product from truck and railcar hoppers safer, faster, and easier.



The Pneumat Systems HopperPopper is a hydraulically driven blast probe that uses a "pop" of compressed air to loosen grain or soybean meal that has become hardened in a railcar or semi-truck hopper.

The wireless control system monitors air and oil pressure, oil flow, probe distance and angle, and more parameters.

Challenge

Unloading bulk materials from railcar and semi-truck hoppers can be especially difficult when meal or grains harden and refuse to flow.

To loosen bulk materials, many methods have been tried — vibrators, scrapers and mechanical impact devices ranging in size from hand held to large hydraulic and air-operated equipment. Some of these devices can be dangerous, costly, or time-consuming to use. Some can even damage the hopper, railcar or truck, if used improperly.

Strategy

Pneumat Systems has developed a faster, safer way to speed hopper unloading by combining the technologies of hydraulics, pneumatics and telematics in a new device called the Hopper Popper. Hydraulics, including SP10-47 four-way proportional valves, are used to drive the blast probe down into the hardened material. Compressed air is used to safely 'fluidize' the material, enabling it to flow, while minimizing potential damage to the hopper and vehicle. Use of telematics, wireless control, and communication with various sensors via CAN bus provide precise motion control. Working with Power Systems, the fluid power distributor, Pneumat was able to configure the Hopper Popper using CODESYS software to log data and enable remote software updates and troubleshooting. Power Systems recommended adding a HydraForce ERAU-6200 Remote Access Unit to the existing hardware to enable this remote access.

Result

Using telematics and remote access had been done before by Pneumat, using a remote Windows PC and an additional telematic device. However this was expensive and took a long time to set up the CAN bus messaging. With the ERAU-6200, telematics and remote access are built in. "The Hopper Popper is used across multiple countries and the software, as with any sophisticated machine, can be continuously improved. Traditionally, software updates and customer support would require a trip to the field by an engineer or field technician, but with the ERAU-6200 it can now be done remotely. HydraForce has provided an outstanding solution for remote troubleshooting, telematics and minimizing service calls," said Cole Joos, Electronics Design Engineer at Power Systems.

About Pneumat Systems

Pneumat Systems was developed out of the need for a better, safer way to clean grain bins and bulk material storage vessels. Through common sense and keen insight into the needs of bulk material handling and storage facilities, founder Gene Nelson created BinWhip. From a small 1,500ft² facility in 1980, Nelson began making product for internal use, as a contract grain bin cleaning specialist.

Today, BinWhip has became the cornerstone of a product line up that includes equipment for restoring flow to bulk materials in railcars and semi trailers (Hopper Popper), loading railcars (RailSpreader), as well as automated solutions for material hang ups in

The operator uses remote controlled hydraulics to drive the probe down and loosen hardened meal in a hopper railcar (left) or truck trailer (right).

production line facilities.

Pneumat Systems continues to provide on-site solutions to bulk material flow issues through TeamPneumat, in addition to sales of products to bulk material handling and load-out facilities.

About Hydraforce

HydraForce was founded in 1985, just north of Chicago by several partners who had the foresight to identify the mobile equipment industry's need for high quality hydraulic cartridge valves and manifolds. Today, it's grown to several manufacturing locations in North America, Europe and Asia, featuring a worldwide network of 120 stocking distributors who can provide our customers with all the local support they need.

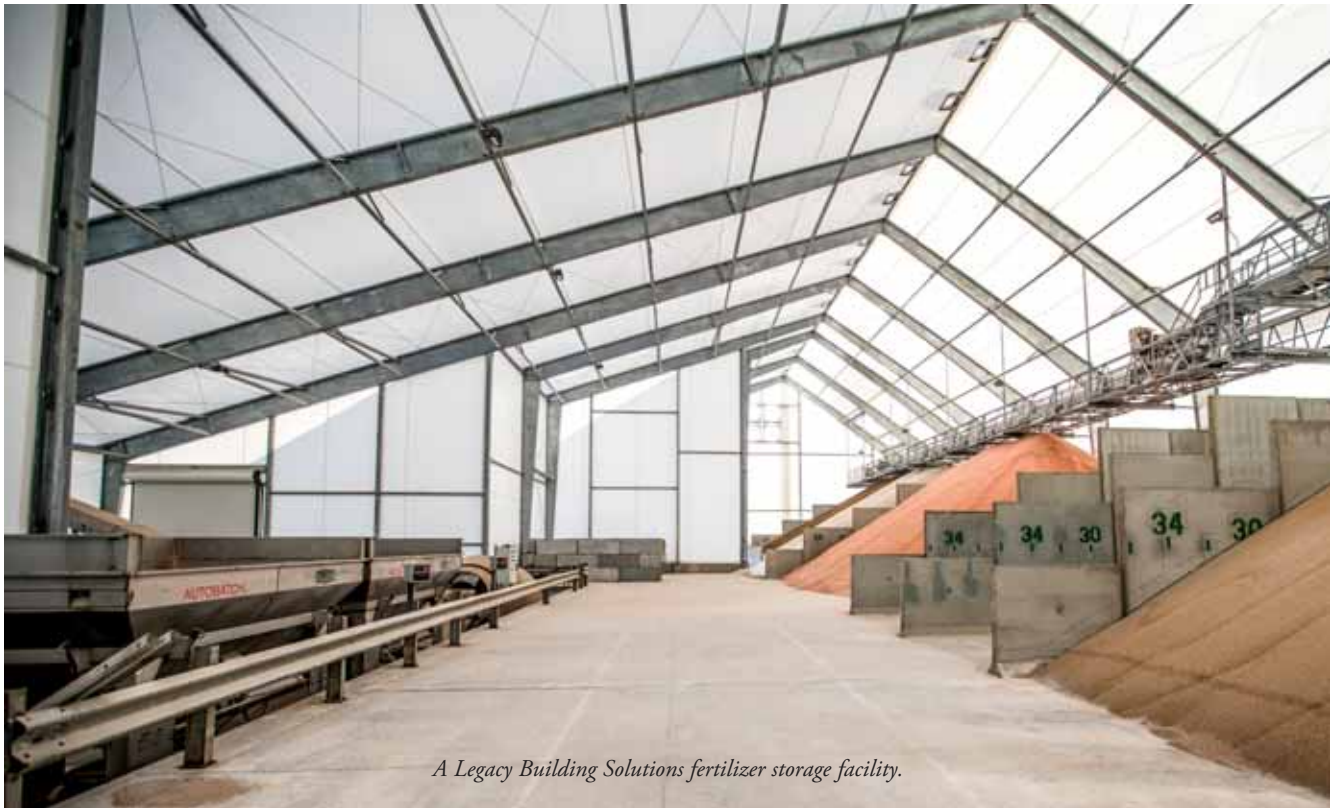
Three critical factors in fabric structure construction

Fabric structures, like any construction project, are a major undertaking. Before committing money, time and property, make sure you are making the most of your investment. Legacy Building Solutions, manufacturer of fabric structures worldwide, explores three critical factors that will help customers choose a high-quality fabric structure.

A Legacy Building Solutions.grain storage facility.

Fabric choice

One of the first choices is the fabric



A Legacy Building Solutions fertilizer storage facility.

membrane. The fabric type will determine the life span of the fabric, and it's one of the driving factors behind the building cost. An experienced fabric structure representative will guide customers toward the right fabric option based on project needs and budget.

The most common structural fabrics are PE and PVC fabrics ranging from 12 to 28oz. Each type of structural fabric has unique characteristics and advantages — as well as properties that must be accounted for during the manufacturing process. The fabric building manufacturer must have experience in the fabric chosen before construction begins.

Frame type

The fabric structure industry uses a wide range of frame options — ranging from simple hollow tubes to solid steel I-beams. The frame will dictate the building's capabilities. Simple frame options are best for small and/or temporary buildings, while rigid steel frames have unlimited design capability.

Fabric attachment

The fabric attachment method largely determines the strength, longevity and safety of the fabric structure. Stronger fabric attachment gives the fabric greater support in cases of heavy wind and snow loads. The fabric attachment method also dictates the ease of fabric structure repair in case of accidental damage.

There are two basic methods of attaching the fabric to the frame — with a single piece of fabric stretched over the entire building, called a monocover, or with individual fabric panels that are attached to each framing member.

Fabric pressure

Unlike steel sheeting, which creates an exoskeleton that structurally aids the frames, fabric places tension on the frames. This tension must be accounted for during the building's engineering — along with other pressures from hanging loads and other environmental factors such as wind and snow.

Properly accounting for the fabric pressure is part of the fabric structure engineering process. An experienced building design team will adjust properly for the fabric pressure, creating a longer-lasting, safer building.

Legacy Building Solutions' free white paper, *Getting Technical with Fabric Structures – How to Properly Design for Fabric Pressure, Proper Fabric Tensioning and Attachment,* is available for download from the company's website.

About Legacy Building Solutions

Headquartered in South Haven, Minnesota, with offices in Edmonton, Alberta, and Chile, Legacy Building Solutions designs, manufactures and installs fabric structures worldwide.

Each custom building is designed for maximum efficiency as sports centres, entertainment venues, commodity and fertilizer storage buildings, hangars, military shelters, mining facilities, salt and sand storage, oil and gas production, port and waterways storage, industrial work and warehousing, and other uses.

The company strives to create long-term and rewarding relationships by partnering with each customer to design a building that meets building codes, project specifications and the customer's unique needs. Legacy's in-house services allow it to provide faster, hassle-free construction in any location.

Legacy Building Solutions' free white paper, Getting Technical with Fabric Structures – How to Properly Design for Fabric Pressure, Proper Fabric Tensioning and Attachment, *is available for download from the company's website.*

Cambelt International Corp.

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CONVEYOR BELTS & SYSTEMS

Integrity. Quality. Competence. Stability.

At the core of **Cambelt International**'s conveyor solutions is our proprietary one-piece sidewall belting which achieves ultimate adhesion strength. Cambelt has set the standard for durability as all of our belts are a monolithic homogenous cured product – no gluing or vulcanizing. This proprietary technology is at the heart of all our conveyor systems which transport horizontally, vertical and horizontally in a single enclosed system. Our designs reduce transfer points and rotating equipment, while providing an industry leading footprint. Cambelt's most important asset is our employees; their dedication to work as a team with our clients to develop customized material handling solutions, delivering tailored engineered conveyor systems to solve each client's unique challenges.

Cambelt International Corp. 2820 West Directors Row, Salt Lake City, UT 84104

P: 1-801-972-5511

E: OEMSales@cambelt.com

www.cambelt.com

Transporting dry bulk from rail, truck or other low clearance discharge points

Cambelt's Scorpion™ line of transloading conveyors are designed for situations where it is impractical to have a fixed conveying system.

When it comes to handling dry bulk, cargo ports and freight yards are in constant motion moving bulk material between ships, railcars, and trucks. Cambelt designs fixed and portable unloaders and transloaders to maximize efficiency and minimize product loss and degradation along the way.

According to Jeremy Hengst, Vice President, Sales, Cambelt International LLC, what sets the company's products apart from competitors, like traditional trough-, screw-, and bucket elevators, is that Cambelt is vertically integrated — engineering and manufacturing its own proprietary conveyor belts and conveyors. "By being a vertically integrated conveyor solutions company, we are able to develop unique solutions to resolve our clients' material transport challenges. Engineering conveyor systems with our proprietary belts allows us to transport materials horizontally, vertically and back horizontally without any transfer points. Designing a system in this manner reduces the number of conveyors in operation while eliminating difficult transfer points, which can be dusty environmental concern areas," he explains.

Cambelt Transloaders: Small Footprint

Cambelt's Scorpion™ line of portable and self-powered transloading conveyors are designed for situations where it is impractical to have a fixed conveying system.

"Due to our propriety belt technology we are able to design conveyor systems with significantly smaller footprints," says Hengst. "For example, our Scorpion® Transloaders loading to discharge point range between 20-27 ft, which is less than half of our competitors' footprint. As transload sites become more compressed, Cambelt's Scorpion® Transloaders can help clients effectively unload in tight transload facilities where a longer conveyor can interfere with traffic patterns reducing overall facility productivity."

Another benefit of Cambelt's mobile conveyor systems is their low profile inlet, which requires only 5-inches (127mm) of clearance, providing unparalleled access underneath railcars or any low clearance loading situation.

These versatile units can be easily moved between various operating lines and are designed to center load railcars enabling them to have the reach to load whatever is required of them.

They are also environmentally friendly, as Hengst explains, "Cambelt systems have been engineered with dust tight enclosures, minimizing environmental concerns. This design has been at the core of Cambelt's history, as our conveyor housing is an integral part of our structure design of our conveyor systems. We have engineered our systems to minimize their exposure to the outside environment."

Range of Products Offered

Besides its Scorpion™ Transloaders line, other products offered by Cambelt are: sidewall conveyor belts, high incline & closed conveyor systems, dome reclaimer systems and its CamSpan Gallery enclosed overhead troughing belt conveyors.

Industries Served

"We are a material handling company," says Hengst, "We specialize in transporting dry bulk materials. Our core business is built around our expertise in conveying dry aggregate materials.

"We work with some of the largest international companies as well as small regional clients throughout the USA, serving industries like agriculture, cement processing, chemical processing, construction and dry bulk cargo handling among others," he adds. "We are working diligently to develop solutions that address and resolve customer pain points to improve their plants efficiency and operation. "

About Cambelt International LLC

Situated in Salt Lake City, Utah, USA, Cambelt has been in business for over 60 years and at the core of its technology is its unique and patented one-piece flexible sidewall conveyor belting. Its proprietary belt design provides a structurally stronger material that can be transported up steep angles including vertical inclines.

In Cambelt's custom engineered press, CamBelt, CamWall, and CamFlex conveyor belts are produced with the base belt, the sidewall, and the cleat or nubs moulded together to form a homogenous belt with unsurpassed durability and achieving ultimate adhesion strength. Furthermore, the company guarantees that its rugged, one-piece, homogeneously cured products will not delaminate.

Cambelt proudly designs, engineers, manufactures and assembles all of its products in the USA.

On a micro-scale Hengst believes Cambelt's core strength is in the team approach to solving customer challenges. The team approach in the workplace has provided the added benefit of "leveraging experience from engineering, manufacturing, field service and operations to developed customized conveyor systems, to solve our clients' unique material handling challenges."

Speaking about the current Covid-19 pandemic, Hengst says the company took early steps and gave non-manufacturing employees the option to work remotely, while they reinforced social distancing with its manufacturing team members. He adds "We are fortunate to have a diverse client base, where some are experiencing tremendous growth throughout the crisis." The company has been maintaining constant communication with its clients and is working with each to accelerate some projects, while putting others on hold until their operations return to a more normal operation. And this has clearly been the right move, as Hengst explains, "The response has been fantastic and our customers are happy to have an alternative to the traditional screw or bucket elevator technologies while having a partner working together to solve their day-to-day material handling challenges.

Conveyor belts: mechanical fasteners or a vulcanized splice?

Conveyors are one of the key components to making any aggregate, mining, recycling, or any facility handling bulk materials run efficiently and successfully, *writes Aaron Gibbs, President of ASGCO®.*

As we all measure ourselves and try to improve our Total Cost of Ownership (TCO), the decisions we make to maintain our plants are critical to improving these metrics. When it comes to the critical issue of belt splicing, there are two primary options to consider: mechanical fasteners or a hot vulcanized splice.

A mechanical fastener is a fastening system that uses steel/metal hinges or plates, that are installed using bolts, rivets, screws, or a series of staples to fasten or attach the fastener to the conveyor belt.

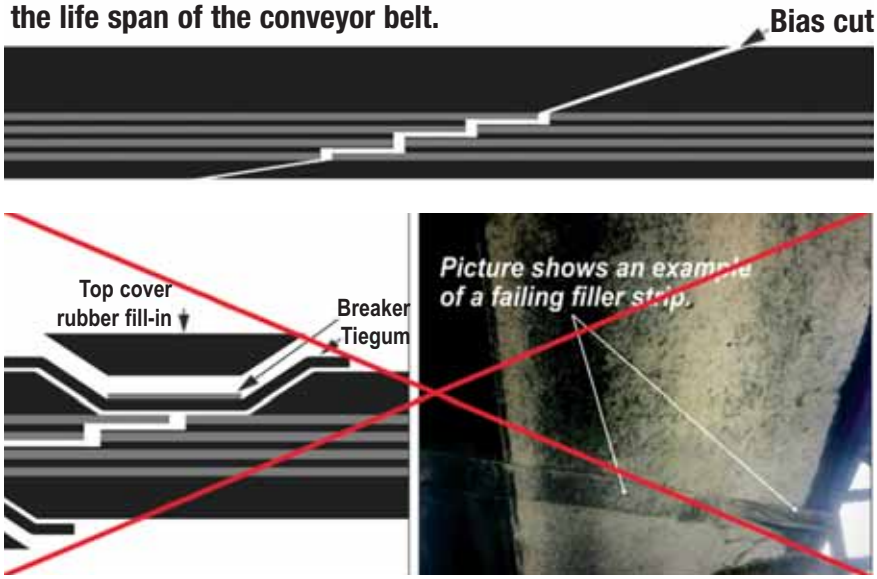
While one of the main benefits of a mechanical fastener is the low cost to install, the downside of mechanical fasteners is the entire load/burden is on a very small portion of the belt. The methods to installing these different types of fasteners involve cutting or tearing the belt's fabric to install the fastener through the belts' carcass. This alone causes the splice to be weaker than the rest of the conveyor belt.

When a conveyor belt 'runs-off' due to mistracking, misalignment, or some other unforeseen reason, the odds that the mechanical splice will either get 'hung-up' or 'pulled-out' or a side of your conveyor belt gets ripped off are pretty high. Also the constant banging of the mechanical fasteners over the idlers, pulleys, and belt cleaners will not only drive your eardrums crazy, but also cause premature wear on all the components they come into contact with.

A hot vulcanized splice is the process of chemically bonding two conveyor belt ends together through the application of uniform heat and pressure. A conventional fabric belt splice consists of two belt ends stepped down and overlapped together. The ends are shaped like matching ends of shallow steps, making a 'seam-less' style splice.

Pictured is a failing mechanical splice.

A proper splice can make all the different for the durability and the life span of the conveyor belt.



A 'seam-less' splice eliminates the highly problematic filler strips of other vulcanized splices.

The primary advantage of a vulcanized splice is that the hot vulcanized splice is nearly as strong as the original belt, which results in longer conveyor belt life and, because of that increase in reliability, conveyor belt downtime is reduced. The

Picture of a completed "Seam-less" splice after being removed from the vulcanizing press during and overland belt installation.

long term strength and durability of a vulcanized splice is unmatched by any type of mechanical fastener.

What are some of the other benefits of a vulcanized splice?

Cleaner: A vulcanized splice is smooth as the top cover of the conveyor belt itself. By having a completely smooth top cover, without metal fasteners helps provide better sealing and won't prematurely wear your skirting in the load zone areas. Vulcanized splices are much 'friendlier' to belt cleaners, as a vulcanized splice won't damage your belt cleaner blades, which will help the belt cleaners do a better job at cleaning the conveyor belt, reducing carryback.

Quieter: Hot vulcanized splices don't have any metal in them and therefore the splice is as quiet running as the rest of the belt.

More efficient: A vulcanized splice allows the conveyor belt to wrap around smaller diameter pulleys than a mechanical fastener.

Reduces maintenance: A vulcanized splice should last the life of the conveyor belt versus a mechanical fastener that might have to be changed out several times before the life of the belt is reached. A splice failure in the middle of production not only stops that conveyor, it stops them all.

Conclusion

In summary, there are a number of advantages of vulcanized splice versus a mechanical fastener. The hot vulcanized splice has more strength, less tracking issues, less spillage, and fewer carryback problems.

Because of that, the conveyor belt and conveyor components will have a longer useful life as a valuable asset to you and your company.

TABLE 1: COMPARISON CHART

Mechanical	Fasteners	Vulcanized Splice
PIW Strength	50-80%	80-100%
Time needed to complete	1 TO 6 HOURS	6 to 12 hours, depending on application
Expected life	Short (25% belt life). Wears faster than the belt.	Permanent. Should last the life of the conveyor belt.
Metal Detectors	No	Yes
Material loss	Yes. Tape or no tape, material is lost through steel plate and hinged fasteners.	No
Belt damage	Yes. Holes, punctures, tears and cuts the fabric.	No
Advance warning of splice failing?	No	Yes. Signs of fatigue will show long before the splice fails.
Conveyor damage	Yes: Idlers, pulleys and belt cleaners.	No

ASGCO® "Complete Conveyor Solutions" founded in 1971 and headquartered in Allentown, PA is a manufacturer, distributor and service provider of proprietary conveyor and screening equipment and accessories that improve the safety and performance of bulk material handling systems.

About ASGCO®

ASGCO® is a diversified and innovative company with three major divisions that serve specific targets of the material handling industry. The growth of the company, over the years, is due to recognized improvements in the efficiency, safety and productivity of our customers operations. At ASGCO® we continue to strive to make the handling of bulk materials more efficient, safer, and more productive.

ASGCO® is expanding, building and moving to new facility in Nazareth, PA

ASGCO announced at the start of June 2020 that it will be expanding and moving its headquarters to a newly purchased and soon to be built operation in Nazareth, Pennsylvania. The company, which operates from Allentown, Pennsylvania, will be moving to Nazareth, Pennsylvania in the autumn of 2021.

ASGCO's most recent eastern Pennsylvania expansion involved the purchase of 19 acres and now is building a new facility to meet the growing demand for their products and services. The new facility will be 194,000 total ft^2, with 30,000ft^2 of offices, wellness, and training areas, and the rest dedicated to fabrication, manufacturing, assembly, distribution and service departments.

Construction of the new facility began in July of 2020 and is expected to be completed in the summer of 2021. The Allentown operations have been an integral part of the design-build team, with JVI Inc. serving as the project's general contractor and Alliance Architecture serving as the project's architect.

All 90 current Allentown and Nazareth employees are expected to move to the new building. While the relocation itself will not immediately result in any new positions, the company anticipates a 30% increase in personnel based on projected sales growth expectations.

Stacker/reclaimer recertification by Heyl & Patterson

Heyl & Patterson has been engineering bulk material handling solutions since 1887. In the early 1960s Heyl & Patterson shifted its focus to the exponential growth of the coal and iron industries. Heyl & Patterson identified the need for stacking equipment and started manufacturing stacker/reclaimers to aid in the effective management of coal and iron ore stockpiles.

Stacker/reclaimers are often ideal machines for terminals, coal yards or transfer sites dealing with the stockpiling of dry bulk materials.

With the ability to convey, stack, and even blend, a stacker/reclaimer is a versatile tool. With extensive experience, Heyl & Patterson engineers outdoor stacker/reclaimers custom designed to meet the specific needs of any site. Capacity requirements, yard limitations and environmental conditions are crucial factors in the design of a stacker/reclaimer. Customization of equipment is important to optimize the efficiency of the material handling process, as no two sites are quite the same.

Working alongside a site's operations team, H&P's engineers design booms that can span from 50 to more than 200 feet. The entire machine travels along a yard rail, which can vary in gauge dependent on customer requirements. Tailoring the design to the needs of the operator is crucial to the success of implementing new equipment.

Heyl & Patterson stacker/reclaimers can be designed with numerous optional features, including a collapsible tripper, which reduces the length of conveyor needed and the amount of chute work required to transfer coal. While Heyl & Patterson refers to its units as light to medium duty stacker reclaimers, as they process between 2,000–4,000tph (tonnes per hour).

However, they are heavy duty in terms of durability and longevity. Heyl & Patterson equipment often reaches lifespans measurable in decades. Heyl & Patterson installed its very first stacker for a steel mill on the shores of Lake Michigan circa 1966; stacking at 2,500tph and reclaiming at 660tph, transporting iron ore pellets from pile to blast furnace. A testament to the machines' endurance, this unit is still in use 52 years later.

In 1972 Heyl & Patterson fabricated a 4,000tph bucketwheel stacker/reclaimer, allowing for the stacking and reclaiming of

coal for an American based power plant. Today, more than 45 years later, this stacker/reclaimer is still operational and continues to stack and reclaim coal off the Ohio River. Although still in use, this machine had surpassed its useful life. Ageing coal yard equipment can be seen across the United States, with many plants lacking the capex budget to invest in new equipment.

Heyl & Patterson's solution to this predicament was to refurbish the existing equipment, bringing it back to life and improving its capabilities and efficiencies along the way. The refurbishment of this seasoned stacker/reclaimer involved the improvement of mechanical, electrical and structural systems.

After a thorough inspection and analysis of the existing machine, salvageable mechanisms and structures were re-conditioned for use within the new machine, providing a great cost saving to the end user.

Many of the machines critical components were improved, including a newly designed slew brake, and the addition of a new machine-mounted operator's cabin.

The new cab enables a single operator to govern all functions of the machine, including; luffing, slewing and travel, all while maintaining a bird's eye view. As coal build-up was identified as a problem with the existing machine, frames on travel trucks, equalizers and bogies, were all upgraded to an enclosed design where possible, to prevent spilled material from piling up on the flat surfaces on the refurbished unit.

The highlight of this recertification project was the electrical upgrades to improve automation. The original stacker/reclaimer was controlled using an Allen Bradley SLC500 PLC and hardwired relay control panels. The control system was modernized using an Allen Bradley ControlLogix PLC and PanelView HMIs in the operator cab and the electrical room. Ethernet remote I/O was utilized to reduce the amount of cabling required on the refurbished machine.

The field devices were updated to allow for expanded automation capabilities. The old machine was dependent on the operator to perform the stacking and reclaiming functions. New field devices (pile height laser, boom inclinometer, and a radar positioning system) were integrated during the refurbishment which allow the machine to automatically stack and reclaim material without operator involvement. With the new field devices, the auto stack/reclaiming parameters can be modified and adjusted to suit the specific needs of the site.

The newly commissioned machine is now in use. Its custom upgrades are suited to meet the requests of the end user. While the stacker/reclaimer maintained several of its existing structures and components, the stacker/reclaimer now operates as new with automation controls that bring an innovative set of functions to the machine.

Heyl & Patterson delivers a stacker/reclaimer that will be an asset to this site for decades to come.

Tandem dumper replacement project awarded to Heyl & Patterson

Heyl & Patterson has been awarded another engineering contract for a tandem rotary car dumper replacement project. The new tandem dumper will serve an iron ore facility located in Northern Canada. The project scope includes the replacement of a failing tandem rotary dumper, barrel and trunnions.

Heyl & Patterson has proposed its most robust, terminal-duty rotary dumper design, to replace the failing dumper. The end rings include 1" wrapper plates and 1" web plates for extended life.

The wrapper and web plates are manufactured with a full penetration weld for optimal structural strength. The rack segments attached to the end rings are machined for precision, as opposed to flame cut, and are shim-able which allows for easy alignment and precise rack-to-pinion backlash setting.

The new tandem dumper has been designed for continuous operation 24 hours a day, seven days a week, 365 days a year. The design of the unloader will promote high impact discharge, in conjunction with mechanical vibration to easily unload tacky material.

Heyl & Patterson's Field Service Team will be on site for pre-outage, outage, commissioning and training for the project's delivery in May 2021.

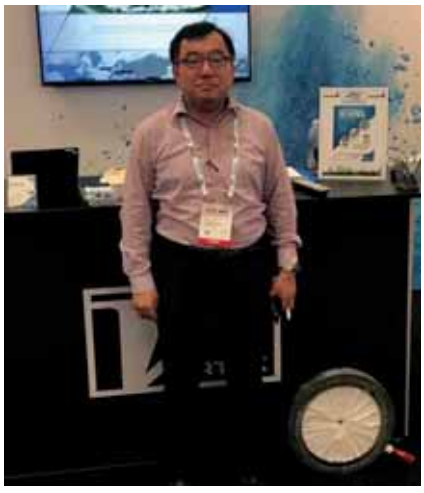
Vortex appoints exclusive dealer for South Korea

Vortex Global, a solids and bulk handling components company, announced on the 26th of June 2020 the appointment of TSP (Total Solution Provider) Korea as its new representative exclusive to South Korea. With this appointment, TSP Korea will be responsible for creating customer relationships, arranging site visits, and following up on Vortex customer inquiries received in South Korea.

TSP Korea was established in 1999 and known as HAN Corporation until 2013. The company is based in the Seongdong District of South Korea's capital city of Seoul. TSP Korea has an extensive background in food & beverage, pet food, animal feed and chemical related machinery. Its primary function is to ensure that the end user's preferences are met and to assist with the implementation of machinery and systems.

"The Vortex team looks forward to working with TSP Korea in the South Korean market," explained Laurence Millington, managing director at Vortex Global. "We are excited about the opportunity to provide South Korea with solutions for their dry bulk handling needs."

With the addition of Vortex Global's portfolio, TSP Korea can now offer its clients slide gates, diverter valves and loading spouts for handling dry bulk solid materials. BaikSoo Han will be the primary point of contact for Vortex's South Korean customers.



TSP Korea's BaikSoo Han will be the primary point of contact for Vortex's South Korean customers.

Cement case study: Laidig's unique hybrid reclaiming solution

One of the challenges of storing cement in large quantities is efficient handling of those materials out of the storage structure. When St Marys Cement evaluated options for their new storage projects, Laidig Systems, Inc. was able to provide them with an innovative solution.

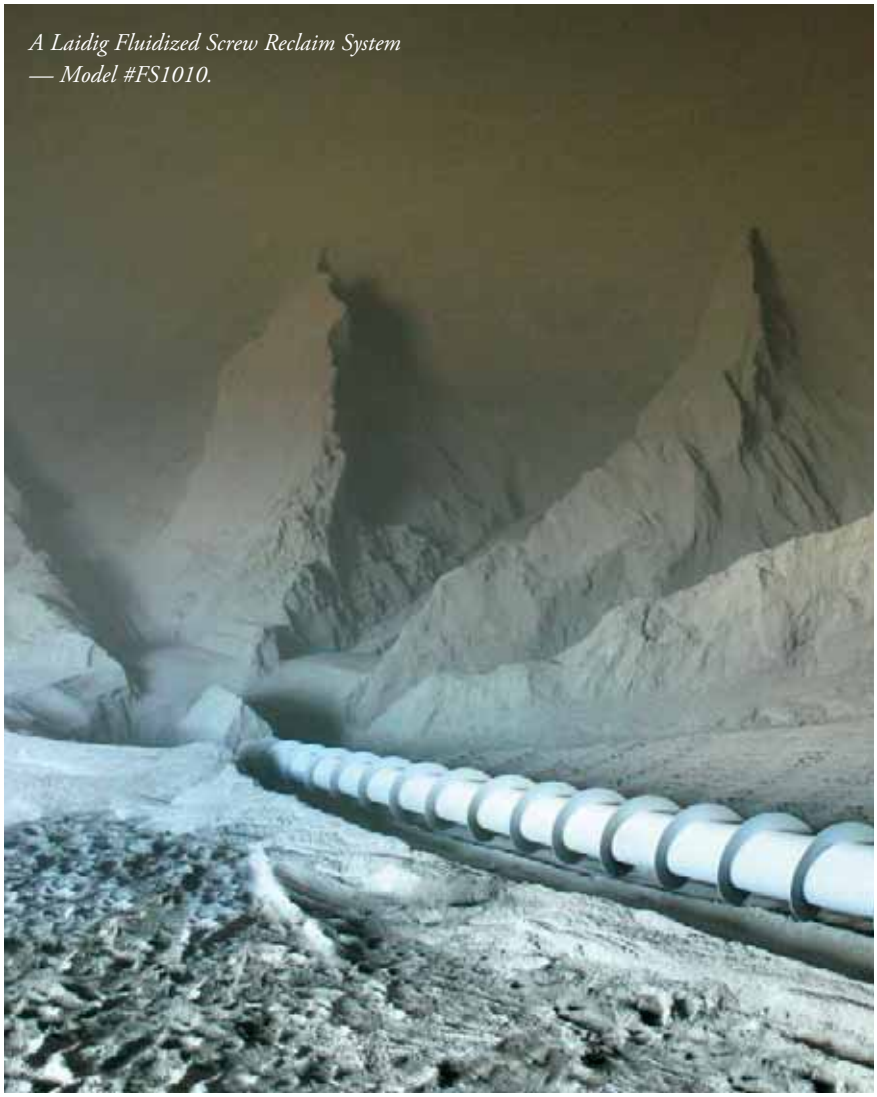
St Marys Cement is a manufacturer and supplier of cement in the Great Lakes region of the United States and Canada.

Headquartered in Toronto, Canada, St Marys is also a significant producer of concrete and aggregates to various markets in the region. The company is part of the North American operations of international building materials supplier, Votorantim Cimentos, based in Brazil.

For more than 100 years, St Marys has been contributing to new construction, modernization and infrastructure improvements around the Great Lakes. Today, the company has manufacturing plants strategically located to serve high-growth markets, with docking facilities in both countries to take advantage of efficient water transportation. This association allows them to achieve synergies and economies of scale, strengthening their ability to provide excellent service and top products to builders of all sizes in all of their locations.

There have been several traditional methods of reclaiming cement from large capacity structures. The methods vary significantly from the complete aeration of structure floors, to partial aeration with manual final clean out (using front end loaders), to large mechanical reclaim systems. All of these options offer advantages and disadvantages, which primarily involve overall cost, level of automation and safety.

Laidig Systems worked with St Marys and other cement companies to develop a unique hybrid solution that best fit the needs of the industry. After considerable research and development, Laidig manufactured the Fluidized Screw Series Reclaim System as a cost effective and automated solution to unload fluidizable materials in large capacity storage structures. Laidig's Fluidized Screw series offers superior performance and dependability for a wide range of fluidizable materials, such as cement, fly ash, talc, and other powders. The Laidig Fluidized Screw system is engineered to provide a fully-automated, near-total clean out while breaking up the hard pack and avoiding the dead zones.



A Laidig Fluidized Screw Reclaim System — Model #FS1010.

The Fluidized Screw Reclaim System was developed to satisfy the requirements of St Marys Cement, and in doing so, was engineered and manufactured with hybrid features that were paramount in the efficient and effective operation of their particular system. For St Marys, the Fluidized Screw Reclaim System was designed to meet their difficult material challenges and did so, along with some other key features: a fully automated system with dependable push button operation, a fully reversible sweep auger for maximum process flexibility, the ability to support storage diameters up to 164 feet (50 metres), the integration of an efficient air-gravity conveyor with a rugged mechanical screw reclaimer, and access to Laidig's lifetime technical support.

The Fluidized Screw Reclaim System that Laidig developed for St Marys incorporates the best of two proven technologies to solve their material handling needs. The Fluidized Screw Reclaim System is a hybrid reclaiming solution that integrates a rugged mechanical screw reclaimer with an efficient air-gravity conveyor system to unload and clean out the dome. This fully automated reclaim system provides the efficiency of air-gravity conveyors along with the ruggedness of a mechanical screw reclaimer. In this process, air gravity conveyors — which consists of an aerated center hub and radial spokes — reclaim a large percentage of the total stored material. A series of air slides are used to fluidize the floor and cleanout a portion of the material in the dome. The air slide system is comprised of radial air conveyors — designed like spokes on a bicycle wheel — extending out from the centre. The air slides operate sequentially around the dome — not all working at once — which reduces the amount of power to operate them, and reduces uneven loads on the dome and foundation. This process will reclaim approximately 80% of the stored material, leaving behind large pie-shaped piles of material between each air slide.

To ensure final cleanout, the Laidig FS1010 Fluidized Screw Reclaim System is then engaged to unload the dome, further

St Marys Cement Distribution Terminal – Chicago, IL.

break down the material, and clean out the remaining hard packed piles to complete the clean-out process. To assist in activating the air-gravity zones within the storage facility, the Laidig System provides an Intelligent Control System that sequentially activates the air-gravity zones to coincide with the location of the Laidig Fluidized Screw Reclaimer, to aid in the completion of the final cleanout.

Safety is also a high priority for St Marys and other companies storing materials in silos and domes, and one of the challenges is to ensure that plant personnel have safe and easy access into the structure. Laidig was proactive in their approach to help ensure that this wouldn't be a concern when storing and transporting fluidizable materials such as cement. Laidig has engineered and developed new product innovations and pioneering technology that have changed how companies approach material storage from a safety perspective. The Laidig FS1010 Fluidized Screw Reclaim System has been designed as an automated storage and reclaim system process that requires no personnel entry — keeping safety as a top priority.

Laidig's Fluidized Screw Reclaim Systems are designed specifically for heavy-duty applications requiring high-volume storage and reclaim of fluidizable materials. Laidig provides turnkey installations including the storage dome, the mechanical reclaim system, blowers, air gravity conveyors, and a customized fully-automated control system. With dome diameters up to 164 feet (50m) and discharge rates up to 250 metric tonnes per hour, the Fluidized Screw system is able to store and efficiently reclaim a high volume of fluidizable material in an automated process with zero personnel entry. This rugged, extreme-duty reclaimer promotes First-In-First-Out (FIFO) material delivery to maintain material quality standards. Laidig Systems, Inc. has proven to be a trusted partner, and is committed to pioneering a total solution for industry-specific storage and material handling needs. The Laidig Fluidized Screw reclaimer is built with longevity and flexibility in mind. Designed to handle a wide variety of materials, the Fluidized Screw is ideal for fluidizable materials, including cement, fly ash, talc and powders. The Fluidized Screw provides a cost-effective, unique hybrid alternative to traditional fully fluidized floors, utilizing fluidized radial spokes to clean out a large portion of the storage vessel and a mechanical screw to reclaim the remaining piles of material.

Laidig specializes in screw-type bottom reclaimers in silos, domes, and open piles. Thousands of bulk storage and reclaim systems are installed worldwide, with new system designs continuously introduced to incorporate the latest technology and meet the challenges of today's world. Laidig is proud to be setting the standards in the bulk storage and reclaim industry.

Known throughout the industry for their rugged, high-quality systems, Laidig excels in providing customized solutions for the storage and reclaim of materials with poor material flow characteristics or other special handling requirements. All over the world, Laidig provides solutions that assist in bulk storage and material handling problems that other companies are unable or unwilling to provide. According to Daniel Laidig, CEO of Laidig Systems, the commitment to being the best still stands today.

"We are providing solutions for large automated storage and reclaim needs with designs that are innovative, sound and guaranteed to work. This continues to illustrate the pioneering spirit, experience and leadership Laidig has throughout the world. It continues to prove that we can develop and deploy storage and reclaim solutions that no other company can."

Since 1961, Laidig Systems has provided solutions to bulk storage and handling problems that other companies are unable or unwilling to provide. Its experience includes thousands of applications reliably storing and reclaiming non-flowing material such as biomass, soybean meal, DDGS, and a variety of powders and chemicals. Decades of problem-solving experience in 40 countries around the globe have resulted in innovative and effective designs, allowing Laidig to expand with confidence into the unique material-handling applications. DCi

Flexicon's dual bulk bag filling/palletizing system

fills copper concentrate at 30tph

Each bulk bag filler features an articulated Swing-Down fill head, allowing the operator to safely access all bag connection points from floor level. Load cells measure weight gain of the bag, allowing a PLC to stop filling the bag once it reaches target weight.

Vale Canada Limited operates one of the largest integrated mining facilities in the world here, mining and processing ores containing nickel, copper and other metals.

The company's Sudbury mining complex has been in operation for over 100 years. Starting in 2012, the Sudbury plant undertook a billion-dollar Clean Atmospheric Emissions Reduction (AER) project to reduce sulphur dioxide stack emissions by 85%.

Previously, Vale refined both nickel and copper in Sudbury, says Tom Zanetti, senior project manager on the Clean AER Project. After analysing the total life of the mines and the long-term projections of mine capacity in the region, the company decided to focus on nickel production and sell copper concentrate to other companies instead of refining it in-house.

Vale worked with Ionic Engineering of Lively, Ontario to design a material handling system capable of packaging 24 to 32tph (tonnes per hour) of the copper concentrate into bulk bags by integrating a Flexicon automated bulk bag filling system into its existing process.

To handle the volume, Francois Nzotungwanimana, Operations Manager at Ionic Engineering and Project Engineer on the bulk bagging project, specified the dual bulk bag fillers, roller conveyors and a central pallet dispenser comprising the Flexicon system. In addition, Ionic designed the electrical and control systems, sourced labelling machines and other equipment, designed safety systems and performed the systems integration including programming, electrical and safety. The Ionic Engineering team also performed additional mechanical design and safety engineering.

Creating copper concentrate

The ore mined on site is first ground into a flour-like powder, says Zanetti. A flotation process removes waste rock. The resulting bulk concentrate is sent to a smelter, which produces a high-grade material containing both nickel and copper. Another flotation process separates the nickel and copper concentrates. Vale refines the nickel concentrate into metal on site.

The copper concentrate, after de-watering and drying, has a texture similar

to that of sand and contains 60–70% copper. It is conveyed to two large feed hoppers positioned above the dual bulk bag filling stations, each hopper holding ten tonnes, enough to fill five bulk bags.

Pallets automatically dispensed to bulk bag fillers

Flexicon's Project Engineering Division integrated a pallet dispenser, pallet turntables, two 7.5m-long roller conveyors, and two Swing-Down® bulk bag fillers. The pallet dispenser is positioned between — and at a right angle to — the mirror-image bag filling lines.

A forklift loads 10–14 pallets at a time onto the pallet dispenser. When one of the bulk bag fillers calls for a pallet, the dispenser lifts all except the bottom pallet, which is sent to the left or right filler by the powered roller conveyor. A turntable then rotates the pallet 90° to align it with the filler.

Automated pallet dispenser feeds pallets to the bulk bag filler which receives copper concentrate granules from the 10-tonne capacity hopper above.

The automated bulk bag filling system includes two bulk bag fillers, a central pallet dispenser, and two 7.5 m long roller conveyors from which a fork truck offloads filled bags for shipment.

Automating bulk bag filling operations

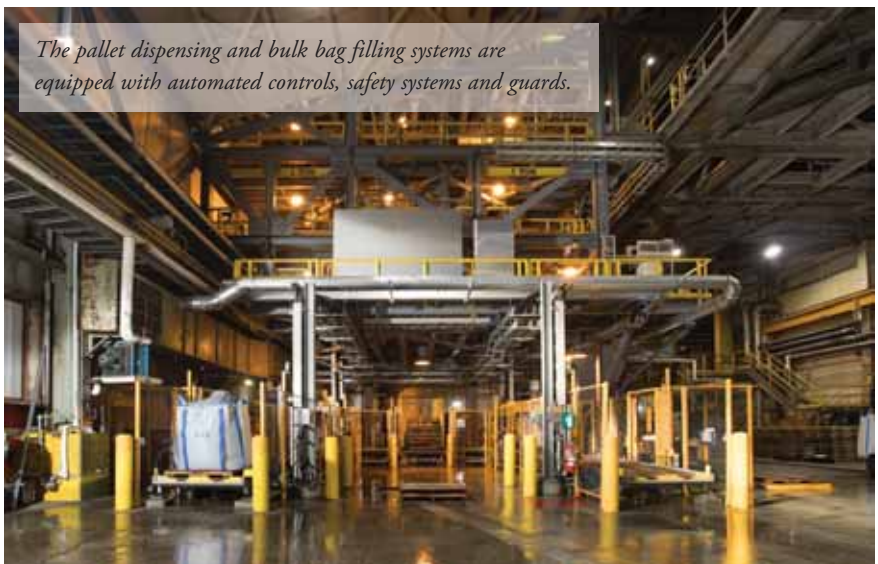
Once a pallet is in place, the filler's Swing-Down fill head lowers and pivots from horizontal orientation to vertical, positioning the discharge chute and bag strap hooks within reach of an operator standing on the plant floor. This furthers the plant's safety initiatives by eliminating the need to step on roller conveyors or strain to reach overhead connection points.

Once the operator places the bulk bag loops over automated latches, fits the bag spout over an inflatable spout seal and pushes the inflator button, the filling cycle is fully automatic:

- The fill head pivots back to horizontal, raises to filling height and inflates the bag to remove creases.
- After several safety conditions are met, a knife gate valve opens, allowing the respective overhead feed hopper to gravity-discharge into the bulk bag at maximum feed rate, as displaced air from the bag is vented through a filter sock to contain airborne dust.
- At timed intervals, a densification deck below the pallet vibrates to stabilize the bag.
- Load cells continually monitor the weight of the copper concentrate as the bag is filled to a weight of two tonnes.
- The controller closes the knife gate valve, releases the bag loops and deflates/disconnects the spout
- The powered roller conveyor moves the palletized bag out of the filler and onto several accumulating powered roller conveyors. The filled bag stops at the last accumulating conveyor where an automated labeller applies an identification label, before being rolled onto a gravity-feed roller conveyor toward a ramp that stops it in position for unloading.
- A forklift transfers the filled bags to a storage area, ready for shipment to customers.

In addition to fitting into the limited space available, the dual bulk bag filler configuration provides capacity, flexibility, and redundancy for the bag filling process. Automatic pallet dispensing reduces wait time and the likelihood of worker injury.

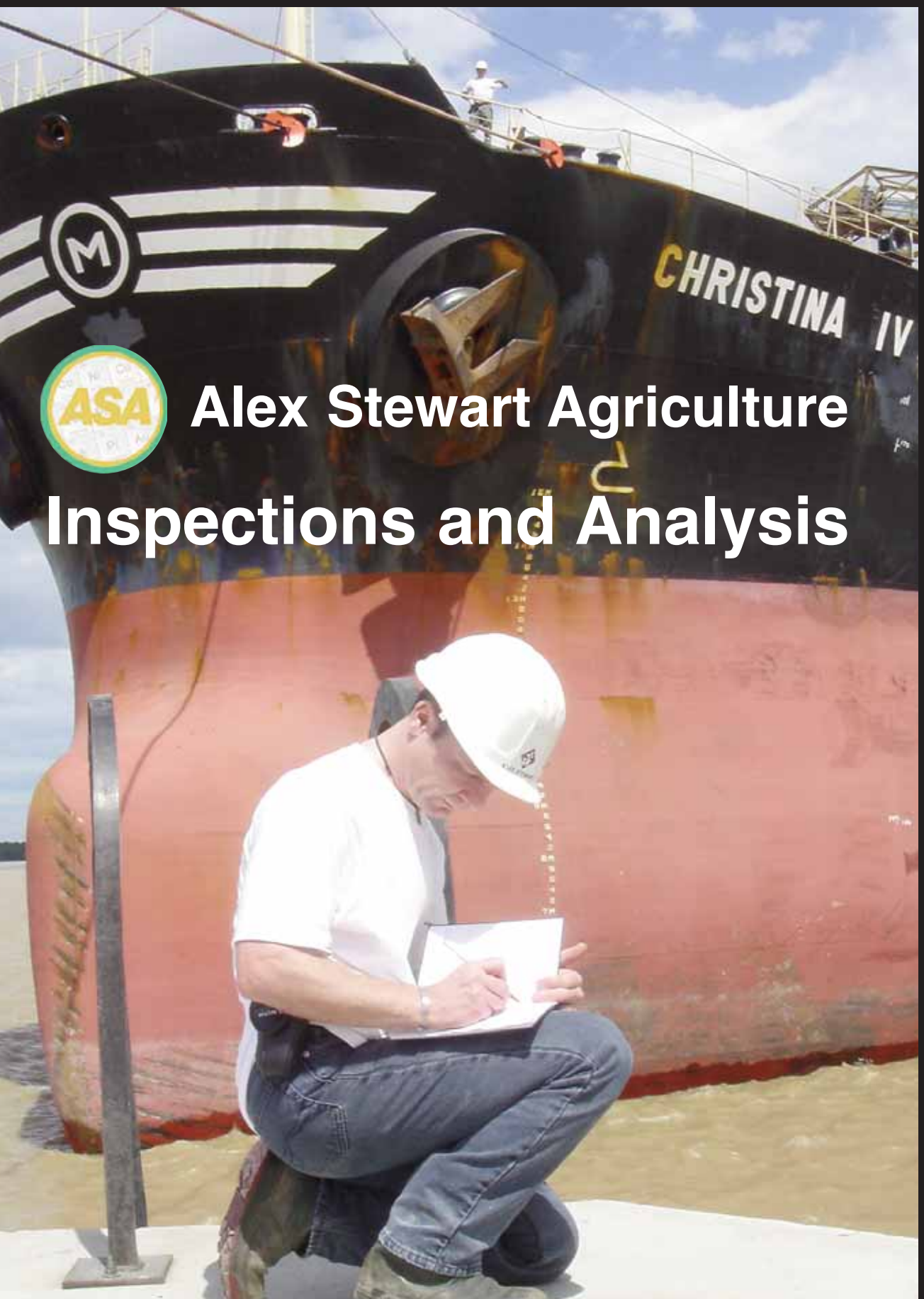
Ionic Engineering designs and builds automation systems for mining, metals processing, and other industries. Besides this bulk bag filling system, Ionic has completed several other projects under the Clean AER initiative. DCi



The pallet dispensing and bulk bag filling systems are equipped with automated controls, safety systems and guards.

DCi GRAIN HANDLING directory

2020



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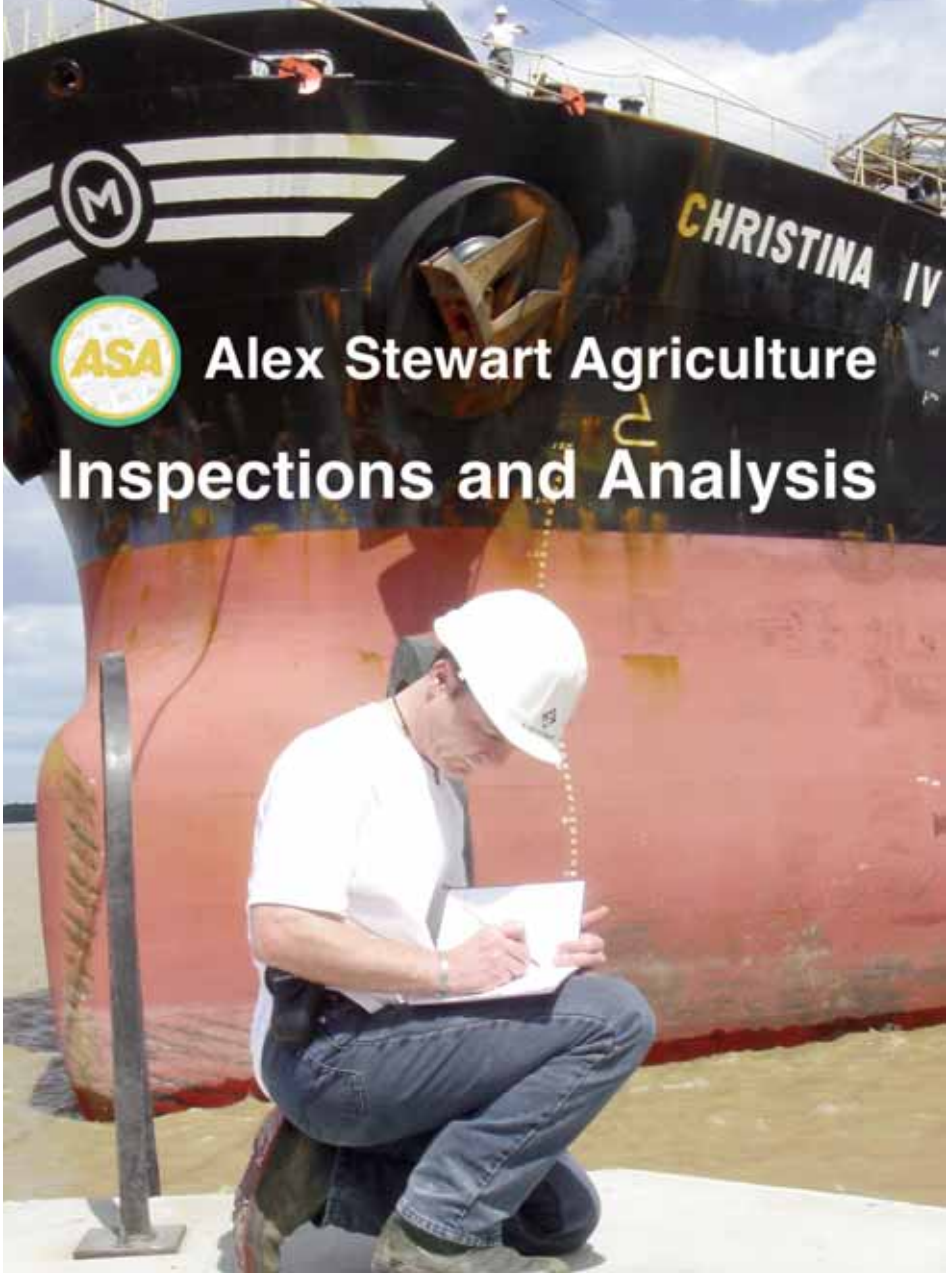

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Alex Stewart International certifies quantity and quality of all commodity imports/exports, including inspection and analysis. The Alex Stewart International network of regional companies provides inspection and analysis of agricultural products and foodstuffs, fuels, metals and minerals, steel and steel scrap, and also geochemical and environmental services.

Alimak Group AB
Blekholmstorget 30
Stockholm SE-111 64
Sweden
Contact: Mr Andreas Magnusson
Job Title: Alimak Brand Global Marketing Manager
T: + 46 8 402 1440
F: + 46 8 402 1459
E: andreas.magnusson@alimakgroup.com
W: www.alimak.com
Alimak is a global leader and pioneer in the design and manufacture of vertical access solutions for industrial and construction industries. The company provides permanent and temporary high quality elevators, construction hoists and work platforms built on rack and pinion and traction technologies.

Ameco Group
1027 S Claremont Street
San Mateo
California 94402
USA
Contact: Mr Alexandre Giess
Job Title: Head of Marketing
T: +1 917 371 9156
E: Alex.giess@ameco-group.com
W: www.ameco-group.com
Delivering custom bulk handling systems (stackers, reclaimers, circular stockyards) for all types of materials.

AMECO SAS
43, Rue du 21 Novembre
Illfurth
Alsace

F-68720
France
Contact: Mr Alexandre Giess
Job Title: Marketing
T: + 33 389 255969
E: sales@ameco.eu.com
Delivering excellence in custom design and manufacturing of bulk handling systems for all types of materials, worldwide since 1932

Andrew S. McCreath & Son, Inc.

1649 Bobali Drive
Harrisburg
PA
17104
USA
Contact: Mr Robert Kozicki
T: + 1 717 364 1440
E: rob@mccreathlabs.com

Anvil Attachments

PO Box 216
261 Highway 19
Slaughter
Louisiana 70777
USA
Contact: Mr Shane Toncrey
Job Title: Marketing
T: + 1 225 654 8223
F: + 1 225 654 3125
E: sales@anvilattachments.com
W: www.AnvilAttachments.com
Manufacturer of grabs, grapples and clamshell buckets for cable, hydraulic and electro-hydraulic operation. Models for ships-gear, gantry, excavators, crawler cranes and hydraulic equilibrium cranes. Brands include Anvil, Hawco, Pro-line, Owen, Yaun, Williams & Drott. New, used, rentals, rebuilds, repairs, parts and service, since 1969.

Applied Conveyor Technology, Inc. DBA The ACT Group

14644 El Molino Street
Fontana
CA
92335-6205
USA
Contact: Mr Edward Sunseri
T: + 1 909 350 4703
F: + 1 909 350 4982
E: esunseri@groupactinc.com
W: www.groupact.com
Distributor of bulk material handling, dust suppression, dust collection and belting components. ACT also provides service, maintenance and engineering services.

Arlona Engineering

PO Box 41125
Rossburgh
Durban
KZN
4072
South Africa
Contact: Mr Steve Christy
Job Title: Managing Director
T: + 27 31 205 5991
F: + 27 31 205 9835
E: steve@arlona.co.za
W: www.arlona.co.za
Design and manufacture of grabs from 3m3 touch down to 12m3 radio remote opening and mobile hopper / conveyor combinations suitable for ship or shore based operations. Customised solutions designed and built by the largest manufacturer of stevedoring equipment in Africa.

Arodo BVBA

Hoge Mauw 740
Arendonk
B-2370
Belgium
Contact: Mr Jan-Mathijs van Noort
Job Title: Sales Manager
T: + 32 14 672 332
F: + 32 14 671 760
E: sales@arodo.be
W: http://www.arodo.com
Arodo specialises in the design of packing systems for complete packing lines and manufactures dosing, weighing, bagging, palletising and stretchhood systems. Development, design and manufacture of the machines take place at the head-office in Arendonk where 100 people are employed.

Ashton Bulk Ltd

Liberty House
South Liberty Lane
Bristol
BS3 2ST
UK
Contact: Mr Joe Dudman
Job Title: Director
T: + 44 117 329 4841
E: admin@ashtonbulk.com
W: www.ashtonbulk.com
Ashton Bulk provide bespoke medium to heavy engineering solutions for the Mechanical Handling and Bulk Materials Handling Industry.
Since inception in 2010, our engineers, project managers and administrative staff, a team with over 300 years experience in this industry, have provided designs and equipment to a broad range of clients in worldwide locations.

ATLAS-SSI Co. Inc

PO Box 1969
622 East McPherson Drive
Monticello
Mississippi
MS 39654
USA
Contact: Mr Ashley Watson
Job Title: Sales Manager - Buckets
T: + 1 601 587 4511 ext 212
F: + 1 601 587 5393
E: ashley@atlas-ssi.com
W: www.atlas-ssi.com
Builds new and custom designed single, two, three and four rope cable grabs as well as hydraulic grabs and continuous unloader buckets. All Atlas-SSI grabs are constructed using high quality alloy steels with heat treated pins and bushings.

August Penkert GmbH

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45479
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E: marketing@penkert.com
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Aurecon

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55 Grenfell Street
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5000
Australia
T: + 61 8 8237 9905
F: + 61 8 8237 9778
E: adelaide@aurecongroup.com
W: www.aurecongroup.com

Ausenco Engineering Canada Inc.

855 Homer Street
Vancouver
British Columbia
V6B 2W2
Canada
Contact: Ms Jodie Davies
Job Title: Marketing Manager
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E: jodie.davies@ausenco.com
W: www.ausenco.com
A leading engineering design & EPCM services company operating worldwide in the bulk products materials handling, simulation, heavy haul rail, marine terminals, ports, coastal, mining, energy and industrial sectors.

Australian Superintendence Company

PO Box 7003
465 Vulture St East
East Brisbane
Queensland
4169
Australia
Contact: Mr Andrew Parry
Job Title: CEO
T: + 61 7 3391 8640
E: aparry@asc.co
W: www.asc.co
Australia's leading independent grain inspection company. Over 50 years experience with grains, oilseeds, pulses and meals.

B.V. BECO

Industrieterrein "De Biezen"
De Limiet 18
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Utrecht
4131 - NR
The Netherlands
Contact: Mr Henk van Vuren
Job Title: Managing Director
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E: h.vanvuren@beco-group.com
W: www.beco-group.com
For more than 20 years Beco Grabs has been providing high-end, ready-to-run technological solutions in the field of grabs for the bulk and dredging market. We have a big scale of products: Grabs – Wheel loader, excavator and demolition equipment - Tipping Trailers - Hooklift carriers - Harbour- and industrial trailers.

Bateman Manufacturing

BATEMAN

5 Winstar Rd
Oro-Medonte
ON
L0L 2L0
Canada
Contact: Mr Mark Vandenberg
T: + 1 705 487 5020
E: mark@batemanmanufacturing.com
W: http://batemanmanufacturing.com
Material Handling Equipment Designer and Manufacturer specializing in Hydraulic Grapples and Clam Shell Buckets as well as Spreader beam and Magnet systems.

Bayards Aluminium Constructions

PO Box 9
Nieuw-Lekkerland
ZH
2957 ZG
The Netherlands
Contact: Mr Dick de Kluijver
Job Title: Commercial Director
T: + 31 184 683000
F: + 31 184 684345
E: dick.dekluijver@bayards.nl
W: www.bayards.nl
Bulk containers.

Bedeschi America Inc.

3275 W. Hillsboro Boulevard - Suite 312
Deerfield Beach
Florida
33442
USA
Contact: Mr Feliciano Spina
T: + 1 954 602 2175
F: + 1 954 602 5390
E: info@bedeschiamerica.com
W: www.bedeschi.com
Bedeschi is a manufacturing and project engineering company with a global outlook, skilled in the design, production and supply of machines and integrated systems for grain handling and storage (shiploaders, shipunloaders, belt conveyors, enclosed and pipe conveyors)

Bedeschi SpA

Via Praimbole, 38
Limena
Padova
35010
Italy
Contact: Mr Lodovico Bernardi
Job Title: Sales Director
T: + 39 049 7663100
F: + 39 049 8848006
E: sales@bedeschi.com
W: www.bedeschi.com
In Grain sector, Bedeschi is a manufacturing and project engineering company with a global outlook, skilled in the design, production and supply of machines and integrated systems for grain handling and storage (shiploaders, shipunloaders, belt conveyors, enclosed and pipe conveyors).

BEHN + BATES Maschinenfabrik GmbH & Co. KG

Robert-Bosch-Strasse 6
Munster
D-48153
Germany
Contact: Ms Laura Muke
T: + 49 251 9796 0
F: + 49 251 9796 260
E: sales@behnbates.com
W: www.behnbates.com
Manual, semi-automatic and fully automatic filling systems for the filling of all kind of food and animal feed products into valve and open-mouth bags with filled weights from 1.5 up to 50 kg and big bags of up to 1,800 kg.

Belt Conveyor Guarding

3478 Penetanguishene Rd
Barrie
Ontario
L4M 4Y8
Canada
Contact: Ms Christine Allen
Job Title: Business Development
T: + 1 866 300 6668
E: safety@conveyorguarding.com
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Bendezu Port Equipment GmbH

C/Camino Padre Cura, 15
Bloq. Oasis II
City
Estepona
Málaga 29680
Spain
Contact: Mr Andrés Bendezú
Job Title: General Manager
T: +34 952 807 144
E: info@bendezu.com
W: www.bendezu.com
We deal with used port equipment such as Mobile Harbour Cranes, STS cranes, Material Handlers, Reach Stackers, Terminal Trucks, Grabs and Spreaders. We also offer new equipment like Diesel Engines, Hoppers and Conveyor Belts, all on an International level. We also suppyl new hoppers, with and without dust suppression, and conveyor belts for loading vessels.

Bergu International AB

Nygata 30
Box 5006
Helsingborg
S-250 05
Sweden
Contact: Mr Conny Simonsson
T: + 46 42 12 7970
F: + 46 42 12 8002
E: bergu@telia.com
W: www.bergu.com
Design and manufacture bag emptying equipment as well as pneumatic conveyors, silos and silo discharge systems, diverter valves, etc.

BGS Holland

Hoogeveeneweg 5
Nieuwerkerk ad Ijssel
2913 LV
The Netherlands
Contact: Ms Martina Hermans
T: + 31 180 317838
F: + 31 180 315538
E: info@bgsholland.nl
W: www.bgsholland.nl
Specialise in tailor made design/manufacturing of loading spout for dry granular and powdery products prone to dust problems. Produce the unique Choke Feed Scavenger.

Bilfinger Tebodin

Laan van Nieuw Oost-Indië 25
The Hague
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2593 BJ
The Netherlands
Contact: Mr Aart-Jan Smit
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Bilfinger Tebodin is a multidisciplinary industrial Consultancy & Engineering firm, active in the markets Food, Beverage & Agro, Pharmaceuticals, Energy, Oil & Gas and Pipelines & Infrastructure.
With a broad network in 17 countries we maintain long-lasting relationships with many clients worldwide.

Birrus International Pty Ltd

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Blue Water Misting

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E: sales@bluewatermisting.com
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BLUG Credeblug S.L.

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Contact: Mr Joseba Fernandez
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F: + 34 943 815 665
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W: www.blug.es
BLUG is strongly related to bulk terminal handling operations for more than 54 years, with different grabs performing successfully in the 5 continents. BLUG s presence in maritime terminals is mainly focused

Bobcat EMEA s.r.o

U Kodetky 1810
Dobris
26312
Czech Republic
Contact: Mr David Frodl
Job Title: Communication Manager
T: + 420 318 532 480 (482 480)
E: david.frodl@doosan.com
W: www.bobcat.com
Range of compact skid-steer and tracked loaders for ship-trimming and cargo hold unloading (together with grab) with operating capacities from 343 - 1850kg: telescopic handlers with lift capacities from 2.6 - 5.0 tonnes and max lift heights from 5.8 - 24.1 metres.

Bosch Rexroth B.V.

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Contact: Mr Edwin Doedee
Job Title: Sales Manager, Materials Handling & Mining
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E: cylinders@boschrexroth.nl
W: www.boschrexroth.nl
Has a worldwide responsibility for turnkey projects and the development and production of Hydraulic Cylinders.
Core competence is the development of engineered-to-order products, mostly one-off solutions for specific applications.

BossTek

1607 W. Chanute Rd.
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W: https://bosstek.com/
DustBoss® suppression systems deliver field-proven solutions for open-area dust issues, including source-point particle management and a family of mobile units. Proprietary technology delivers superior results and reliability, able to blanket up to 280,000 square feet with a single oscillating machine.

Boyne Area Manufacturing (BAM)

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Contact: Mr Michael Ryan
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T: + 1 231 459 4242
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E: mfryan@boynearea-mfg.com
W: www.boynearea-mfg.com
Bulk Material Handling Specialist. Design, Engineer and Build, Spouts,Positioners, Gates& Valves, Diverters,Air Flow Conveyors,Hoppers, Bin Vents,& Dust Collectors.We are a new (4yrs.)& growing company with over 100 years of combined experience. Our designs and equipment have been sold and installed throughout the world. Other services -onsite inspection & equipment recommendations.

BRUKS AB

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BRUKS Klöckner GmbH

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W: www.bruks.com

BRUKS Rockwood Incorporation

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W: www.bruks.com

BSP ENGINEERING S.R.L

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Frazione Santa Maria (VR)
Zevio
37050
Italy
Contact: Ms Daniela Viviani
T: + 39 045605 1199
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E: info@bspengineering.it
W: www.bspengineering.it

Bucket Mart Inc.

PO Box 1240
Marion
Illinois
62959
USA
Contact: Mr Jack Johnson
Job Title: President/CEO
T: + 1 813 390 8626
F: + 1 813 908 9474
E: salesbucketmart@aol.com
W: www.bucketmart.net
We have all Sizes/Types of New/Used Clamshells/Grapples/Misc./ buckets,
Grapple buckets, Dragline buckets, Grabs, Concrete buckets, misc. for sale/rent/lease.
Buckets/Grapples/Clamshells/ for Handling Scrap, Cement, Logs, Ore, Coal, Grain, Waste, Gravel, Rock, Stone, Demolition, Misc. Supplying Customers Worldwide/Around the Clock/ 24-7!

Buhler AG, Grain Quality and Supply

Gupfenstrasse 5
Uzwil
Sankt Gallen
CH-9240
Switzerland
Contact: Mr Marcel Sherrer
T: + 41 71 955 3950
E: marcel.scherrer@buhlergroup.com
W: www.buhlergroup.com
Customized solutions for grain handling.
Bühler Grain Logistics Terminals is the ideal partner when it comes to reliable solutions in the area of grain handling and storage. The company's wide range of offerings includes ship loading and unloading solutions, conveying systems and silos as well as storage equipment.

Bühler GmbH

Grain Quality & Supply
Eichstaetter Strasse 49
Beilngries
DE-92339
Germany
Contact: Mrs Martina Eckerle
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E: martina.eckerle@buhlergroup.com
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Bühler Grain Quality & Supply offers package solutions, machinery and components throughout the entire food value-added chain - from the reception of agricultural products through to the final stages of processing. Whether it's a silo installation, a rice mill or individually tailored malting systems: Bühler is a competent global partner providing individualized on-site customer service from conception to startup. Safety, dependability and sustainability thereby form the basis of a trustful customer relationship.

Bulk Lift International

1013 Tamarac Drive
Carpentersville
IL
60110
USA
Contact: Mr Brian Kelly
Job Title: President/CEO
T: + 1 847 428 6059 x 215
F: + 1 847 428 7180
E: info@bulklift.com
W: www.bulklift.com
Manufactures a wide array of flexible intermediate bulk containers (FIBCs), or bulk bags. With manufacturing faciliies worldwide and stocking available in the United States the company can offer just in time deliveries of all bulk bag requirements.

Buttimer Engineering

Cahir Business Park
Cahir
Co. Tipperary
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Contact: Mr Fergal Buttimer
Job Title: Director & Owner
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W: http://buttimer.com
Buttimer Engineering is a diversified mechanical engineering firm specialising in bulk materials handling solutions and high-quality steel fabrication. From once off design, fabrication or installation works to full turnkey projects, Buttimer Engineering can call upon skilled teams to deliver the service that our clients require.

C Spencer Ltd

One Humber Quays
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Contact: Mr Ian Atkinson
Job Title: Engineering Director
T: + 44 1482 766 340
E: marketing@thespencergroup.co.uk
W: https://thespencergroup.co.uk
Spencer Group is an industry leader in materials/mechanical handling, including the transportation of biofuel and biomass. We have vast experience in heavy-duty materials handling including loading/unloading, by road, ship or rail, and the automatic transportation of materials using bespoke conveyors.

C Transport Maritime S.A.M

7 Rue du Gabian
Gildo Pastor Centre
Monaco
MC 98000
Monaco
Contact: Captain Giorgio Vallega
Job Title: Operation/Commercial Manager
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F: + 377 9798 2306
E: gvallega@ctmmc.com
W: www.ctmmc.com
Sums up the experience, know-how and networks of its parent companies in the dry bulk and logistics field, providing a full range of integrated services from the supplier to the end users, including specialised barge services, transshipment, river, coastal and ocean transportation by means of conventional bulkcarriers or self-unloading vessels and barge.

Cachapuz Bilanciai Group

Parque Industrial de Sobreposta
Apartado 2012
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Braga
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Portugal
Contact: Miss Inês Lopes
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E: marketing@cachapuz.com
W: www.cachapuz.com
Cachapuz is a reference in the implementation of innovative solutions to automate the logistics, dispatching, reception and weighing processes in industrial plants. With a modular platform and extensive know-how, Cachapuz is able to meet the needs of several sectors worldwide.

Calim Grab Industry

Piri Reis Cad
Çinar San.
Sitesi No:46 Maltepe
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81540
Turkey
Contact: Mr Murat Calim
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F: + 90 216 399 79 71
E: info@calimkepce.com.tr
W: www.calimkepce.com.tr
Calim Grabs is a manufacturer of mechanical, electro-hydraulic and remote controlled grabs.

Camar Mill Systems Ltd

P.O. Box 419
1600 King St N
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Contact: Mr Rick Weber
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Cambelt International Corp

2820 West Directors Row
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84104
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Contact: Mr Jeremy Hengst
Job Title: Vice President, Sales
T: + 1 801 972 5511 ext 205
F: + 1 801 972 5522
E: jeremyhengst@cambelt.com
W: www.cambelt.com
Suppliers of fully moulded sidewall belting, high incline conveyor systems, dome storage reclaim systems and conveyor components.

Caterpillar Inc

100 NE Adams Street
Peoria
IL
616-6335
USA
Contact: Mrs Sharon Holling
Job Title: PR
T: + 1 309 675 8995
F: + 1 309 675 4757
E: Holling_Sharon_L@Cat.com
W: www.cat.com
Wide range of front end loaders, bulldozers, wheel loaders etc, used for all types of bulk products and different industry applications.

Cavotec Deutschland GmbH

Ludwig-Erhard Strasse 1a
Eschborn
D-65760
Germany
Contact: Mr Peter Gronholm
Job Title: VP Supply Chain
T: + 49 6196 50950 20
F: + 49 6196 50950 22
E: Peter.Gronholm@cavotec.com
W: www.cavotec.com
Cable management systems with electrical cable reels, hose reels, cables/hoses with up to 25kV. Spring reels; Plugs and sockets/connectors up to 660A up to 25kV medium voltage collectors, remote controls with Atex.

Cavotec SA

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Contact: Mr Dirk Fussel
Job Title: Sales Director Mining & Tunnelling
T: + 41 91 911 4010
F: + 41 91 922 54 00
E: lorene.grandidier@cavotec.com
W: www.cavotec.com
Cavotec Group is a global leader in connecting mobile equipment.
Products from the Cavotec Group manufacturing units include: Eex radio remote controls, electrical connectors up to 15kV, flexible cables, cable reels, and slipring units. Distribution is supported by 22 Cavotec sales and service companies around the world.

CDM Systems, Inc

19230 Evans Street NW
Suite 202
Elk River
MN
55330
USA
Contact: Mr Andrew Parker
Job Title: Vice President
T: + 1 763 428 9700
F: + 1 763 428 9701
E: sales@cdmsys.com
W: www.cdmsys.com
CDM Systems offers a comprehensive array of Bulk Conveying Systems, Components and Engineering/Design Services. With over 30 years of experience, we can provide you with conveying and bulk handling solutions for Materials from Ash through Zinc, including marine applications as well as those in hostile, severe or high-temperature environments.

Cesur Packaging Corporation

Cumhuriyet Mahallesi
Yüzyil Caddesi, No:64
Istanbul
Kartal
34876
Turkey
Contact: Mr Ömür ÖNDER
Job Title: Marketing Executive
T: + 90 216 377 28 55
F: + 90 216 377 11 90
E: omur.onder@cesur.com
W: www.cesur.com
Cesur Packaging is a manufacturer of all types of FIBC 's (Type A, B, C, D for various industries - UN, Food Grade, Hygiene big bags), PP woven bags and international dunnage bags with 82 years of experience in the industry and international markets.

CHIA Espirales.es

Polígono Industrial El Sotillo S/N
La Puebla de Cazalla
Seville
41540
Spain
Contact: Ms Carmen Sojo
Job Title: Commercial Department
T: + 34 629 340 472 / + 34 695 402 000
E: espirales@espirales.es
W: http://www.espirales.es/eng/
CHIA focuses its efforts on providing tailor-made solutions for port, coal and olive oil industries. Specialized equipment for industry, hoppers, ship unloaders conveyor belts, lifts, port terminals, solid bulk storehouses, ecological load and unload systems are only some of the tasks most carried out by this enterprise.

Chief Industries UK Ltd.

Beckingham Business Park
Tolleshunt Major
Maldon
Essex
CM9 8LZ
UK
Contact: Mr Georgina Rippingale
T: + 44 1621 868944
F: + 44 1621 868955
E: georgina@chief.co.uk
W: www.chief.co.uk
International supplier of galvanized grain storage silos and ancillary equipment. Undertake complete projects or component supply to main contractors. Manufacturing companies in USA, UK and France, providing flexibility for international design standards. Experienced in countries throughout the world.

Chief Industries, Inc.

Chief Agri
P.O. Box 848
Kearney
NE 68848
USA
Contact: Ms Christa Britton
Job Title: Marketing Coordinator
T: + 1 308 237 3186
F: + 1 308 389 6703
E: agri@chiefind.com
W: www.agri.chiefind.com
Chief Agri specializes in the design, manufacture and sale of grain storage systems around the world. Chief offers everything needed in a complete grain storage system, including steel grain bins, grain handling, conditioning equipment along with continuous flow grain dryers and square feed mill storage bins.

China Huadian Engineering Co., Ltd

Room 711, Building A, Hudian Plaza
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Fengtai
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China
Contact: Ms Chen Qiao
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W: www.hhi.com.cn;
www.chec.com.cn

Christianson Systems Inc.

PO Box 138
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Minnesota
56216
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Contact: Ms Barbara Gilberts
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W: www.christianson.com
Manufactures ship unloaders and conveyor systems under brand names of Handlair, VacBoss, Vac-U-Vator, SeedVac, ChemVac, Push-Pac, SuperTower and SuperPortable.
Equipment for the transfer of dry flowable products including grain, feed, seed, rocks and sand.

Cimbria Unigrain A/S

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Contact: Mr Thomas Mohr
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T: + 45 72 42 24 00/ + 45 96179000
F: +45 72 42 24 99
E: cbe@cimbria.com
W: www.cimbria.com
Markets a large line of products within dustfree loading systems. Loading solutions can be delivered for all types of material using ship loading, stock piling, road and rail. Close to 30 years experience. Product programme covers all branches where bulk products are handled from agriculture to industry.

Civettini Italo & c sas (CFS Handling)

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25012
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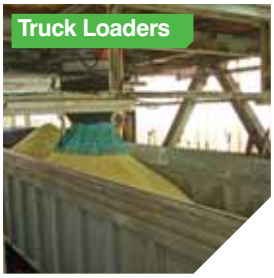
E: civettini@cfshandling.it
W: www.cfshandling.it
Sede Operativa - working headquarters:
Via Sigalina a Mattina, 12/14
25018 - Montichiari - (BS) - Italy

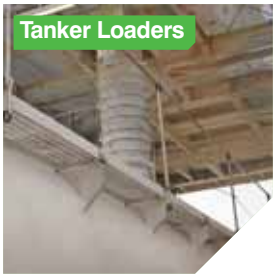
Clariant Corporation

101 Christine Drive
Belen
NM
87002
USA
Contact: Mr Justin Mueller
Job Title: Head of Business Group CDP Americas
T: + 1 505 975 1676
E: desiccants@clariant.com
W: www.clariant.com/desiccants
Clariant Cargo and Device Protection offers moisture solutions such as Container Dri®

Cleveland Cascades Ltd

Global leader in bespoke dry bulk loading chutes





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

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

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

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

Contact Cleveland Cascades Ltd

Unit 22, Dukesway, Teesside Industrial Estate, Thornaby, Stockton-on-Tees, Cleveland, TS17 9LT, United Kingdom Tel: +44 1642 753260 | Fax: +44 1642 753270

E-mail: enquiries@clevelandcascades.co.uk | Website: **www.clevelandcascades.co.uk**

II container desiccants for a broad range of transport applications: from goods traveling in conventional cargo containers to shipment and storage of sensitive electronic and semiconductor devices.

Claudius Peters Projects GmbH

Schanzenstrasse 40
Buxtehude
D-21614
Germany
Contact: Mr Kurt Herrmann
Job Title: Managing Director Sales
T: + 49 4161 706 227
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E: projects@claudiuspeters.com
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Cleveland Cascades Ltd

Unit 22 Dukesway
Teesside Industrial Estate
Thornaby
Stockton on Tees
TS17 9LT
UK
Contact: Mr Ian Barnard
Job Title: Managing Director
T: + 44 1642 753260
F: + 44 1642 753270
E: enquiries@clevelandcascades.co.uk
W: www.clevelandcascades.co.uk
Designs, manufactures, markets and installs bulk loading chutes for ship loading, silo filling, truck loading, conveyor transfer point; minimising dust emissions and product degradation, as well as segregation.

COBRA Europe SAS

12 rue Henry Guy
Luxeuil les Bains Cedex
70300
France
Contact: Miss Florence Gachelin
T: + 33 7 87 69 73 97
E: florence@cobra-cs.com
W: www.cobra-europe.eu
The COBRA group is one of the leading manufacturers of conveyor belts. Our products are intended 3 brands as DEPREUX to heavy industries (mines, steel mills and power plants), TRANSCO for the food industry and INDI for pharmaceutical and transporting isolated loads and packages.
Our mission: to provide you solutions in order to meet your rubber conveyor and elevator belts requirements.
More information on our web site : www.cobra-europe.eu

Commodity Inspection Services

PO Box 35112
Rotterdam
3005 DC
The Netherlands
Contact: Mr Paul Schweitzer
Job Title: Co-Founder and Director
T: + 31 10 2140589
E: info@cis-inspections.com
W: www.cis-inspections.com

Condepols S.A.

Avda. Iberoamérica, 35
Alcalá La Real
Jaén
23680
Spain
Contact: Mrs Laura Leyva
Job Title: Marketing
T: + 34 953 1021 00
E: usuario.marketing@condepols.es
W: www.condepols.es
Manufactures and commercialises big bags made of polypropylene to store or transport merchandise ranging from 500 to 2000kg, with one or 4four lifting points. Also manufacture liners in polyethylene or polypropylene 'Dbulk' for maritime containers to store or transport merchandise in bulk. All the products manufactured are food approved.

Conductix-Wampfler

Rheinstrasse 27 + 33
Weil am Rhein
79576
Germany
T: + 49 7621 662 0
F: + 49 7621 662 144
E: info.de@conductix.com
W: www.conductix.com
Conductix-Wampfler's core competency is in the development, production, consulting, and installation of tailor made, engineered solutions like festoon systems, conductor rails, cable chains, slip ring assemblies or spring and motorized cable reels that provide energy supply and data transmission for moving machinery. Other equipment/services: Energy & Data Transmission Systems.

Conductix-Wampfler Americas

10102 F Street
Omaha
Nebraska
NE 68127
USA
Contact: Mr Mark Schechinger
Job Title: Senior Engineered Product Specialist
T: + 1 402 952 9383
F: + 1 402 339 9627
E: mark.schechinger@conductix.com
W: www.conductix.us
Mobile Electrification systems: Motorized reels, cable festoon systems, cable chains, slip ring assemblies (including hazardous duty), and pendant or radio remote controls. Conductix Wampfler is a global leader in the electrification of rail mounted equipment and bulk handling equipment involved in the storage and handling of all types agricultural products.

Conservatek Industries, Inc.

498 North Loop 336 East
Conroe
Texas
77301
USA
Contact: Ms Nita Bailey
Job Title: Marketing
T: + 1 936 539 1747
F: + 1 936 539 5355
E: nbailey@conservatek.com
W: www.conservatek.com
Designs, fabricates and installs aluminium domes and aluminium roof structures for use on tanks of various shapes and sizes. Typical applications include bulk storage enclosures.

Continental Construction (Memphis)

5646 Shelby Oaks Drive
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Tennessee
38134
USA
Contact: Mr Brian Morphis
Job Title: Marketing
T: + 1 901 382 4070
F: + 1 901 388 2534
E: mail@continentalconst.com
W: www.continentalconst.com
Heavy Industrial Contractor for Foundations, Silos, Conveying, and Unloading. Call (901)382-4070 or go to www.continentalconst.com for more information.

ContiTech Antriebssysteme GmbH

Vahrenwalder Str. 9
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Job Title: Manager External Communications ContiTech
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ContiTech Transportbandsysteme GmbH

Breslauer Strasse 14
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Contact: Mr Hans-Jürgen Duensing
Job Title: Managing Director
T: + 49 5551 702207
F: + 49 5551 702504
E: transportbandsysteme@cbg.contitech.de
W: www.contitech.de/conveyorbelts
With over 30 years experience in design, manufacturing and supply, MAXOFLEX has become one of the leading solution providers in the field of steep angle conveying. Quality, reliability and service is what our customers have come to expect. We pride ourselves on delivering and no challenge is too small.

Conveyor Dynamics, Inc.

3633 Alderwood Avenue
Bellingham
Washington
98225
USA
Contact: Mr Andrew Jennings
Job Title: President
T: + 1 360 671 2200
F: + 1 360 671 8450
E: cdi@conveyor-dynamics.com
W: http://conveyor-dynamics.com/
CDI designs the longest, strongest, and most advanced belt conveyor systems in the world. Last year we commissioned the world's longest belt conveyor: a 27km conveyor in South Africa. We specialize in detailed mechanical design, software development, and control system.

Cotecna Inspection SA

Calle 103 No.14A-43
Oficina 20
Edificio Gemedco
Santafe
Bogota
Colombia
Contact: Ms Coline Quinty
Job Title: Operations & Marketing Officer
T: +41 22 849 78 44
E: coline.quinty@cotecna.com
W: www.cotecna.com

CPS Projects (Pty) Ltd

PO Box 47261
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Durban
KZN
4023
South Africa
Contact: Mr Banzi Majola
Job Title: Managing Director
T: + 27 31 466 4396
F: + 27 31 466 4399
E: banzi@cpsprojects.co.za
W: cpsprojects.co.za
Affiliated with CPS Projects Pty and Salzgitter SA Pty in South Africa, Portquip Pty provides mechanical shiploaders, grabs and truck loaders and unloaders.

C-River Logistics

2955 Ridgelake Drive
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Metairie
LA 70002
USA
Contact: Ms Pamela Cascio
Job Title: President
T: + 1 504 832 0500
F: + 1 504 832 8110
E: Pam.Cascio@c-riverlogistics.com
W: www.ssamarine.com/locations/metairie-louisiana/

CRS - Container Rotation Systems Pty Ltd

18 Sleigh Place
Wetherill Park
Sydney
NSW
2164
Australia
Contact: Mr Murray Bridle
Job Title: Managing Director
T: + 61 0412469549
E: sales@containerrotationsystems.com
W: www.containerrotationsystems.com
CRS specialises in the design and manufacture of Container Rotators and specialised rotatable heavy duty containers.

CST Covers

498 N Loop 336 E
Conroe
Texas
77301
USA
Contact: Mrs Kimberly Mathis
Job Title: Global Marketing Director
T: + 1 713 351-3769
F: + 1 936 539 5355
E: kmathis@cstindustries.com
W: www.cstcovers.com
Designs, manufactures and installs large (30m to over 145m diameter) clear span aluminium domes for covering storage systems of all types. Conveyor penetrations and support can be all part of the roof design. Each dome is custom designed to the site and customer specific requirements worldwide. Cost competitive and virtually maintenance free as aluminium does not rust, rot or solar degrade.

CST Storage

903 E 104th Street, Suite 900
Kansas City
MO
64131
USA
Contact: Mr David Wheat
Job Title: Director
T: + 1 913 621 3700
F: + 1 913 621 2145
E: sales@cst-storage.com
W: www.cstindustries.com
Columbian TecTank is the leading manufacturer of bolted steel, and factory welded storage tanks for the dry bulk market. Columbian TecTank is proud to introduce a new coating -Trico-Bond EP™, a high-performance, factory-applied, thermally-cured, highly-engineered modified epoxy powder coating.

DCL, Incorporated

08660 Ance Road
Charlevoix
MI
49720
USA
Contact: Mr Kyle Smith
T: + 1 231 547 5600 Ext 3124
F: + 1 231 547 3343
E: sales@dclinc.com
W: www.dclinc.com
DCL provides loading systems as well as components to the bulk material handling industry. Our product line includes Loading Spouts, Loading Spout Positioners, Aeration Equipment, Shut-Off Valves, Diverter Valves, Dust Collection Equipment, Bag and Drum Filling, System Design, and Plant Automation.

De Regt Conveyor Systems

Ijzendijkseweg 5
Biervliet
Zeeland
4521 GX
The Netherlands
Contact: Mr Peter De Regt
Job Title: Director
T: + 31 115 481238
F: + 31 115 481234
E: peter@deregt.com
W: www.deregt.com
De Regt is a company specialized in developing, building and installing conveyor systems and structures needed to achieve a partial or total project.

DeMarco Industrial Vacuum Corporation

PO Box 1138
Crystal Lake
IL
60039-1138
USA
Contact: Mr Thomas DeMarco
Job Title: President
T: + 1 815 344 2222
F: + 1 815 344 2223
E: Sales@DeMarcoVacuums.com
W: www.DeMarcoVacuums.com
Manufacturer of Patented DEMARCO Industrial Vacuum Systems and vacuum loaders for portable, stationary and central manifold systems. 10 to 300 HP

Dinnissen BV

Horsterweg 66
Sevenum
NL-5975 NB
The Netherlands
T: + 31 77 467 35 55
F: + 31 77 467 37 85
E: powtech@dinnissen.nl
W: www.dinnissen.nl
Dinnissen Process Technology specialises in handling and processing bulk materials. Complete processes for the milling, sieving, weighing, mixing, dosing, drying, expanding, extruding, vacuum coating, packaging and transporting of powders, grains and granulates. Developed, tested and manufactured in-house. 70 years international experience in bulk materials technology, machine development, processing, engineering, control, automation and service.

DMN-WESTINGHOUSE

Gieterij 3
Noordwijkerhout
Zuid-Holland
NL-2211 WC
The Netherlands
Contact: Mrs Tonneke Krempel
Job Title: Manager Marketing Services and PR
T: + 31 252 361 800
F: + 31 252 375 934
E: dmn@dmn-nwh.nl
W: www.dmnwestinghouse.com
Offering tailor-made solutions in the design and manufacture of rotary valves, diverter valves and other components for the bulk solids handling industry for more than 45 years. The company's products are distributed and supported worldwide.

Dome Corp of North America

5450 East Street
Saginaw
Michigan
48601
USA
Contact: Mr Ross Lake
Job Title: President
T: + 1 989 777 2050
F: + 1 517 777 3477
E: sales@dome-corp-na.com
W: www.dome-corp-na.com

Dome Technology, LLC

4946 North 29th East
Idaho Falls
ID
83401
USA
Contact: Mr Jason Miller
Job Title: Vice President of Marketing
T: + 1 208 529 0833
F: + 1 208 529 0854
E: jason.miller@dometechnology.com
W: www.dometechnology.com
Dome Technology Inc.,(Inventors of the thin shell concrete dome) - activities include the design and construction of modern, insulated reinforced concrete domes for both industrial and commercial applications. Dome Technology builds domes for all bulk storage products throughout the world. Products commonly stored include fertilizer, cement, clinker, gypsum, fly ash, coal, alumina, grains and mining ores. Established in 1976.

DOMTEC International LLC

4355 N Haroldsen Drive
Idaho Falls
Idaho
83401
USA
Contact: Mr Mike Hunter
Job Title: General Manager
T: + 1 208 522 5520
F: + 1 208 522 5344
E: domtec@domtec.com
W: www.domtec.com
Serving the bulk storage industry for many years, constructing concrete domes to store a multitude of products. The company designs and constructs high quality concrete domes, delivering projects on time and within budget. They have broad experience with a variety of reclaim systems, both mechanical and pneumatic, pending on clients' needs.

Donaldson Filtration Deutschland GmbH

Industriestraße 11
Dülmen
48249
Germany
Contact: Mrs Susanne Fulko
Job Title: Marketing Manager
T: + 49 2594 781 0
F: + 49 2594 781 21
E: IAF-de@donaldson.com
W: www.DonaldsonToritDCE.com
Donaldson offers innovative dust collection systems. The products are engineered to improve efficiency, save energy and extend filter lifetime. The R&D engineers invented new filtration technologies for customers and their specific applications.

Dos Santos International, LLC

531 Roselane Street NW
Suite 810
Marietta
GA
30060
USA
Contact: Mrs Amy D. Duncan
Job Title: Marketing Manager
T: + 1 770 423 9895
F: Text: + 1 916 US SNAKE
E: info@dossantosintl.com
W: www.dossantosintl.com
Foremost authority on sandwich belt high angle conveyors with the inventor of the worldwide system at the helm of the company. DSI offers discipline-oriented engineering services in mechanical and structural engineering, along with their in-house conveyor analysis software, ExConTec.
Other Equipment: Sandwich Belt High Angle Conveyors.

Dry-Bag A/S

Dalagarde 1
Aarhus C
DK 8000
Denmark
Contact: Mr Soren
Job Title: Marketing
T: + 45 86 19 0500
F: + 45 86 19 0577
E: production@dry-bag.dk
W: www.desiccant.com

DSH Systems Ltd.

PO Box 48052
Blockhouse Bay
Auckland
0644
New Zealand
Contact: Mr Ian Walton
Job Title: CEO
T: + 64 275 999 592
F: + 64 9828 8012
E: ian@dshsystems.com
W: www.dshsystems.com
DSH Systems award winning dust suppression loading spouts contain the dust from free-running, dry, granular products in a tight free-falling column. No electricity required, has no internal moving parts, mitigate dust explosion risk, achieve health, safety, environmental and business benefits.

DURO FELGUERA, S.A.

Parque Científico y Tecnológico de Gijón
c/ Ada Byron, 90
Gijón
Asturias
33203
Spain
Contact: Mr Angel Pelegry
Job Title: Head of Proposals & Studies - DF Mining & Handling
T: + 34 985 199 202
F: + 34 985 199 059
E: dfmh@durofelguera.com
W: www.dfdurofelguera.com

A one hundred sixty year-old company specialized in turn-key projects worldwide for the bulk handling sector. Its great experience enables the company to develop state of the art designs and achieve high performance as well as run all the projects based on environmentally friendly solutions and competitive costs.

Dust Solutions Inc

103 Industrial Village Road
Beaufort
SC
29906
USA
Contact: Mr Richard Posner
Job Title: President
T: + 1 843 846 3700
F: + 1 843 846 3701
E: sales@nodust.com
W: www.nodust.com
Manufacturers of Dry Fog Dust Suppression Systems for conveyors, truck & rail dumps, hoppers, feeders, crushers, ship loaders/unloader. Modular systems produce fog droplets that attach to like size airborne dust particles. Functions in below freezing temperatures. DustTamer Windfences for hoppers & stockpiles.

E-Crane World Wide

Koekoeklaan 53
Adegem
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Belgium
Contact: Mr Bas Tolhuizen
Job Title: International Sales Manager
T: + 31 165 320100
F: + 31 165 320759
E: bas.tolhuizen@e-crane.com
W: www.e-crane.com
Provides engineering, sales management and technical product support for the E-Crane fleet. The 'E' stands for equilibrium. A revolutionary hydraulic bulk material handler, the E-Crane uses the balance principle and is perfectly suited for loading and unloading ships and inland river barges, all while consuming up to 50% less energy.

E-Crane World Wide / E-Crane International USA

1332 Freese Works Place
Galion
Ohio
44833
USA
Contact: Mr Mark W Osborne
Job Title: President
T: + 1 419 468 0090
F: + 1 419 468 0074
E: mark.osborne@e-crane.com
W: https://www.e-crane.com/
Equilibrium Cranes from 6 to 40 tons capacity, reach from 64 to 147 feet with project specific lowers such as fixed, gantry, rail or crawler for bulk material handling.

ECS Eurocargo Services AS

Tongavej 19
Århus C
DK-8000
Denmark
Contact: Mr Peterson
T: + 45 86 20 82 20
E: ecs@eurocargoservices.dk
W: www.eurocargoservices.dk
Custom clearance
Evaluation of damages

EDGE INNOVATE. (NI) LTD

30 Farlough Road
Newmills
Dungannon
County Tyrone
BT71 4DT
Northern Ireland
Contact: Mr Lee Williamson
Job Title: Global Sales Manager
T: + 44 2887 740525
F: + 44 2887 747244
E: info@edgeinnovate.com
W: https://edgeinnovate.com/
Edge Innovate are a blue sky thinking, imaginative and creative equipment manufacturing company. With our ethos of "Innovation at Work" EDGE persist in pushing the boundaries of design and manufacturing to produce hard working, quality machinery to fit any materials handling requirement from recycling, material handling to quarrying.

Elgin Engineering and Construction

2001 Butterfield Road
Downers Grove
Chicago
Illinois
60515
USA
Contact: Mr Bob Williams
Job Title: Marketing Director
T: + 1 630 434 7200
F: + 1 630 434 7272
E: soros@elgin industries.com
W: www.elginindustries.com
An international consulting and engineering firm specialised in conceptual development, planning, feasibility studies, design engineering, project management, construction supervision, etc.

EMS-Tech Inc

699 Dundas Street West
Belleville
Ontario
K8N 4Z2
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Contact: Mr Kyle Sorensen
Job Title: Assistant Manager, Global Sales & Market Research
T: + 1 613 966 6611
F: + 1 613 966 6710
E: sales@ems-tech.net
W: www.ems-tech.net
A multi-task, multi-discipline company specialising in design and supply of dry bulk material handling equipment, including custom designed conveyors, shiploaders, stackers and reclaimers, self-unloading ships, transhippers, belt elevators, receiving hoppers, storage/loadout systems, environmental controls.

Endress + Hauser Inc

2350 Endress Place
Greenwood
IN
46143
USA
Contact: Mr Victor Wolowec
T: + 1 317 535 1410
F: + 1 317 353 1481
E: info@us.endress.com
W: www.us.endress.com
Processes control devices and measurement systems, which include level flow, pressure tank guaging, temperature and liquid analysis systems.

Engicon nv

Broelstraat 20
Harelbeke
B-8530
Belgium
Contact: Mr Pieter Van Acker
Job Title: Sales & Marketing Director
T: + 32 56 73 21 21
F: + 32 56 73 40 40
E: sales@geldof.be
W: www.geldof.be
Specialised in the engineering, construction and erection of storage and handling installations for bulk goods. Fully equipped mechanical shiploaders; Silos; Tanks; Dust reducing hoppers and stackers; Belt, chain and bucket elevators, conveyors and screws. Large turnkey installations combining storage and handling; Environmental projects - flue gas cleaning, waste incineration plants, recycling plants.

Engineering System Solutions, ES2

4943 N 29th E
Suite A
Idaho Falls
ID
83401
USA
Contact: Mr Adam Aagard
Job Title: Project Manager
T: + 1 208 552 9874
E: adam.aagard@es2eng.com
W: https://www.es2eng.com

EQUIPO LLC

P.O.Box : 64624
DEIRA
Dubai
64624
UAE
Contact: Mr Dharmaraju Sundaram
Job Title: Marketing Manager
T: + 971 55 473 6204
F: + 971 4 268 2217
E: sales@equipo.ae
W: http://www.equipollc.com/

Esch Group bv

Veerweg 14
Hoorn
5145 NS
The Netherlands
Contact: Mr Evert van Esch
Job Title: Sales Director
T: +31 (0) 416 315656
E: info@eschgroup.nl
W: http://www.eschgroup.nl/nl/home
A manufacturer (production) of transport rollers, drive and tension drums and import bearings and bearing blocks.

ESI Eurosilo BV

Newtonstraat 26-28
Purmerend
1446 VR
The Netherlands
Contact: Mr Richard Spaargaren
Job Title: Commercial Director
T: + 31 299 630 730
F: + 31 299 630 737
E: esi@eurosilo.com
W: www.eurosilo.com
Large scale flat bottom storage silos with a Eurosilo stacking and reclaim system inside. Max.storage volume 100,000 m3 per unit.

EUROMECC S.r.l. (HQ)

SS 192 Km 79 Casella Postale 163
Misterbianco
95045
Italy
Contact: Eng Alfio Daniele
Job Title: Owner
T: +39 331.1834741

F: +39 095.7130115
E: info@euromecc.com
W: www.euromecc.com
EUROMEC, born from the merger of companies Eurohydromec and Isomec, has years of experience in the material handling field and the production of products such as lifting equipment, electrohydraulic and mechanical grabs and buckets.

Euro-Tech Corporation

N48 W14170 Hampton Avenue
Menomonee Falls
Wisconsin
WI 53051
USA
Contact: Ms Patricia Albers
Job Title: Marketing Coordinator
T: + 1 262 781 6777
F: + 1 262 781 2822
E: sales@eurotechcorporation.com
W: www.eurotechcorp.com
Eurotech Corporation is a distributor of crane & excavator attachments. We service North and Central America. Our product range includes attachments of all types and in all size ranges including hydraulic, electro hydraulic, diesel hydraulic and mechanical grabs for bulk material handling.

Euro-Tramco BV

Spacelab 47 D
Amersfoort
3824MR
The Netherlands
Contact: Mr Hans Plekkenpol
T: + 31 33 4567033
F: + 31 33 4558149
E: hans@tramco-europe.com
W: www.tramcoinc.com
Manufactures chain, screw and bucket conveyors and 'Aerobelt' air-supported belt conveyor systems.

Fabtech International Ltd

PO Box 61015
Jebel Ali Freezone
Dubai
UAE
Contact: Mr Murali Ganesan
Job Title: VP PROJECTS
T: + 971 4 883 8833
F: + 971 4 883 5126
E: info@fabtech.ae
W: https://www.fabtechint.com/

FAM GmbH

Sudenburger Wuhne 47
Magdeburg
D-39112
Germany
Contact: Mr David Horschig
Job Title: Senior Vice President Sales & Service
T: + 49 391 6380 10 1 04
F: + 49 391 6380 10 0 99
E: sales@fam.de
W: www.fam.de
FAM successfully plans, designs, manufactures and delivers turnkey equipment for extracting, producing, loading and storing bulk materials. FAM combines know-how of series and customized production processes and offers a complete range of manufacturing services including after-sales services along with engineering services.

FAMUR S.A.

ul. Armii Krajowej 51
Katowice
40-698
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Contact: Ms Iwona Sobczak
T: + 48 22 244 57 00
E: famur@famur.com
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FELD Maschinen- und Industriebau GmbH

Winkelfeld 3
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D-45739
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Contact: Mr Andreas Renner
Job Title: Executive Director
T: + 49 2368 98 8930
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E: info@maschinenbau-feld.de
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FFE Ltd

9 Hunting Gate
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Hertfordshire
SG4 0TJ
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Contact: Mr Mark Wood
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T: + 44 1462 444 740
F: + 44 1462 444 789
E: sales@ffeuk.com
W: http://www.ffeuk.com/

Figee Crane Services BV

PO Box 235
Zaandam
1500 EE
The Netherlands
Contact: Mr Robert de Rijcke
Job Title: Commercial Director Kenz Figee Group
T: + 31 75 6810 410
E: r.derijcke@kenz-figee.com
W: www.kenz-figee.com
Engineering, manufacturing, commissioning and service of a wide range of harbour cranes and lifting systems such as grab cranes, including floating Lemniscate cranes, single and double boom cranes and gantry grab cranes.

Flexco

2525 Wisconsin Avenue
Downers Grove
IL
60515-4200
USA
Contact: Mr Martin O'Neill
Job Title: Sen. Director - NA Sales & Global Strategic Accs.
T: + 1 630 971 0150
F: + 1 630 971 1180
E: info@flexco.com
W: www.flexco.com
Flexco provides the world's belt conveyors with efficient, safe products, services, and solutions for splicing, belt cleaning, belt tracking, spillage, and slippage. The company is based in Downers Grove, Illinois USA and operates subsidiaries in Australia, Chile, China, England, Germany, India, Mexico, Singapore, and South Africa. Flexco markets its broad line of products through a worldwide network of distributors, under the Flexco® and Mineline® names.

Flexco Europe GmbH

Maybachstraße 9
Rosenfeld
D-72348
Germany
Contact: Mr Joerg Schairer
Job Title: Managing Director
T: + 49 7428 94060
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E: europe@flexco.com
W: www.flexco.com
Manufacturer and distributor of mechanical belt fastening systems, installation tools, ceramic lagging, cleats and cleaners.

Flexicon Corporation

2400 Emrick Blvd
Bethlehem
PA 18020-8006
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Flexoveyor Conveyor

3795 Paris St., Unit D
Denver
Colorado 80239
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Contact: Mr Bill Priday
T: + 1 303 375 0200
F: + 1 303 373 5149
E: www.flexoveyor.com
W: www.flexoveyor.com
A leading manufacturer of material handling equipment for bagged material to include belt conveyors, bag palletizers, empty pallet dispenser and full pallet conveyors. Systems are complete with all required electrical controls, wiring and programming. All equipment is shipped as fully assembled as possible and is tested 100% prior to shipment.

Franz Wölfer Elektromaschinenfabrik Osnabrück GmbH

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Ganz Danubius Trading Co Ltd

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Hungary
Contact: Mr Károly Bajusz
Job Title: Managing Director
T: + 36 1 350 5570
F: + 36 1 329 8041
E: gdtco@hu.inter.net
W: www.ganztrading.hu
Suppliers of mechanical shiploaders and unlaoders, level luffing harbour grab cranes, floating grab cranes and other bulk handling equipment.

General Kinematics

5050 Rickert Rd
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Geo - Chem Laboratories Pvt. Ltd

Geo - Chem House
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Geometrica Inc

12300 Dundee Court
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77429
USA
Contact: Mr Cecilio Zalba
Job Title: Sales Manager
T: + 1 832 220 1200
F: + 1 832 220 1201
E: sales@geometrica.com
W: www.geometrica.com
Specializes in design, fabrication and erection of bulk storage enclosures requiring large, column-free interiors. Geometrica structures may span over 300m and may be galvanized steel or aluminium. Geometrica domes are used over circular, square, rectangular, and irregular piles.

Geroldinger GmbH & Co KG

Au-Strasse 9
Sigharting
A-4771
Austria
Contact: Mr Walter Geroldinger
Job Title: CEO
T: + 43 7766 24370
F: + 43 7766 243724
E: office@geroldinger.com
W: www.geroldinger.com
Product range includes grain silos and bins, railcar loaders and unloaders, truck loaders and unloaders and hopper systems.

Getriebebau NORD GmbH & Co. KG

Getriebebau-Nord-Str. 1
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Golfetto Sangati s.r.l. (GEA Group)

GOLFETTO SANGATI

Via Monte Grappa, 8
Galliera Veneta (PD)
35015
Italy
Contact: Mr Pietro Barbujani
Job Title: Sales Area Manager
T: + 39 0422 476 700
E: pietro.barbujani@gea.com
W: www.golfettosangati.com
Construction of grain terminals and plants for bulk handling, including shiploaders, pneumatic and mechanical shipunaloders and conveyors. Engineering and construction of fully automated systems for grain handling.

Goodtech AS

Bjoernslettveien 2
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W: www.portabulk.com or www.goodtech.no
Part of the Norwegian Goodtech Group, Goodtech AS' business network provides superior materials handling technology, services and systems, under the PORTABULK® brand, to a wide variety of user segments throughout the world.

Grapplers India Pvt Ltd (Essar Industries)

XIV/261- A, Chembaracky
South Vazhakulam Post
Aluva Perumbavoor Road
Ernakulam
Bengaluru
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W: www.essarmaterialhandling.com/

Gulsan A.p.

Organize Sanayi Bolgesi 2 Cad. No: 18
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E: info@gulsan-group.com
W: www.gulsan-group.com

Guttridge Limited

Wardentree Park
Pinchbeck
Spalding
Lincolnshire
PE11 3UU
UK
Contact: Mr Doug Anderson
Job Title: Sales and Marketing Manager
T: + 44 1775 765300
F: + 44 1775 765304
E: sales@guttridge.co.uk
W: www.guttridge.com
Guttridge - A Mitchells Group Company, manufacture a range of bespoke bulk conveying and elevating equipment solutions capable of moving between 1 and 2000tph for a wide range of applications and complete deployable modular mill systems.

Guven Grab Machine Industry and Trade Inc.

Akse Mahallesi 535. Sk. No: 3/1
Çayırova
Kocaeli
41420
Turkey
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T: + 90 262 743 8858
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E: info@guvengrab.com
W: www.guvengrab.com
Established in 1984, Guven Grab & Machine (Guven Kepce Makine) has its own manufacturing facilities. Its product range includes radio remote control grabs, electro hydraulic clamshell/orange peel grabs, mechanical clamshell orange peel touch down grabs and mechanical double wired grabs. It has supplied its units to countries all over the world.

Hanson Silo Company

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8 SE
Lake Lillian
MN
56253
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Contact: Mr Mike Hanson
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T: + 1 800 843 7456
E: hscinfo@hansonsilo.com
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Hanson Silo is the leader in Modular Precast Concrete Storage Systems.

Hapman

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Haskoning India Pvt Ltd

13th Floor, Maithili's Signet
Plot - 39/4, Sector 30A
Vashi
Navi Mumbai
400 705
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HASLER GROUP SAS

Z.I. De l'Abbaye
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E: sales.fr@hasler-gp.com
W: www.hasler-gp.com
We are specialized in the study and the realization of industrial installations grouping an important and coherent set of equipments. Our Strategic Business units are: dosing, mixing, filtration and processing.

Heavy Handling

Steenlandlaan - Haven 1112
Beveren (Kallo)
Oost-Vlaanderen
9130
Belgium
Contact: Mr Mathias Matton
Job Title: Sales Director Port Cranes
T: + 32 479190755
E: info@heavyhandling.be
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Our mission is to make your operations better, faster and safer.
We import, distribute and service port equipment in the Benelux.
Our offer: forklifts, reachstackers, containerhandlers, materialhandlers, port cranes, translifters and others from renowned brands such as KONECRANES, MANTSINEN, MOVELLA.

Henry International Diplomatic Marine

27502 Vilna Avenue
Santa Clarita
CA
91351
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Contact: Mr Jim Hill
Job Title: International Sales Manager
T: + 1 713 676 2400
F: + 1 713 673 5805
E: jhill@henry.com
W: www.henry.com
Products include:
RAM-NEK - Premium heavy duty hatch cover tape.
GULF-SEAL - Heavy duty hatch cover tape
MARITAPE-60 - Hatch cover tape
MARITAPE-40 - Hatch cover tape
KOAMING-AIDE - Coaming joint sealant
RAM-WRAP - Pipe repair system

Heyl & Patterson Equipment Division of The HALL Group

701 Technology Drive
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USA
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Heyl & Patterson Equipment specializes in custom engineered capital equipment for bulk material handling. We engineer railcar movers, dumpers, stacker reclaimers and barge unloaders, as well as provide replacement parts, upgrades and retrofits for the life of our equipment, which is measured in decades.

HIT S.r.l.

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HKD Blue

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E: gsantry@hkdblue.com
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HKD Blue engineers and manufactures water-atomizing dust control equipment and technology. The company offers powerful misting cannons for sensitive material handling, as well as turnkey engineering and design services for automated dust suppression infrastructure.

Horizon Conveyor Equipment

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W: www.horizonconveyors.co.uk
Manufacturers of steel, plastic idler rollers and Idler Sets, conveyor belt scrapers, pulleys/drums and conveyor components.

Hycontrol Limited

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W: www.hycontrol.com
Hycontrol has been providing precision level measurement solutions to industry for over thirty-five years, measuring most liquid and solid materials including slurries, pastes, powders, grains, pellets and flakes at ranges up to 100m. Hycontrol is also the world's leading silo pressure safety system expert.

IMASA

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IMGS

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Inspections and testing of various commodities worldwide.

Inspectorate America Corporation

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Interjute BV

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INTERJUTE is a global supplier of woven polypropylene bags and big bags with offices in the Netherlands, Spain, Romania and Brazil. Based on its 50 years' experience supplying flexible packaging materials, the company has achieved a leading position in the international bulk packaging sector offering quality, efficiency and competitive prices. We deliver from stock throughout Europe including Black Sea and Baltic ports but also to Africa.

Intermodal Solutions Pty Ltd

The Zhen Building
210/33 Lexington Drive
Bella Vista
NSW
2153
Australia
Contact: Mr Garry Pinder
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T: + 61 400 035 548
E: gpinder@isgpts.com
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Suppliers of a dust free logistics , storage and ship loading system using bulk containers and tipplers. Visit our website to see how the system works www.pittoship.com

Intersystems

9575 N 109th Ave
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T: + 1 214 495 9713
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W: www.intersystems.net
Intersystems manufacturers a complete line of enclosed belt and en-masse conveyors, bulk weighers, bucket elevators, samplers, probes, screeners, distributors, micro ingredient systems and bolted bin systems.

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Istop Spamat Srl

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Italgru S.r.l

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T: + 39 035 4932 411
F: + 39 035 4932 409
E: info@italgru.com
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Since 1954 a total number of 1500 cranes have been delivered world wide and ITALGRU is an established market leader in crane technology.

J & B Grabs b.v.

Rijksstraatweg 32
Utrecht
Utrecht
3545 NA
The Netherlands
Contact: Mr Edgar Joustra
Job Title: Director
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Designs, engineers and manufactures mechanical and hydraulic grabs for all kinds of bulk material.

Jansen & Heuning

Bulk Handling Systems
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JEM International

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T: + 1 913 441 4788
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E: info@JemScales.com
W: www.JemBaggingScales.com
Manufactures complete range of open-mouth bag filling equipment and bag closing conveyors. Also makes self-contained bag plants comprising bag filling scales, bag closing conveyors, air compressor surge hoppers, control panels - all container installed and mounted.

Jenike & Johanson Inc.

400 Business Park Drive
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MA
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USA
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Bulk solids handling engineers with nearly 50 years of field experience. Based on the scientific approach, the company will assist with handling needs, improving the reliability of clients' existing equipment and helping to choose new equipment. The quick response engineering team provide on-site consulting services in; Testing, Modelling, Functional design, Structural design, Equipment supply and Courses/seminars.

Jiangsu ZDPM Manufacturer Co.,Ltd

No. 38, Fuchun River Road
Changshu City
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215533
China
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Jimway Enterprise Co., Ltd

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Established in 1982 and obtained ISO 9001 certification in 1998, Jim Way is an expert belt conveyor components manufacturer. We focus our expertise to produce idlers, pulley laggings, belt cleaners, skirt rubber, ceramic liners, etc. for conveyor solutions.

Joy Global Conveyors Inc

438 Industrial Drive
Winfield
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35594
USA
Contact: Lou Boltik
Job Title: Director Marketing & Communications
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F: + 1 205 487 4233
E: info@joyglobal.com
W: https://mining.komatsu/
The HAC® has proven itself to be a versatile and money saving alternative for elevating and lowering materials at any angle, up to and including 90° (vertical). The HAC® can be located on a ship or in a loading area.

Kalenborn Kalprotect GmbH & Co. KG

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Job Title: Sales Manager
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Kardesler Grab & Machine Co.

Istanbul Mermerciler Sanayi Sitesi
Koseler Mah. 21. Cad. No : 39
Dilovası
Kocaeli
41455
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Contact: Mr Huseyin Isikoglu
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E: info@kardeslergrab.com
W: www.kardeslergrab.com

Kinergy Corporation

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Manufacturer of vibratory machines for bulk solid material handling. Induced Vertical Flow units either discharge or densify materials placed in storage. Induced Conveying units use vibration to transport or process bulk solid materials.

King Bag & Manufacturing Co

1500 Spring Lawn Avenue
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OH
45223
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Contact: Mr Mike Jennings
Job Title: Sales Manager
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W: www.kingbag.com
Manufactures FIBCs with 100 years of experience in the speciality bag business producing custom sewn products for customers around the world.

KINSHOFER GmbH

Hauptstrasse 76
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D-83666
Germany
Contact: Mr Martin Locher
Job Title: Marketing
T: + 49 8021 8899 2510
F: + 49 8021 8899 37
E: m.locher@kinshofer.com
W: www.kinshofer.com
KINSHOFER GmbH produces Premium Quality Attachments such as Clamshell Grabs (up to 7 cubic metres) for excavators & re-handling machines up to 100 t operating weight, HD Orange Peel, Selector and Timber Grabs. Big Bag Handlers too. Custom solutions. Catalog available.

KOCKS ARDELT KRANBAU GmbH

Heegermühler Straße 64
Eberswalde
16225
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Contact: Ms Ulrike Manke-Krausemann
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W: www.kocksardelt.de
Crane manufacturer (designing, fabrication, assembling, commissioning, training, after sales service in one hand for harbour cranes, shipyard cranes, balancer cranes - refurbishment, inspection, repair service for own and third party cranes)

Komatsu Mining Corp.

West Quay Road
Sunderland Enterprise Park
Sunderland
Tyne & Wear
SR5 2TD
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Previously known as Joy Global and Continental Conveyor Ltd. Capabilities range from manufacturing of individual conveyor components to full project design and execution, with over 100 years' experience.

Konecranes Port Solutions - Konecranes GmbH

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Contact: Mr Giuseppe Di Lisa
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T: + 49 211 7102 3771
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FOR GREATER BULK HANDLING PRODUCTIVITY
Reach out and grab it with eco-efficient Konecranes Gottwald Mobile Harbor Crane technology. Depending on site and operating conditions, our four-rope grab cranes, also available as rail-mounted portal and floating cranes, achieve handling capacities of up to 2,000 tph in continuous-duty bulk handling. Our broad range of products with their smart crane features is supported by dedicated planning and consultancy services and backed by a global service network.

Kröger Greifertechnik GmbH & Co. KG

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Lachenmeier Monsun A/S

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Laidig Systems Inc

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Indiana
IN 46544
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Contact: Mr Mike Schuster
Job Title: VP of Sales
T: + 1 574 256 0204 x 236
E: sales@laidig.com
W: www.laidig.com
Laidig Systems Inc, manufactures custom engineered storage and reclaim systems for tough, hard to handle materials and whole grains. Such materials include soybean meal, other grain meals, whole grains, wood chips, sawdust, and recycled materials.

Langston Companies Inc.

PO Box 60
Memphis
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38101-0060
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Contact: Mr Bob Langston
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Lawrence Industries, Inc.

10403 Arbor Trail
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46725
USA
Contact: Mr Kerry McAtee
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E: kmcatee@lawrenceindustriesnow.com
W: www.lawrenceindustriesnow.com
Lawrence Industries, Inc. is a supplier of industrial lining materials that improve bulk material flow in silos, bins, and bunkers. TIVAR 88 is a primary material that is used to eliminate bridging, arching and ratholing. Lawrence Industries designs and fabricates.

Legacy Building Solutions, Inc.

19500 County Road 142
South Haven
Minnesota
55382-9240
USA
Contact: Ms Sarah Cords
Job Title: Director of Marketing
T: + 1 320 258 0500
F: + 1 320 259 0087
E: marketing@legacybuildingsolutions.com
W: www.legacybuildingsolutions.com
Legacy structures harness the power of corrosion resistance, natural light, and a faster installation process for an increase in ROI. Custom engineered to spec, worldwide installation, built in half the time, warrantied in corrosive environments. Legacy Building Solutions, customized for your needs.

Librawerk Maschinenfabrik GmbH

Vossenkamp 1
Braunschweig
Lower Saxony
D-38104
Germany
Contact: Mr Rolf Klein
Job Title: Owner
T: + 49 531 370980
F: + 49 531 3709888
E: info@librawerk.de
W: https://www.librawerk.de/en/home.html
Fully automatic and semi-automatic bagging units for almost all kinds of bulk goods. Big bag filling machines with a weighing range of up to 2,000kg, with capacities from 5 to 60 bags/hour.

Liebherr-MCCtec Rostock GmbH

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Germany
Contact: Ms Monika Schedler
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T: + 43 50809 41725
F: + 43 50809 41447
E: maritime.cranes@liebherr.com
W: www.liebherr.com
With over 1,600 machines delivered in more than 100 countries Liebherr mobile harbour crane offers today a range of 7 models (42 - 308 tonnes capacity), providing ideal solutions for the efficient handling of containers, bulk, general cargo and heavy lifts.

Lion Bulk Handling b.v.

Global Headquarters
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Capelle aan den Ijssel
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Listenow GmbH & Co.

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E: c.lohr@listenow.com
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Loading equipment from 200-2000mm and length up to 24m, loading tubes - patented - PU flex, loading tubes of many materials, filter for loading equipment, electric rope winches, bellow expansion joints, collars, hoses, folding stairways, transport racks.

Loeffler Engineering Group

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E: frank@loefflerengineering.com
W: www.loefflerengineering.com
Specializing in Conveyors and bulk materials handling.

Loibl Förderanlagen GmbH

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Macawber Engineering, Inc

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Maryville
TN
37801-3796
USA
Contact: Mr Dean Wicks
Job Title: VP Business Development
T: + 1 800 433 2213
F: + 1 865 984 5286
E: webinquiry@macawber.com
W: www.macawber.com
Designing and manufacturing low-velocity pneumatic conveying systems to solve your conveying needs, especially when your material is difficult to handle. With thousands of materials conveyed in virtually every industry, Macawber has remained X to its core business for 40 years with proven capability and expertise to create systems that are not only reliable and efficient but also cost-effective to operate and maintain.

Mack Manufacturing Inc

PO Box 1559
7205 Bellingrath Road
Theodore
Alabama
36582
USA
Contact: Mr Matthew A. Davidson
Job Title: Vice President - Marketing
T: + 1 251 653 9999
F: + 1 251 653 1365
E: sales@MackMfg.com
W: www.mackmfg.com
A leader in designing and building heavy-duty high performance grapples and clamshell buckets since 1942. We are dedicated to supplying our customers with the right attachment for their application. Quality and reliability are trademarks of Mack grapples and buckets.

Mantsinen Group Ltd Oy

Valikankaantie 3
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FIN-80400
Finland
Contact: Mr Asko Kinnunen
Job Title: Area Sales Director
T: + 358 20 755 1230
E: asko.kinnunen@mantsinen.com
W: www.mantsinen.com
MANTSINEN builds the largest hydraulic material handling machines and cranes in the world and supplies them through an extensive dealer network worldwide. MANTSINEN also provides large scale logistic services in Finland and Russia. We are a family owned company with over 550 employees in Finland, Russia and Sweden. Our company is headquartered in Liperi, Finland where we have also our production facilities. Our heart has been beating to port and terminal logistics since 1963.

Maquinas Condor SA

Av Dos Estados 1383
Porto Alegre
RS
90200-001
Brazil
Contact: Mr André Meyer da Silva
Job Title: Director
T: + 55 51 2104 3388
F: + 55 51 2104 3345
E: andre@maquinascondor.com.br
W: www.maquinascondor.com.br
Founded 1959. Engineers and manufactures complete systems for solid bulk materials handling ports and terminals. Equipment range includes pneumatic grain unloading, continuous shiploading, bulk stacking, reclaiming, belt coveyor, bucket elevator and mechanical conveyor. Operating from barges up to capesize ships, to 3000 tph. Shipunloaders and shiploaders operating successfully in ports around the world.

Martin Engineering

One Martin Place
Neponset
Illinois
IL 61345
USA
Contact: Mr Greg Milroy
Job Title: Customer Service Manager
T: + 1 309 852 2384 ext 214
F: + 1 800 814 1553
E: rickf@martin-eng.com
W: www.martin-eng.com
Supplier of conveyor components, flow aids, safety products and training to make bulk material handling cleaner, safer and more productive.

Martin Engineering GmbH

In der Rehbach 14
Walluf
Hessen
D-65396
Germany
Contact: Mr Joachim Preiß
Job Title: Marketing Manager Europe
T: + 49 61 23 978 221
F: + 49 61 23 75 5 33
E: info@martin-eng.de
W: www.martin-eng.de
Conveyor Inspection (WTB) Safety training seminars, Conveyor equipment, belt cleaners, belt tracking systems, impact cradles, sealing systems , dust suppression systems, air cannons and vibrators, silo cleaning services , air supported conveying systems, inertial flow transfer chutes.

Martin Engineering South Africa

PO Box 12696
Leraatsfontein
1038
South Africa
Contact: Mr Hannes Kotze
Job Title: Managing Director
T: + 27 13 656 5135
F: + 27 13 656 5129
E: hannesk@martin-eng.co.za
W: www.martin-eng.co.za
Installation & Maintenance of belt cleaners, sealing systems, impact support, belt tracking, air-cannons, screen vibrators, silo cleaning, service contracts, Martin Engineering Service Group - MESG S Class air supported conveyors, Inertial Flow chutes.

Maschinen und Mühlenbau Erhard Muhr GmbH

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D-83098
Germany
Contact: Mr Roland Muhr
Job Title: Managing Director
T: + 49 8034 90720
F: + 49 8034 9072 526
E: info@muhr.com
W: www.muhr.com
MUHR offers a wide range of high quality Bulk Loading Systems (for open and closed, dust-free loading), Loading Spout Positioners, Pneumatical Docking Devices and even Railcar Dumping Systems for economical unloading of trains with open railcars.

Matrix PDM Engineering

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OK
74135
USA
Contact: Ms Lesley Windler
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E: lwindler@matrixservicecompany.com
W: www.matrixpdm.com
Matrix PDM Engineering delivers complete design-build services to the grain industry for 35 years. From greenfield facilities, retrofits, and expansions our services include Owner's Engineer, multidiscipline engineering, fabrication, construction, marine and dock expertise, silo design and inspection and control systems integration.

MegaDome® Buildings by Harnois

1044 Prinicipale
St-Thomas
Saint-Thomas
Quebec
J0K 3L0
Canada
Job Title: Marketing Coordinator
T: + 1 450 756 1042
F: + 1 450 756 8389
E: info@harnois.com
W: www.megadomebuildings.com

MegaRoller

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WA 6163
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T: + 61 4 1629 6950
E: info@megaroller.co.za
W: www.megaroller.com.au

Merrick Industries

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Lynn Haven
FL
32444
USA
Contact: Mr Erik Nolte
Job Title: Sales Manager
T: + 1 850 265 3611
F: + 1 850 265 9768
E: info@merrick-inc.com
W: www.merrick-inc.com
Invented dynamic weighing in 1908 and has been operating continuously ever since. Offer carbon and stainless steel belt scales, weigh belt feeders, loss-in-weight feeders, volumetric feeders, flow meters and microprocessor controls. The company is focused on the dynamic weighing of powders, granules, pellets and liquids while in motion. Products are supplied worldwide and can be used in batching, continuous weighing and continuous feedrate control applications.

Metso Brasil Industria e Comercio Ltda.

Av. Independencia, 2,500 Eden
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18087-050
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T: + 55 15 2102 1762
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Metso Minerals Industries, Inc.

Bulk Materials Handling
2715 Pleasant Valley Road
York
PA
17402
USA
Contact: Mr Tom Lippencott
Job Title: VP, Mineral Process Solutions Sales, USA
T: + 1 412 999 8552
F: + 1 717 849 7148
E: Tom.Lippencott@metso.com
W: www.metso.com
Products: Railcar and Barge Pullers, Railcar Dumpers and Positioners, Grab & Equilibrium Unloaders, En-Masse Conveyors, Ship Trimmers, Throwers, Railcar Indexers, Barge Haul Systems, Breasting Winches, Apron Feeders
Brand Names: Stephens-Adamson, McNally Wellman, PECO, Nolan HCM, MKT, Mead Morrison, McDowell Wellman, NICO

Mideco

Factory 2, 63-71 Bayfield Rd East
Bayswater North
Victoria
3153
Australia
Contact: Mrs Olha Lyeskakova
Job Title: Chief Marketing Officer
T: + 61 3 8873 0200
F: + 61 438 859 178
E: sales@mideco-llc.com
W: www.mideco-llc.com
Mideco is an Australian founded and 100% owned designer and manufacturer of dust and air pollution control systems with headquarters in Melbourne, Victoria. Mideco have developed industry leading equipment for dust control including innovations - Burnley® Baffles and Bat Booth®.

Midwest International Standard Products, Inc.

105 Stover Road/ PO Box 438
Charlevoix
MI
49720-0438
USA
Contact: Mr Walter Pair
Job Title: President and CEO
T: + 1 231 547 4000
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E: sales@midwestinternational.com
W: www.midwestmagic.com
Midwest International's specialized Vacupac™ Bustle Filters, velocity reduction modules, and vented low velocity trimming spoons make loading of grains into barges and ocean going vessels simple and dust free. Available in multiple configurations and sized to handle up to 100,000 bushels per hour, these devices can be adapted to an existing telescoping spout, or supplied as a complete telescoping solution.c

Mitsubishi Chemical Advanced Materials Inc.

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19612
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Contact: Mr Edward Zibert
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W: https://www.mcam.com/na-en/
With more than 40 years experience, MCAM's SystemTIVAR® Engineering designs, fabricates and installs lining systems worldwide for use in hoppers, chutes, bins, dump bodies, railcars, ships, etc., featuring industry-leading low coefficient of friction, abrasion-resistant TIVAR® 88 family of products.

Mole Master Services Corporation™

27815 State Route 7
Marietta
Ohio
45750
USA
Contact: Mr David Laing
Job Title: General Manager
T: + 1 740 374 6726
F: + 1 740 374 5908
E: contactus@molemaster.com
W: www.molemaster.com
Silo, bin, bunker, transport and process vessel cleanout & unclogging services and equipment. Pipe cleaning, Vacuum services, Dry ice Blasting, Media Blasting, Silo structural inspection services and facility cleaning.

Monolithic Dome Institute

177 Dome Park Place
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76651
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Contact: Mr David B South
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T: + 1 972 483 7423
E: sales@monolithic.com
W: www.monolithic.org/

Motherwell Automation

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Contact: Mr Lawrence Sule
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MRS Greifer GmbH

Talweg 15-17
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D-74921
Germany
Contact: Mr Peter Koerting
T: + 49 7263 9129 20
F: + 49 7263 9129 12
E: export@mrs-greifer.de
W: www.mrs-greifer.de
Approaching 50 years experience in producing all types of grabs. The company's product range extends from mechanical grabs, also radio-controlled, to hydraulic and electro-hydraulic grabs with motor drive. Besides excellent after-sales service, MRS provide spare parts from stock.

Mühlen Sohn GmbH & Co. KG

Blaustein
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F: + 49 151 15192754
E: info@muehlen-sohn.de
W: www.muehlen-sohn.de
Mühlen Sohn GmbH & Co. KG is one of the leading suppliers of fluidising fabrics and looks back to a success story since 1880 which means over 130 years of weaving experience. Fluitex® air slide fabrics for pneumatic loading and unloading systems, airslides for pneumatic conveying, storage and homogenising silos, discharging cones, fly ash handling systems.

Muller Beltex BV

Ambachtsweg 28A
Pijnacker
2641 KS
The Netherlands
Contact: Mr Lars Muller
T: + 31 15369 5444
F: + 31 15369 7864
E: info@mullerbeltex.com
W: www.mullerbeltex.com
Other Equipment: Elevators. Specialists in elevator components, buckets belts ATEX conform safety monitoring equipment. Design engineering and problem solving. Elevator belt bolt hole punching up to 2000 mm width Specialist in abrasion resistant polyurethane liners.

MWI Silo Systems Inc.

5001 Rd. 104 N. Easthope Perth East
Wellesley
Ontario
N0B 2T0
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Contact: Mr Joel Gingerich
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E: joel@mwisilo.com
W: http://mwisilo.com

Nantong Rainbow Heavy Machineries Co.,Ltd.

GENMA International Sales Center
1505,Zhongji building No.819
Yinxiang Road
Shanghai
201802
China
Contact: Ms Karen Huang
Job Title: Marketing
T: + 86 21 6333 3037
E: karen.huang@rainbowco.com.cn
W: http://www.genmasolution.com

Natural Grabs

Toros Caddesi Fethi bey sokak no 11
Natural Business Center
Maltepe
Istanbul
Turkey
Contact: Cpt Hayrettin Yakut
T: + 90 216 380 60 03
F: + 90 216 380 65 59
E: sales@naturalgrab.com
W: www.naturalgrab.com/

NAVCO (National Air Vibrator Co)

PO Box 40563
Houston
TX
77240-0563
USA
Contact: Mr Trey Gros
Job Title: Technical Sales Manager
T: + 1 832 467 3636
F: + 1 832 467 3800
E: trey@navco.us
W: www.navco.us
Manufacturer of high quality, industrial grade air vibrators and vibratory equipment. NAVCO is the leading expert in material flow solution using industrial vibrators and vibratory equipment.

Nectar Group Ltd

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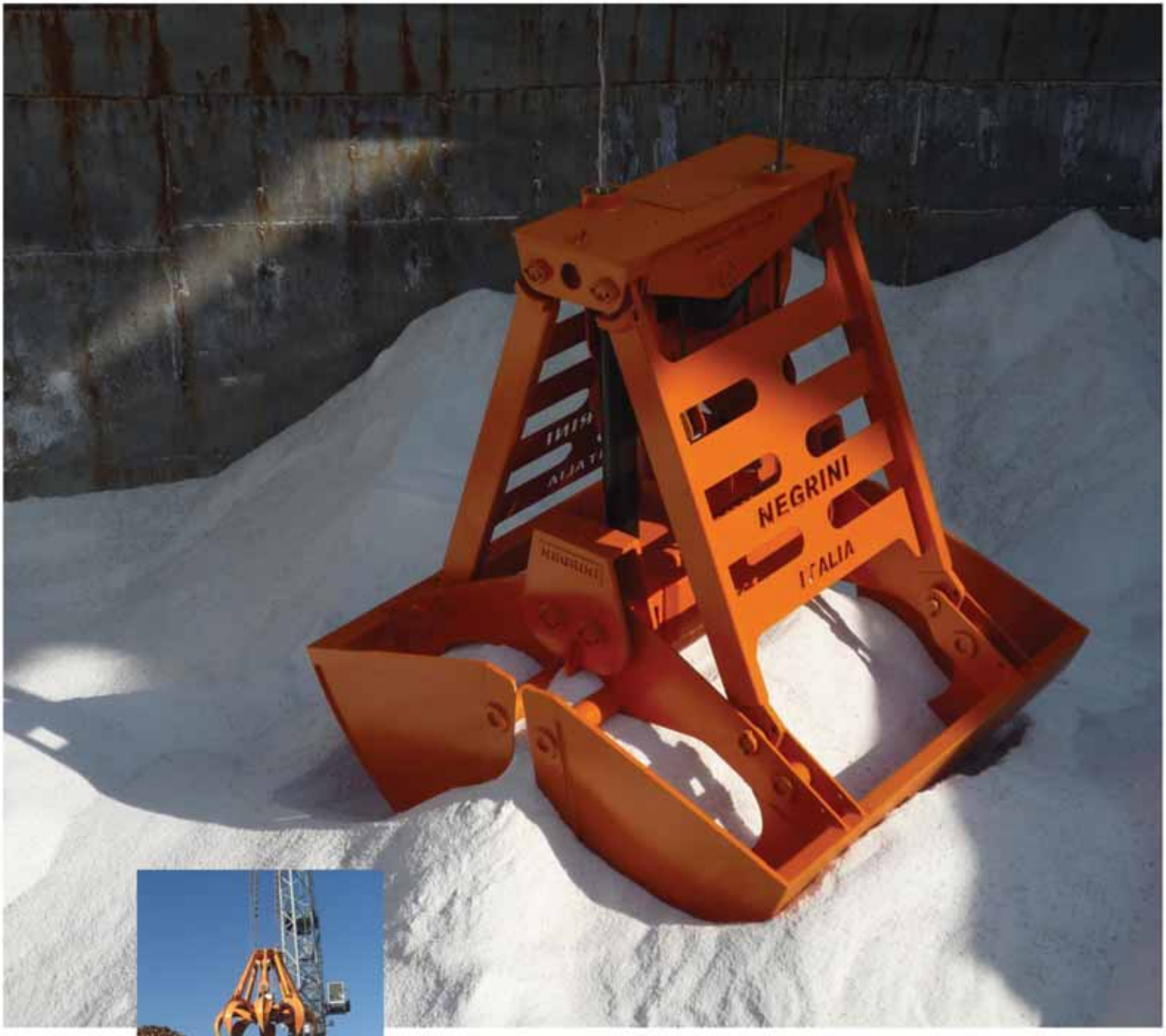
F: + 44 1708 386 665
E: commercialteam@nectar.co.uk
W: www.nectargroup.co.uk
Nectar is involved in handling bulk commodities such as cereals and fertilizers in ports and/or inland locations. Involvement ranges from positioning of mobile bagging machines for spot cargoes to long term projects including terminal management and storage and logistics solutions.



NEGRINI
since 1967 S.R.L.

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

www.negrini.org

Negrini Srl

via E. Torricelli n.4
Castelfranco Emilia
Modena
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Italy
Contact: Mr Massimo Negrini
Job Title: Managing Director
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E: info@negrini.org
W: www.negrini.org
Negrini srl considers the attainment of client satisfaction our primary objective, through a continuous and effective process of study and collaboration with both clients and suppliers. Professionalism and versatility towards different customer demands: this is the business philosophy of Negrini srl.

Nemag BV

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Contact: Mr Riny Stoutjesdijk
Job Title: Sales Manager
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F: + 31 111 416 154
E: sales@nemag.com
W: www.nemag.com
NEMAG specializes in sales and manufacture of tailormade mechanical grabs. Also rope end fittings like the NEMAG Rope Pear Socket and NEMAG Quick Release Link. NEMAG is one of the leading grab manufacturers world wide.

NERAK GmbH Fördertechnik

Brigitta 5
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D-29313
Germany
Contact: Mr Edgar Bleeker
Job Title: Marketing
T: + 49 50 84 944 0
F: + 49 50 84 944 222
E: info@nerak.de
W: www.nerak.com
Conveying on combined horizontal/vertical paths is our strength. The NERAK rubber block chain is the basis for the world wide success of NERAK conveyors: reliable, nearly maintenance free, without any lubrication and very silent, operating in various industries.

Neuero Industrietechnik GmbH

Neuerostrasse 1
Melle
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Germany
Contact: Eng. Andreas Haeuser
Job Title: Sales & Project Manager
T: + 49 5422 9503 26
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W: www.neuero.com
NEUERO offers a wide range of pneumatic ship unloaders up to 800 t/h and ship loaders with Neuero KIKO system and loading capacities up to 3.000 t/h.
Bulk handling products varies from grain to alumina and biomass. Special unloading systems with rotating feeder for non-free flowing materials are also available.

Nilfisk SpA

Via Porrettana 1991
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Job Title: Director of Marketing
T: + 39 059 973 00 00
F: + 39 059 973 00 99
E: industrial-vacuum@nilfisk.com
W: Nilfisk SpA
Nilfisk SpA is the world leader in the production of industrial vacuums, pneumatic conveyors, centralized vacuum systems and high power vacuums.

NK Tehnologija SIA

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T: + 371 67271092
F: + 371 67271038
E: nkteh@nkteh.lv
W: www.nkteh.lv
Industrial design, engineering and assembly company specializing in dry bulk material handling projects and lifting equipment since 2001. In addition to shiploaders, weigh hoppers and container tilting spreaders we supply solutions for integrated bulk handling systems and equipment allocation.

NKM Noell Special Cranes GmbH

Kruisweg 643
Hoofddorp
2132 NC
The Netherlands
Contact: Mr Frank Heen
Job Title: Manager Offshore Cranes
T: + 31 20 655 0030
F: + 31 20 655 0040
E: sales@nkmnoell.com
W: www.nkmnoell.com/
Leading manufacturer of lemniscates cranes and special equipment for the bulk industry. Turn key project capability; design, manufacturing and erection in-house. Our maintenance division provides added value service for refit, modernisation and redesign for increased performance.

NMH s.r.o

Priemyselná 4608/10
Sered 926 01
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W: www.nmh-sro.com

Nordströms Konstruktionsbyrä

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Sweden
Contact: Mr Peter Vedin
Job Title: Marketing
T: + 46 90 1136 4500
F: + 46 90 1330 69
E: arletun@nordstroems.se
W: www.nordstroems.se
The company, established 1981, is a supplier of turnkey plants and custom-made equipment for general dry bulk solids and aggregate material handling. The product portfolio includes belt and worm conveyors; telescopic loading chutes; weighing scales; silos, bins and hoppers; feeders and valves. Machines are parametrically adjusted to meet individual client's needs on terms of specifications and capacities.

Nouvelles Graines

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O. B. Wiik AS

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N-2021
Norway
Contact: Ms Merete Nymoen
Job Title: Marketing & Communications Manager
T: + 47 64 83 55 00
E: obw@obwiik.no
W: www.obwiik.com
WiikHall Storage Tents are used for storage of food and non-food items within the construction segment, industry in general, Storage and logistics, Oil and gas. WiikHalls are installed in more than 100 countries. Size: in widths from 4 to 100 meter. Unlimited length in 5 meter sections.

OPTION srl

Via Domenico Scolari, 8
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T: + 39 0432909727
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W: http://www.insacchettatrice.com

Orthos Projects Ltd.

Fernie Road
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LE16 7PH
UK
Contact: Mr Nick Hall
Job Title: Director
T: + 44 1858 462806
F: + 44 1858 464403
E: Nick.Hall@orthosprojects.com
W: www.orthosprojects.com
Orthos Projects, specialists in bulk materials handling, have taken over the operation of E&F services. Their Dockside Mobile Loaders have gained a technological lead in eliminating spillage and controlling dusty products from Ports operations. Their range of Filters eliminate pollution.

ORTS GmbH Maschinenfabrik

Schwartauer Strasse 99
Serez
D-23611
Germany
Contact: Herr Sigvard Orts
T: + 49 451 3988515
F: + 49 451 392374
E: info@orts-gmbh.de
W: www.orts-grabs.de
Grabs "Made in Germany". Whole range of grabs for all kind of bulk materials, dredging and scrap handling: Radio controlled independent working motor grabs, electro- hydraulic grabs, mechanical rope grabs, load-beams. For nearly all kind of dry bulk materials and scrap handling.

PAGE MACRAE ENGINEERING

61 Aerodrome Road
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3116
New Zealand
Contact: Mr Bruce Ennis
Job Title: Cargo Handling Equipment Manager
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F: + 64 7 574 8594
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W: www.page-macrae.co.nz
With over 50 years of engineering experience behind it, Page Macrae Engineering is regarded as Australasia's leading manufacturer of ship cargo handling equipment. They have commanded a reputation for delivering high quality equipment that is robust, low maintenance and highly productive, regardless of conditions and loads.

Pakiet

82-103 Stegna
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Gdansk
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Contact: Mr Piotr Rzeszutek
Job Title: Director
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E: patrycja@pakiet.com
W: https://pakiet.com

Paul Hedfeld GmbH

Hundeicker Strasse 20
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58285
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Contact: Mr Axel Berghaus
Job Title: Managing Director
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F: + 49 2332 61167
E: hedfeld@hedfeld.com
W: www.hedfeld.com
The company has produced complete installations for over 60 years for the transport of bulk goods such as bucket elevators, screw- and chain conveyors. The delivery of spare parts used in these conveyors was and is the basis of the current business.

PEBCO®

PO Box 7506
225 North 4th Street (42001)
Paducah
KY
42002-7506
USA
Contact: Mr David Finke
Job Title: VP, Sales and Marketing
T: + 1 270 442 1996
F: + 1 270 442 5214
E: sales@pebco.com
W: www.pebco.com
PEBCO® is recognized world-wide as the leading manufacturer of powder and dry bulk solids handling equipment. Products range from truck, train, and ship loading equipment to gates, valves, diverters, mass flow feeders, Cascade® and dustless loading chutes.

Peinemann Cranes

Nieuwe Langeweg 40
Hoogvliet
DB 3194
The Netherlands
T: + 31 10 295 50 00
F: + 31 10 295 50 49
E: kranen@peinemann.nl
W: www.peinemann.nl

PEINER SMAG Lifting Technologies GmbH

Windmühlenbergstraße 20-22
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D-38259
Germany
Contact: Ms Beatrix Mischer
Job Title: Marketing Consultant
T: + 49 5341 302 223
F: + 49 5341 302 304
E: beatrix.mischer@peiner-smag.com
W: www.peiner-smag.com
PEINER SMAG Lifting Technologies GmbH (PSLT) develops and manufactures motor, rope, hydraulic grabs and slewing units for various industries. The portfolio is supplemented by container spreaders from RAM Spreaders. PSLT is the only full-service provider for bulk and container handling worldwide.

Peterson Agricare & Bulk Logistics BV

Boompjes 270
Rotterdam
3011 XZ
The Netherlands
Contact: Mr Arno Maehlmann
T: + 31 10 282 3333
F: + 31 10 282 3282
E: info@peterson.nl
W: www.peterson.nl
Offers a wide range of logistic, inspection, laboratory and certification services in agribulk commodities, mineral bulk commodities, chemicals, biomass and biofuels. Complete supply chain covered from origin to destination.

Pfister Waagen Bilanciai GmbH

Linker Kreuthweg 9
Affing-Mühlhausen
D-86444
Germany
Contact: Ms Susanne Geller-Dürr
Job Title: Marketing and Sales Manager
T: + 49 82 07 9 58 99 28
F: + 49 82 07 9 58 99 29
E: marketing@pfisterwaagen.de
W: www.pfisterwaagen.de
Truck weighbridges, railway scales, platform scales, crane scales, weighing data management software, load cells, load cell units, weighing indicators.

PHB Weserhütte, S.A.

Parque Científico y Tecnológico de Gijón
C/Ada Byron, 220
Gijón
Asturias
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Spain
Contact: Dr Jose Ramón Prado
Job Title: Technical & Commercial Director
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E: jrprado@pwh.es
W: http://www.grupotsk.com/
PHB Weserhütte, has over 60 years' experience and its own "know how" in the area of materials handling. The company has vast experience in the development of Turnkey Projects in the sectors of energy, cement, ports, iron and steel, fertilisers, mining and industrial plants.

PHOENIX Conveyor Belt Systems GmbH

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Hamburg
21079
Germany
T: + 49 40 7667 03
F: + 49 40 7667 2413
E: info@phoenix-cbs.com
W: www.phoenix-conveyorbelts.com

Pirnar and Savšek d.o.o.

Žabjek 18a
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Contact: Mr Janez Lukančič
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W: http://www.pirnar-savsek.com/

Pirs SAS

ZI St Hermentaire
309, Avenue de l'Europe
Draguignan
Var
83300
France
Contact: Mr Gerard Mathieux
Job Title: Marketing Manager
T: + 33 498 10 6767
F: + 33 498 10 6768
E: info@domepirs.com
W: www.domepirs.com
Specialists in the construction of reinforced concrete dome storage for bulk products. Storage capacity can reach up to 100,000 tons depending on the product. The company has built more than 100 domes worldwide and provide engineering, materials, supervision construction and turnkey projects.

PLM Cranes B.V.

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4794 SW
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Contact: Mr Pieter Pulleman
Job Title: Managing Director
T: + 31 167 528 510
F: + 31 167 524444
E: info@plmcranes.com
W: www.plmcranes.com
We build hydraulic and electric cranes from 50 to 2000 tm with a transhipment capacity up to approx. 2000 ton/hour. We are specialized in shipboard cranes, mobile cranes and harbour cranes for dredging, transhipping, hoisting and pile-driving.

Pneumat Systems Inc

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MN
56001
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Contact: Mr Sam Cebula
Job Title: Sales and Marketing Manager
T: + 1 507 345 4553
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E: info@pneumat.com
W: http://pneumat.com/
Pneumat Systems is the leading source for bin and silo cleanout equipemnt. The BinWhip and our patented "Dual Impact" Whiphead will clear the toughest problems. Pneumat also has equipment to empty hopper trucks and railcars quicker and our RailSpreader can load 5-10% product in your railcars.

Polymer Industries - Ultrapoly Division

2404 Center Street
Tacoma
WA
98409-7638
USA
Contact: Mr Bryan Olin
T: + 1 253 272 1217
F: + 1 253 272 1457
E: bryan.olin@polymerindustries.com
W: www.polymerindustries.com
Other equipment: wear and liner components.

UHMWPE and other olefins for impact, wear and flow applications.

Port of Amsterdam

Harbour Building
De Ruijterkade 7
PO Box 19406
Amsterdam
N-Holland
1000 GK
The Netherlands
Contact: Mr James Hallworth
Job Title: Commercial Manager Circular & Renewable Industry
T: + 31 20 523 4573
F: + 31 20 523 4073
E: James.Hallworth@portofamsterdam.nl
W: www.portofamsterdam.com

Portpack UK Limited

Unit A2/G11 Enterprise Business Park
Wigwam Lane
Hucknall
Nottinghamshire
NG15 7SZ
UK
Contact: Ms Sharon Henson
Job Title: General Manager
T: + 44 1159 680130
F: + 44 1159 641926
E: portpack@portpack.biz
W: www.portpack.biz
Portpack design and manufacture containerised Mobile Bagging Systems for the direct discharge of bulk carriers in the port of arrival, with materials weighed and bagged at dockside, filled sealed bags are loaded directly onto trucks for onward distribution or delivery.

Port-Trade AS

Karetmagervej 9
Fredericia
DK 7000
Denmark
Contact: Mr Peter J Muller
Job Title: Managing Director
T: + 45 7628 0102
F: + 45 7628 0103
E: peter.muller@port-trade.com
W: www.port-trade.com
Sales and service in all Nordic countries of mobile harbour cranes, grabs, containerspreaders, shiploaders, reclaimers, material handling equipment etc.

Powertex Inc

1 Lincoln Boulevard
Rouses Point
New York
New York
12979
USA
Contact: Mr Stephen Podd
Job Title: President and CEO
T: + 1 518 297 4000 ext 102
F: + 1 518 297 2634
E: stephenpodd@powertex.com
W: www.powertex.com
Powertex is a market leader in the dry bulk container liner market, with its Sea Bulk container liner system for 20' and 40' ocean containers. Powertex assist clients through Project Management, with Logistics and with Loading and Discharge Equipment - supplying equipment specifically designed for the use of bulk container liners.

PRADO SILOS

Ribera de Axpe 6
Erandio
48950
Spain
Contact: Mr Javier Resano
Job Title: Commerical Director
T: + 34 946 400 983
E: info@pradosilos.com
W: https://pradosilos.com

Precia-Molen Nederland BV

Franse Akker 1
Breda
4824 AL
The Netherlands
Contact: Mr Frédéric Felten
Job Title: Export Manager
T: + 31 76 524 2510
F: + 31 76 522 8039
E: export@preciamolen.nl
W: www.preciamolen.nl
For almost 150 years Precia Molen is specialized in industrial weighing equipment such as weighbridges, hopperscales, baggingscales, platformscales, truckdumpers etc.

PREMIER TECH

Premier Tech World Headquarters
1, avenue Premier
Rivière-du-Loup (QC)
Quebec G5R 6C1 CA
Canada
Contact: Mrs Ina Wronkowitz
Job Title: Sales Assistant
T: + 1 866 571 7354
E: WROI@premiertech.com
W: www.ptsystemsautomation.com
Among the largest packaging equipment manufacturers in the world, Premier Tech is committed to creating sustainable solutions that help improve the efficiency of manufacturing facilities in the nutrition, industrial, agricultural and organics market sectors.

Premier Tech - PT Systems and Automation

Löhestrasse 18
Hennef
53773
Germany
Contact: Mr Ingo Jonas
Job Title: Geschäftsführer
T: + 49 2242 9335 0
F: + 49 2242 9335 186
E: info-eu@ptchronos.com
W: www.ptchronos.com
PREMIER TECH CHRONOS (PTC) is recognized worldwide for its innovative and customized packaging, material handling and bulk processing solutions. We are driven by innovation: we developed several state-of-the-art technologies which are still in the lead today. Our prime objective is to meet your packaging needs in the most creative and efficient way.

Premier Tech Chronos b.v.

Meerheide 40
Eersel
Noord Brabant
5521 DZ
The Netherlands
Contact: Ms Marie-Pier Vallée
Job Title: Communications Coordinator
E: valm2@premiertech.com
W: www.ptchronos.com
PREMIER TECH CHRONOS (PTC) is recognized worldwide for its innovative and customized packaging, material handling and bulk processing solutions. We are driven by innovation: we developed several state-of-the-art technologies which are still in the lead today. Our prime objective is to meet your packaging needs in the most creative and efficient way.

Premier Tech Chronos Ltd

Unit 1, Centurion Business Centre
Blenheim Industrial Estate
Nottingham
Notts
NG6 8WN
UK
Contact: Mr Peter Orm
Job Title: General Manager
T: + 44 115 935 1351
F: + 44 115 960 6941
E: info-eu@ptchronos.com
W: www.ptchronos.com
PREMIER TECH CHRONOS (PTC) is recognized worldwide for its innovative and customized packaging, material handling and bulk processing solutions. We are driven by innovation: we developed several state-of-the-art technologies which are still in the lead today. Our prime objective is to meet your packaging needs in the most creative and efficient way.

Procon Engineering Limited

Vestry Estate
Otford Road
Sevenoaks
Kent
TN14 5EL
UK
Contact: Mr Ian Hall
T: + 44 1732 781 300
F: + 44 1732 781 311
E: joe.naylor@proconeng.com
W: www.proconeng.com
Manufactures belt weighers for process control and trade use in the grain industries. Weighing systems for grain have been produced with capacities as low as 2t/h and as high as 2,000t/h. (In other materials the company has machines as high as 12,000t/h. Many single sites trade over GBP£100 million per annum over their Procon Inflo trade approved belt weighing systems.

ProStack

Terex Materials Processing
40 Keans Hill road
Campsie Industrial Estate
Campsie
Co. Londonderry
BT47 3YT
Northern Ireland
Contact: Mr Terence Bratton
Job Title: Technical Sales Director
T: + 44 7990555099
E: terence.bratton@terex.com
W: https://www.terex.com/en/prostack

Protan International

PO Box 420
Brakerøya
Drammen
NO-3002
Norway
Contact: Mr Erik Øyno
Job Title: Direktor Protan International Roofing
T: + 47 90 51 30 72
E: erik.oyno@protan.no
W: www.protan.no

PT Armada Rock Karunia Transshipment

AIA Central Building 33rd Floor
Jl. Jend. Sudirman Kav. 48 A
Jakarta
South Jakarta
12930
Indonesia
Contact: Ms Lisa Witono
Job Title: Manager - Marketing
T: + 62 817 609 8883
F: + 62 21 2525 928
E: enquiry@ark-transshipment.com
W: www.ark-transshipment.com

PT. Bando Indonesia

Wisma Hayam Wuruk, 6th floor, Suite 600
Jln. Hayam Wuruk No. 8
Jakarta
10120
Indonesia
Contact: Mr Wahyono Wardiman
Job Title: Conveyor Belt Division
T: + 62 21 3517590
F: + 62 21 3517591
E: conveyor.div@bandoindonesia.com
W: www.bandoindonesia.com
PT. Bando, established in 1987, is one of the leading automotive and industrial power transmission belt manufacturers in Indonesia. It has one main plant located in Tangerang and its marketing office located in Central Jakarta.

QML Services

Unit 4, 178 Main Road
Speers Point
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Australia
Contact: Mr Steve Maxwell
Job Title: GVice President, Mining, APAC Sales
T: + 61 2 4908 2222
F: + 61 2 4958 4255
E: qml@qmlservices.com
W: www.qmlservices.com

R & S Srl / Roncuzzi - WAM Group

Via del Cmapo Sportiuo 40
Mezzana 48123
Italy
Contact: Ms Sara Zaccarelli
Job Title: Marketing
T: + 39 0535 61 81 11
E: sara.zaccarelli@wamgroup.com
W: www.roncuzzi.com
Design and build wide range of equipment for bulk handling material. Pneumatic ship unloaders, mechanical ship loaders (bulk and bags), grab loading hoppers (dust free) conveyor belt, bucket elevators and chain conveyors. Rotary valves, Screw conveyors, diverters, telescopic bellows.

RAM SMAG Lifting Technologies (UK) Ltd

6 Selby Place
Stanley
Skelmersdale
Lancashire
WN8 8EF
UK
Contact: Mr Patrick Draper
Job Title: PR & Communication
T: + 44 1695 556355
F: + 44 1695 556356
E: p.draper@ramspreaders.com
W: www.ramspreaders.com/
Part of the SMAG Group, we are the world's leading lifting accessories suppliers in the bulk cargo industry; providing bulk handling solutions to ports, ships, crane manufacturers, waste-to-energy plants, recycling/scrap handling industries, as well as providing container lifting spreaders.

Rapat Asia

Clark, Philippines
Angeles
Pamapaga
061
Philippines
Contact: Mr Craig Stall
Job Title: General Manager
T: + 1 2182514261
F: + 1 2184833344
E: cstall@rapat.com
W: www.rapat.com

Rapat Corporation

919 O'Donnell Street
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MN
56549-4310
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Contact: Mr Justin Koenig
Job Title: Industrial Sales Manager
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E: jkoenig@rapat.com
W: http://www.rapat.com/

Rapidpack Corporation

Suite 207
Mazaya Tower AA1
Jameirah Lakes Towers
Dubai
UAE
Contact: Mr Peter Ascot
Job Title: Sales Manager
T: + 9714 445 8336
F: + 9714 445 8337
E: peter@rapidpack.ca
W: www.rapidpack.ca
Rapidpack designs, engineers and manufactures state of the art bulk cargo handling machinery for ports, trading houses and shipping companies around the world.

RBL-REI France

11 Boulevard Brune
Paris
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75682
France
Contact: Mr David Nirefois
Job Title: Project Manager
T: + 33 0241 2113 81 (dct) / + 33 1 53 90 22 40
F: + 33 1 53 90 22 24
E: d.nirefois@rblrei-france.com
W: www.rblrei-france.com
Designs, builds and supplies continuous bulk handling belt conveyor systems and associated equipment, stackers up to 10,000 tph, reclaimers up to 15,000 tph and shiploaders up to 3,000 tph.

RC Inspection B.V

Gustoweg 66
Rotterdam
NL 3029
The Netherlands
Contact: Ms Birgit Bender
Job Title: Sales and Marketing Manager
T: + 31 610 742 140 / + 31 10 425 0237
E: Birgit.Bender@rc-inspection.com
W: www.rc-inspection.com/

REEL Alesa Ltd

150 Rockland Rd
Town of Mount Royal
Quebec
H3P 2V9
Canada
Contact: Mr Jean-Pierre Desmoulins
Job Title: General Manager
T: + 1 514 937 9105 ext. 2231
F: + 1 514 937 0473
E: jean-pierre.desmoulins@reel-alesa.com
W: www.rta-alesa.com
Alesa Engineering Ltd is specialised in tailor made solutions for the pneumatic handling of bulk materials. Travelling ship unloaders are typically designed for capacities above 600 t/h. Dense Phase conveyors is another speciality of which various capacities and conveying distances have been contracted.

REEL Alesa Ltd

Max Hogger-Strasse 6
Zurich
CH - 8048
Switzerland
Contact: Mr Marcel Polidori
Job Title: Manager Sales & Marketing
T: + 41 44 435 3357
F: + 41 432 0666
E: marcel.polidori@reel-alesa.com
W: http://www.reel-alesa.com/
Specialised in dry bulk materials handling system for port terminals and plant, travelling pneumatic ship unloaders >600 t/h, storage systems, truck/railcar loading unloading systems, all kind of pneumatic conveying system (incl. dense phase, dilute phase, airlifts, airslides, suction systems), belt and tube conveyors, bath plant & carbon recycling plant, which includes for crushers, electrolysis pot control system, engineering services for all project activities above including civil and structural.

REMA TIP TOP AG

Gruber Straße 65
Poing
Bavaria
D-85586
Germany
Contact: Mr Günter Busse
Job Title: Head of Global Product Management
T: + 49 8121 707 10100
F: + 49 8121 707 10100
E: info@tiptop.de
W: www.rema-tiptop.com
World leader in high-quality conveyor maintenance, wear protection and corrosion prevention. Provides products, accessories, technical consultancy and customized problem solving solutions in over 150 countries. Equipment range - rubber linings for wear protection; rubber repair material for conveyor belts; pulley laggings; corrosion protection linings; coating and bonding systems.

Representaciones Alfredo Brand y Cia. Ltda.

Casilla 16871
Santiago
Región Metropolitana
7510147
Chile
Contact: Mr Alfredo Brand
T: + 56 222 38968
F: + 56 234 40817
E: abrandp.gm@gmail.com
W: www.abrandp.com

RHC Deutschland GmbH

Am Taennele 6
Senden-Aufheim
Bayern
D-89250
Germany
Contact: Mr Rolf Hofmann
Job Title: CEO
T: + 49 174 2050 164
F: + 49 7307 253 39
E: info@rhc-deutschland.de
W: http://rhcheavymachinery.com/
RHC is a German company with engineering and manufacturing facilities in Europe and Asia.

RIKON A/S

Tvaika Street 68b
AS – Joint Stock Company
Riga
LV-1034
Latvia
Contact: Mr Inal Akhba
Job Title: Council Chairman
T: + 371 67393156 / + 371 29103410
F: + 371 67393828
E: rikon@rikon.lv
W: www.rikon.lv
A/S RIKON manufactures portal slewing and gantry cranes, parts of cranes, grabs, spreaders. A/S RIKON makes handling devices, overhead cranes and other steel structures, provides services for installation, commissioning and handling portal cranes, gantry cranes and various other port equipment.

River Consulting

3510 N. Causeway Blvd
Ste 515
Metairie
LA
70002
USA
Contact: Mr Kevin Fry

Job Title: Vice President
T: + 1 504 293 3900
E: kfry@riverconsulting.com
W: www.riverconsulting.com
River Consulting delivers EPCM material handling experience, including project management, design/supply of conveying systems and engineering. With 30 years of experience, we provide proven solutions including blending, conveying, silo and stacking tubes, automation and controls, and marine structures.

Robson Handling Technology Ltd

Coleford Road
Darnall
Sheffield
S9 5PA
UK
Contact: Mr Tris Young
Job Title: Marketing Manager
T: + 44 114 244 4221
F: + 44 114 243 3066
E: youngt@robson.co.uk
W: www.robson.co.uk
Design and Manufacture and Install Bulk Handling Systems including Belt, Screw and Chain Conveyors, Elevators, Hoppers, Vibros and Feeders. Steelwork and Supports. Individual units or Turn Key Projects.

Ronin System Solutions

No 1 Nobel Avenue
Modderfontein
Johannesburg
Gauteng
1645
South Africa
Contact: Mr Ferdinand Meyer
Job Title: Sales and Marketing Executive, Ronin Group
T: + 27 11 608 3666
F: + 27 11 608 4679
E: ferdi@thisisronin.com
W: www.thisisronin.com
Ronin System Solutions supplies Bulk Inventory management solutions, analytical grading equipment and services to the Southern African Grain Handling Industry. We provide Cargo Monitoring, Bulk Audits, Portside and Marine services on hard Commodities. We promote our laser Inventory Systems Worldwide.

Royal Haskoning DHV

PO Box 8520
Rotterdam
3009 AM
The Netherlands
Contact: Ms Berte Simons
Job Title: Director Advisory Group
T: + 31 10 2865 398
F: + 31 10 443 3688
E: info@rotterdam.royalhaskoning.com
W: www.royalhaskoningdhv.com
With knowledge and experience in the development of modern ports and (un)loading, transport and storage systems, high quality advice and comprehensive project management is provided in the field of grain and other dry bulk handling. Clients' objectives vary from increasing capacity, operational efficiency and handling speed to shifting from road to rail or inland water transport. From pre-investment studies and conceptual design to construction management, practical, sustainable and cost-effective engineering solutions are offered.

Rubb Buildings Ltd

Dukesway
Team Valley Trading Estate
Gateshead
Tyne & Wear
NE11 0QE
UK
Contact: Ms Clare Wilson
Job Title: Marketing Director
T: + 44 191 482 2211
F: + 44 191 482 2516
E: info@rubb.co.uk
W: https://www.rubbuk.com/
Designs, manufactures and installs bulk storage and general storage buildings from 3m span to 100m span. Supply structures for storage of all types of cargo, from coal and grain to salt. The structures are totally prefabricated and relocatable, are maintenance free and the fabric has a life expectancy of up to 25 years depending on usage.

RULMECA HOLDING S.P.A.

Via A Toscanini 1
Almè
Bergamo
24011
Italy
Contact: Mr Enrico Aledi
Job Title: Marketing & Corporate Communications Manager
T: + 39 035 430 0111
F: + 39 035 430 0259
E: marketing@rulmeca.com
W: www.rulmeca.com
The RULMECA Group specializes in the production of rollers, motorized pulleys and other components (such as stations, suspended garland sets and covers) for bulk material handling applications. It is composed of 8 manufacturing units and 9 sales companies and employs more than 1200 people.

SAMSON Materials Handling Ltd (AUMUND Group)

Gemini House
Cambridgeshire Business Park
1 Bartholomew's Walk
Ely
Cambridgeshire
CB7 4EA
UK
Contact: Mr Dale Lockley
Job Title: Managing Director
T: + 44 1353 665001
E: sales@samson-mh.com
W: www.samson-mh.com
Experts in mobile bulk materials handling equipment for surface installation: from truck unloaders, to ship loaders, rail and barge loaders, ecological import hoppers and mobile stockpiling equipment. Hard-working equipment designed for rapid set-up and continuous high performance.

Saxlund International Ltd

11 Freemantle Business Centre
Millbrook Road East
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Hampshire
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Contact: Mr Matt Drew
T: + 44 2380 636330
F: + 44 2380 636343
E: mattdrew@saxlund.co.uk
W: www.saxlund.co.uk

Schenck Process UK Limited

Unit 6-9 Railway Court
Off Ten Pound Walk
Doncaster
South Yorkshire
DN4 5BF
UK
Contact: Mr Richard Sims
Job Title: MD - Construction, Minerals & Metals
T: + 44 1302 321 313
F: + 44 1302 554 400
E: enquiries@schenckprocess.co.uk
W: www.schenckprocess.co.uk
Schenck Process Group provides innovative solutions for the handling and storage of bulk materials using pneumatic and mechanical conveying technologies together with weighing, feeding and air filtration equipment to give a comprehensive package of products and services.

Scorpio Engineering Pvt. Ltd

Scorpio House
132 Wheeler Road
Cox Town
Bangalore
560 005
India
Contact: Mr Jacob P.
Job Title: VP - Marketing & Application
T: + 91 99801 625 39/+ 91 77026 3779
F: + 91 80 2548119
E: info@scorpioengg.com
W: www.scorpioengg.com
The company engineers and manufactures a complete range of grain & flour handling equipment with turnkey engineering capability. Capacities of equipment range from a few tonnes per hour to about 500mt per hour. Key strengths are the ability to engineer, manufacture, install and commission complete grain terminals for ports and grain storage & flour handling systems for large grain processors & food processing industry.

Screw Conveyor Corporation

700 Hoffman Street
Hammond
Indiana
46327-1894
USA
Contact: Mr Jim Calhoun
Job Title: VP of Business Development & Marketing
T: + 1 219 931 1450
F: + 1 219 931 0209
E: jcalhoun@screwconveyor.com
W: https://screwconveyor.com
Screw Conveyor Corporation engineers and manufactures Screw Conveyors, Screw Feeders, Drag Conveyors, Bucket Elevators and Hydraulic Truck Dumpers.

Seabulk Inc

10331 Mortfield Road
Richmond
British Columbia
V7A 2W1
Canada
Contact: Mr Sidney Sridhar
Job Title: President
T: + 1 604 273 1378 Ext 103
E: sbs@seabulk.com
W: www.seabulk.com
Design and build contractors involved with ports, self-unloaders and transshippers for bulk cargo. The firm provides turn-key logistics solutions for the transportation, storage and handling of bulk materials, prototype new developments including material handling systems for ship and open-sea transshipment.

S-E-G Instrument AB

Box 111 43
Bromma
S-161 11
Sweden
Contact: Mr Hakan Lagergren
Job Title: Sales and Marketing Manager
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F: + 46 8 764 75 00
E: inform@s-e-g.com
W: www.s-e-g.com
S-E-G is one of few companies in the world specializing in industrial weighing. For over 50 years we have acquired a unique knowledge in our special fields such as Belt Scales, Mass Flow Meters, Batching Systems, and Level Measuring.

Sempertrans

Modecenterstrasse 22
10 rue des charretiers
Vienna
1030
Austria
Contact: Ms Monika Riedel
Job Title: Group Head of Communications & Sustainability
T: +43 676 8715 8620
E: sempertrans@semperitgroup.com
W: www.sempertrans.com
SEMPERTRANS has been developing, manufacturing and installing conveyor belts for more than 50 years. Its knowhow, its experience and the quality of its products make SEMPERTRANS one of the world's leading companies in its field.

SENNEBOGEN Maschinenfabrik GmbH

Hebbelstrasse 30
Straubing
D-94315
Germany
Contact: Mr Alfred Endl
T: + 49 9421 540148
F: + 49 9421 43882
E: marketing@sennebogen.de
W: www.sennebogen.com
SENNEBOGEN offers a wide range of all kinds of materials handling machines, HD rope excavators/cranes, crawler cranes, telescopic cranes and base carriers. SENNEBOGEN has a specific strength in realizing solutions based on individual customer specifications.

Servo Berkel Prior

Jan Evertsenlaan 4
Katwijk
2224 SV
The Netherlands
Contact: Mr Erwin van Diest
Job Title: Managing Director
T: + 31 71 4030101
F: + 31 71 4032317
E: info@servoberkelprior.eu
W: https://servoberkelprior.nl/
Servo Berkel Prior B.V. is the biggest manufacturer and supplier of weighing equipment in the Netherlands.

SESCOTRANS For Developed Logistics (SAE)

1, Elshahied Sayed Zakarya St.
(Behind Sheraton Airport)
Cairo
11361
Egypt
Contact: Mr Kareem Abd El Latif
Job Title: Assistant General Manager
T: +2 057 229 00 95
F: +2 057 229 08 49
E: kareem.abdelatif@sescotrans.net
W: www.sescotrans.com
Other Equipment: Mobile Harbour Cranes - CMA, SMA. SESCOTRANS has 50 years experience of integrated logistics solutions for your business, serving main Egyptian ports including transportation, customs clearance, warehousing, loading and discharging of different cargo and vessel sizes, supported with full setup of facilities and fully-employed resources.

SEW-EURODRIVE GmbH & Co KG

P O Box 3023
Bruchsal D-76652
Germany
Contact: Ms Martina Wegerich
Job Title: Marketing Dept
T: + 49 7251 75 0
F: + 49 7251 75 1970
E: martina.wegerich@sew-eurodrive.de
W: www.sew-eurodrive.com
Complete drive packages: Helical gear units, Bevel-helical gear units, motors, couplings, swing bases, brakes, geared motors. Planetary gear units, frequency inverters Torque range: 100 ... 1 Mio Nm

SGH Equipment Limited

Unit 32
King Street Trading Estate
Middlewich
Cheshire
CW10 9LF
UK
Contact: Mr Stuart Henderson
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T: + 44 1606 536 955
F: + 44 1606 536 956
E: sales@sghequipment.co.uk
W: www.sghequipment.co.uk
SGH Equipment provide process & materials handling engineering solutions, specialising in bulk powder & granular materials
Equipment: Storage Silos & Vessels, Conveying, Weighing, Mixing & Blending, FIBC Fill+Discharge, Dust Collection, Filtration, & Suppression, Bagging, Weighing & Packing Machines
Services: Design, Manufacturing, Fabrication, Electrical - Control & Instrumentation, Installation (Mechanical & Electrical), Commissioning

SGS (Nederland) BV

Malledijk 18
Spijkenisse
AE
3200
The Netherlands
Contact: Mr Rolf Wilting
T: + 31 181 69 3260
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E: rolf.wilting@sgs.com
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SGS Australia Pty Ltd

Unit 16
33 Maddox Street
Alexandria
NSW 2015
Australia
Contact: Mr Stephen Hemsworth
Job Title: National Business Manager
T: + 61 2 8594 0400
F: + 61 2 8594 0419
E: stephen.hemsworth@sgs.com
W: www.au.sgs.com
SGS is the world's leading inspection, verification, testing and certification company. SGS also designs and supplies mechanical sampling systems for a wide range of bulk materials. SGS has more than 30 years experience in this field with equipment in operation throughout the world.

SGS Minerals Services

185 Concession Street
PO Box 4300
Lakefield
ON K0L 2H0
Canada
Contact: Ms Peggy Bell
Job Title: Global Minerals Marketing Coordinator
T: + 1 705 652 2000
F: + 1 705 652 6365
E: minerals@sgs.com
W: www.sgs.com/coal

Shanghai Global Machinery Co Ltd

RM 1001. BLDG 2
Meichuan Road 1295
Putuo District
Shanghai
201711
China
Contact: Mr Luo Tao
T: + 86 21 398 21129
F: + 86 21 398 21130
E: luo@sgmc.com.cn
W: www.sgmcgrab.com
We are a Chinese grab manufacturer, specializing in the shore and ship crane grabs for handling bulk cargo, such as radio remote control grabs and motor-hydraulic grabs. www.sgmcgrab.com

Shanghai Guanbo Machinery Equipment Co.,Ltd

3736-5 Hunan Road
Pudong
Shanghai
China
Contact: Ms Alica Fang
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E: sales@gbm-china.com
W: www.gbm-grab.com

Shanghai Janus Grab Co., Ltd.

Room 518-519
VMO 37#
2049 Pujin Road
Shanghai
Shanghai
201114
China
Contact: Mr Fred Hu
Job Title: Deputy General Manager
T: + 86 21 6885 5558
F: + 86 21 6885 5559
E: janus@janusgrab.com
W: http://www.janusgrab.com/

Shanghai Qifan Co., Ltd.

25F, Baoding Mansion
Xujiahui Road
Shanghai
200025
China
Contact: Mr Eric Liu
T: + 86 21 51029257
F: + 86 21 51062358
E: ericshpy@163.com
W: http://www.qifanco.com/
Develops high-tech grabs, such as motor hydraulic bulk grab, motor hydraulic orange peel grab, wireless remote control bulk grab and contractible single rope bulk grab. Also manufactures a variety of handing tools, loading and unloading equipment, steel structure frame and other mechanical products.

Shanthi International

21, Center Point
Indira Gandhi Road
Jamnagar
Gujarat
361008
India
Contact: Mr Sanjay Masuria
Job Title: Director - Marketing - International
T: + 91 288 255 6671 / + 91 288 2555 867
F: + 91 288 255 4254
E: info@servoday.com
W: www.servodaygrabs.com
Manufacturer & Exporter of Radio Remote Control Grabs, capacity from 6 CBM to 55 CBM, with the unique features of Grabs operation counting, with Weight calculation, online Grab monitoring systems etc.

Shi.E.L.D. Services srl

Viale Monza, 270
Milano
20128
Italy
Contact: Mr Luca Condini
Job Title: Technical Director
T: + 39 02 8362 3450
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E: lcondini@shieldservices.it
W: http://www.shieldservices.it/
We provide management and consultancy services for the shipping and industry markets and for the on-shore and off-shore logistics of dry bulk materials, including design, construction, maintenance, management and operation of ships and transhippers and cargo handling equipment.

SIG Società Italiana Gomma Spa

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Gorla Minore
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Siwertell AB

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Siwertell dry bulk handling systems are based on a unique screw technology and provide the most environment-friendly, efficient and versatile operation on the market today. All systems can be tailor-made to fit each port or terminal.

Sly Incorporated

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SMB International GmbH

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SMB meets the demanding material-related requirements of conveying bulk and bagged goods. The company designs and manufactures high-performance conveying solutions designed for trouble-free long-term operation. Projects all over the world convince fertilizer producers, port operators and industrial specialists of the quality of German engineering.

Smiley Monroe Ltd

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Sobemai by IRI nv

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Solimar Pneumatics

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Discharge aids for storage silos.

Sotecma inc

245, boul. Yvon - L'Heureux Nord
Beloeil
Quebec
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Canada
Contact: Mr Denis C Boulais
Job Title: President
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E: cgermain@sotecma.com
W: www.sotecma.com
Canadian company offering turnkey engineering and construction services in bulk handling and flat storage solutions at low cost. The type of structure used is a highly versatile alternative to conventional constructions. The storage shed can be dismantled and be relocated. For more details visit www.sotecma.com.

South Africa Cargo Services

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Congella
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Manufactures pneumatic and mechanical shiploading and unloading systems, belt conveyor systems and other bulk handling equipment.

STAG AG

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STAG bulk material technology for mechanical and pneumatic conveying technology as well as ensilage technology . We are also the ideal partner as a general company for complex assignments for nearly all bulk materials in plant construction.

Stemm Equipos Industriales, S.L.

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With extensive experience in the bulk handling sector, STEMM manufactures a wide range of grabs for harbour and industrial cranes, especially electrohydraulic clamshell and orange peel grabs and single rope radio-controlled clamshell grabs with state-of-the-art construction and service concepts.
STEMM is your partner for consulting, manufacturing and servicing around the grab world. For further information, kindly check our website www.stemm.com

Strudes Inc

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Strudes Inc. is an Engineering Consulting Company, specializing in design for heavy industry in general and Cement Industry in particular. For markets and more information: www.strudes.com.

Suomen Viljava Oy

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Suomen Viljava is the leading Finnish company in grain logistics specializing in storage and handling. We serve, in addition to domestic market, companies operating in export, import and transit trade in and around northeastern Europe. Suomen Viljava operates in 19 different storage locations in Finland. The silo plants of Rauma, Naantali, Helsinki, Loviisa and Kotka are situated at ports. These ports are able to serve ships year-round..

Supercargo, Lda

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Supercargo is a GAFTA and FOSFA accredited members Superintendent and applies a Quality Management System for Supervision, Inspection and Surveys in International Trade according NP EN ISO 9001:2015

Superior Industries

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Superior Industries, Inc.

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T: + 1 320 589 2406
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Opposite of costly stationary ship loading systems, custom-configured mobile conveyors from Superior deliver lower capital investment, short lead times, quick assembly and mobility on a small footprint.

Svendborg Brakes USA, LLC

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TAIM WESER, S.A.

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TAIM WESER is a worldwide company with 120 years of experience and projects in more than 65 countries, specialized in the development and supply of tailor made solutions in the fields of lifting of loads and bulk materials handling.

TBA Doncaster

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Specialize in Industrial IT Solutions. The CommTrac system is a total Facility Management solution for grain and animal feed stores, combining optimized operations and stock control with traceability and HACCP food safety procedures in compliance with legislation and assurance scheme requirements.

TBA Group

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The TBA Group is an international consultancy, simulation and software company for ports, terminals and warehouses. TBA provides the market-leading Terminal Operating System software for bulk material handling and terminal operations, which has been running at bulk terminals for over 20 years.

TBMA Europe BV

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Systems and Components for dry Solids Handling. Pneumatic and mechanical conveying, rotary valves, diverter valves, sampling equipment, bellow feeders, Big-Bag filling and discharging equipment, dosing feeders, silo discharge equipment etc.

TD Micronic

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techNaero aps

Blaabaervej 3
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Contact: Mr Anders Larsen
Job Title: CEO
T: + 45 56314925
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E: sales@techNaero.dk
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Other Expertise: Pneumatic transport systems.
Supply of complete, high quality, low cost, professional dust removal systems according to ATEX.
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Pit-intake filters for discharge from trucks, railcars and around crane hoppers.
Complete projects for Pneumatic Transport.

Telestack Limited

Bankmore Way East
Omagh
County Tyrone
BT79 0NZ
Northern Ireland
T: + 44 28 82 25 11 00
F: + 44 28 82 25 22 11
E: marketing@telestack.com
W: www.telestack.com
Telestack Limited specialize in the design, manufacture, installation and commissioning of MOBILE bulk material handling solutions for the Ports & Inland Terminals, including a range of ship-loaders / Ship Un-loaders, mobile truck un-loaders, link conveyors and hopper feeders.

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Teta Mühendislik A.Ş.
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Provides engineering, representation, manufacturing and erection of industrial equipment and plants for storage, handling and weighing, as well as bagging and loading of wide ranging bulk products.

The Grab Specialist b.v.
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The Grab Specialist B.V. design, develop and manufacture grabs for the dry bulk cargo-, dredging- and recycling industry. A service-oriented company, complying with the highest standards of after-sales and spare part supply service to secure productivity in your operations.

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W: www.thermofisher.com/bulkweighing
The Thermo Scientific Bulk Weighing & Monitoring product line for material handling in grain applications includes conveyor belt scales, weighbelt feeders, impact weighers, numerous level indication devices, speed switches and conveyor safety switches.

thyssenkrupp Industrial Solutions AG
Mining - Materials Handling
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Saarland
D-66386
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Contact: Dr Wei Ye
Job Title: Head of Sales and Projects
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W: www.thyssenkrupp-industrial-solutions.com
Besides individual items of machinery as listed above, thyssenkrupp Industrial Solutions design and supply complete material handling plants turn-key.to the fertilizer industry (for handling of urea and phosphates etc.), the cement and mining industry, coal handling systems for power stations as well as complete port handling solutions.

TMSA Tecnologia em Movimentação S/A
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The TMSA group, headquartered in Brazil with offices in LATAM and the USA, is one of the largest suppliers for bulk material handling equipment for Port Terminals, Agro Industries and Oilseed Processing Plants under turn-key, EPCM and Partnership Contract Agreements.

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RDS specialises in the design and manufacture of electronic instrumentation including on-board weighing systems for loaders operating in grain and animal feed applications enhancing operational efficiency. The range includes the Weighlog 10 , Weighlog 200 and Loadmaster series.

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E: sales@tramcoeurope.co.uk
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A global leader in bulk material handling, TRAMCO EUROPE LTD produce a complete line of high quality, robust, fully ATEX certified enclosed conveyors including TramrollTM, JetBeltTM, Bulk-FloTM, the Model G, Model RB, and Bucket Elevators.

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TRAMCO has been involved in the design, application, engineering and manufacture of the worlds most complete line of chain conveyors, enclosed belt conveyors, specially designed conveyors and conveyor conversions since 1967. TRAMCO's philosophy is to produce high quality, reliable equipment that meets specific customer needs.

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Designs, manufactures and installs unique enclosed storage systems for all kinds of bulk materials, including the high capacity Space Frame domes and barrel vaults.

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Produces bulk handling systems equipment, bucket, flow and pan conveyors.

TTS HuaHai Ships Equipment
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TVH Parts Holding NV
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UK Bagging, a totally mobile bagging service that travels throughout the UK and Ireland bagging dry bulk products into 500, 600 & 1000kg bags. We also provide a screening and re-bagging service for lumpy and hard products, bulk or bagged.

V D D B (Pty) Ltd
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Services are delivered to a variety of projects for mining and industrial clients and range from performing a particular task such as providing a bill of quantities to taking charge of a comprehensive cost structuring, capital estimating and project cost management service through to final accounts and close-out.

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Vendig AB
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Vendig develops and markets conveyor components for bulk material handling industry in Sweden and rest of Europe and distributors.
Vendig delivers affordable products, such as cleaning device, transfer point sealing and belt covers, with high quality and with best service.

Verachtert Nederland B.V.
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In 60 years Verachtert has developed into the market leader of Work Tools for all types of diggers and wheel loaders, and offers solutions for the specific wishes of the customer. Verachtert products represent quality and productivity.

Verstegen Grijpers BV
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Manufactures and supplies wide range of grabs for all bulk commodities.

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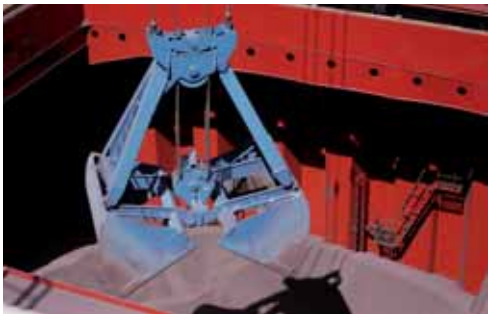

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Vibco Inc

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Vibrafloor

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VIBRAFLOOR, the modular vibrating floor, is used in various bulk industries, inside silos, ships and railway cars as a versatile reclaimer using powered gravity.

VIGAN

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VIGAN equipment are suited for most of materials in bulk such as cereals, oilseeds, alumina, chemicals and wood pellets. As a solution provider, VIGAN can manage your bulk handling projects from initial design up to full erection under "turnkey" conditions.

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VIVO consult s.r.o.

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VIVO consult provides individual deliveries in dust suppression. These products include Dry Fog, DustTamer, Wind Fence and Wind Screen Systems, Soil stabilization and Road Dedusting, Antierosion Control, Odour Control and Remediation, Algae Reduction, Waste Water Treatment, Decontamination of Petroleum Products.

Vortex Global

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Vortex manufactures loading spouts, slide gates & diverters for fast and steady loading flow of dry/bulk materials. Vortex spouts are designed to capture fugitive dust, prevent material waste, and ensure plant and environmental safety, with low maintenance and service expenses.

W&R Barnett

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WeatherSolve Structures

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WeatherSolve Structures dust control professionals that build customized suspended fabric systems for many situations from dust / wind fencing, hopper, truck dumps, conveyor and many more situations requiring dust control. Give a call today and we will come up with a solution for you. 1.604.607.7781 or www.weathersolve.com

Webster Griffin Ltd

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Manufactures all types of bag and sack filling systems (including mobile systems), big bag/bulk bag filling systems, robot palletising systems for all types of grain, granular or powdered products.

Windmöller & Hölscher KG

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Windmöller & Hölscher - one of the leading machine manufacturers in the world for the flexible packaging industry and the global leader in bag making and bagging equipment.

Wolf Point Engineers & Contractors

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Worley Parsons Canada (Westmar)

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Provides consulting engineering services to clients worldwide. The diverse experience gained over thousands of projects, combined with a commitment to research results in maximum value for clients. The team of project management and design specialists work with clients to develop projects from concept to completion, providing services ranging from initial planning and economic evaluation studies through to detailed design, procurement, construction and commissioning.

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ZPMC - Shanghai Zhenhua Heavy Industries Company Limited

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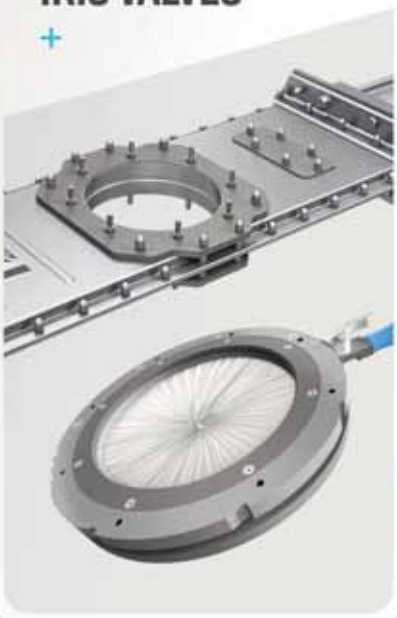
Job Title: Project Management Department
T: + 86 21 5839 6666 (20364)
F: + 86 21 5839 9555
E: guhaiqing@zpmc.com
W: www.zpmc.com
A world-famous manufacturer of bulk materials handling equipment. Its main products include ship loaders and unloaders, bucket wheel stackers and reclaimers. With proven design, manufacturing and fully-erect shipment capabilities to ensure on time delivery.

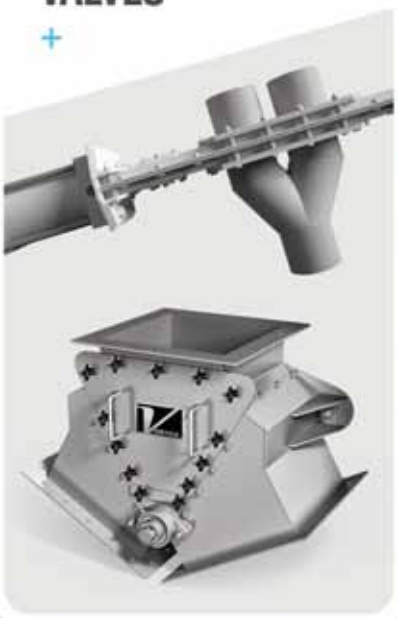
Solids & bulk handling components engineered with **technical focus from**

« START TO FINISH »

GATES & IRIS VALVES +



DIVERTER VALVES +



LOADING SOLUTIONS +

· OUR DESIGN PHILOSOPHY ·

+ COMPENSATE FOR WEAR

Vortex closely studies the characteristics of thousands of dry bulk materials and how they interact with various materials of construction. We assess the wear potential for each client's process and make application-specific modifications to ensure reliability, durability and longevity.

+ MAINTENANCE FRIENDLY

Our priority is to keep you up and running – because in your world, there is no time for downtime. Vortex components are engineered with in-line service features that accelerate the system maintenance process, saving your team time and money.

+ MINIMAL SPARE PARTS

Vortex approaches wear parts with simple, durable design. Doing so means maintenance procedures are also kept simple while the need to perform maintenance is infrequent. This leads to a reduction in spare part inventories – which also means a reduction in costs.

+ LONG SERVICE LIFE

End users are often attracted to equipment on the fallacy of low price, ignoring the cost-benefits of reliability and longevity. Vortex believes in designing products that will out-perform and outlast market alternatives – so that end users realize the full value of their investment.

+ DUST FREE ENVIRONMENTS

Facilities have an ethical obligation to protect against the hazards of manufacturing. Vortex closely studies trends in air quality, environmental dust emissions, workplace safety and evolving regulations. Our components are designed with these concerns in mind.

+ APPLICATION ENGINEERING

Vortex believes in offering only value-added products that are designed for purpose, rather than producing off-the-shelf, commodity components. With an in-house team of application engineers, Vortex designs for the most demanding applications.

Learn more about our Slide Gates, Diverters, Iris Valves & Loading Solutions at:

www.**vortexglobal**.com

VORTEX

GRAIN HANDLING EQUIPMENT SUPPLIED

KEY

S&BL	=	ship and barge loaders
PS&BL	=	pneumatic ship and barge loaders
MS&BU	=	mechanical ship and barge unloaders
C	=	conveyors
FB	=	FIBCs, bags & bag handling
H	=	hoppers
G	=	grabs
DS	=	dust suppression
S&I	=	sampling & inspection
W&M	=	weighing & measuring
G&S	=	grading & sifting
TL&U	=	truck loaders & unloaders
RL&U	=	railcar loaders & unloaders
SS	=	storage systems
EC	=	engineering consultants
O	=	other

	S&BL	PS&BL	MS&BU	C	FB	H	G	DS	S&I	W&M	G&S	TL&U	RL&U	SS	EC	O
2000 Engineering																
4B BRAIME Components			✔	✔											✔	✔
AAF International																
Advanced Conveyor Technologies Inc (AC Tek)				✔											✔	
AGI (Brazil)																
AGI (Canada)																
AGI - YARGUS																
Agrico Sales, Inc.	✔			✔										✔		
Agromatic AG									✔	✔					✔	
Airoflex Equipment																
Alex Stewart Agriculture Ltd									✔	✔						
Alex Stewart International Corporation Ltd									✔							
Alimak Group AB																✔
Ameco Group	✔				✔									✔		
AMECO SAS	✔													✔		✔
Andrew S. McCreath & Son, Inc.																
Anvil Attachments	✔					✔	✔									
Applied Conveyor Technology, Inc. DBA The ACT Group				✔		✔		✔		✔			✔		✔	✔
Arlona Engineering			✔	✔	✔	✔	✔								✔	
Arodo BVBA					✔											✔
Ashton Bulk Ltd				✔		✔							✔			✔
ATLAS-SSI Co. Inc							✔									
August Penkert GmbH	✔			✔				✔	✔	✔		✔	✔		✔	
Aurecon	✔															
Ausenco Engineering Canada Inc.	✔		✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Australian Superintendence Company									✔	✔						
B.V. BECO							✔									
Bateman Manufacturing	✔					✔	✔					✔	✔			
Bayards Aluminium Constructions														✔		✔
Bedeschi America Inc.	✔		✔	✔		✔		✔				✔	✔	✔	✔	✔
Bedeschi SpA	✔		✔	✔		✔		✔				✔	✔	✔	✔	✔
BEHN + BATES Maschinenfabrik GmbH & Co. KG					✔											

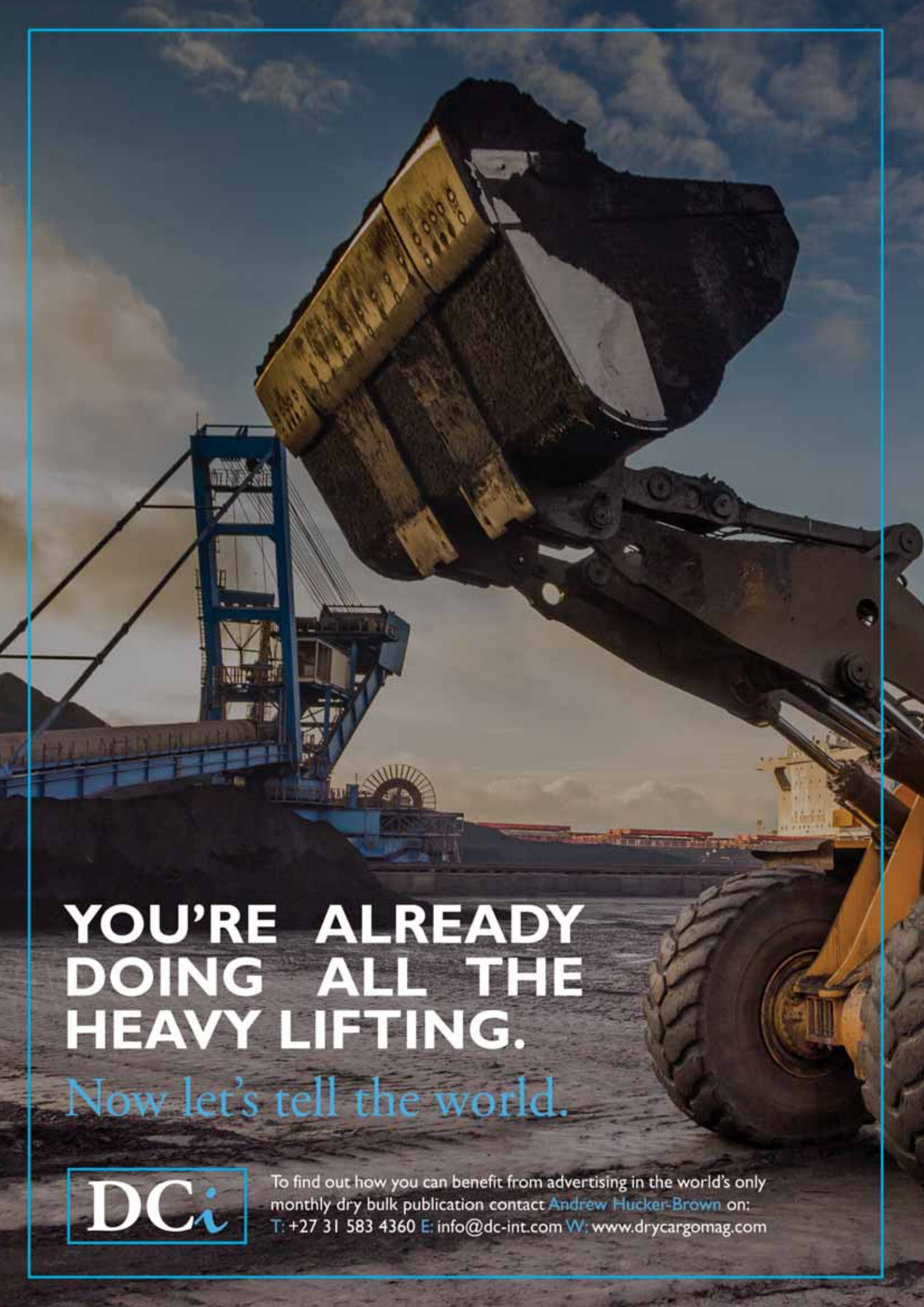
	S&BL	PS&BL	MS&BU	C	FB	H	G	DS	S&I	W&M	G&S	TL&U	RL&U	SS	EC	O
Belt Conveyor Guarding																
Bendezu Port Equipment GmbH	✔		✔	✔		✔	✔	✔							✔	✔
Bergu International AB				✔										✔		
BGS Holland	✔				✔			✔				✔	✔	✔		
Bilfinger Tebodin															✔	
Birrus International Pty Ltd				✔												
Blue Water Misting								✔								
BLUG Credeblug S.L.							✔									
Bobcat EMEA s.r.o	✔		✔									✔	✔			
Bosch Rexroth B.V.	✔	✔	✔	✔		✔										
BossTek				✔		✔		✔								✔
Boyne Area Manufacturing (BAM)	✔	✔	✔	✔	✔	✔	✔	✔				✔	✔	✔	✔	✔
BRUKS AB	✔		✔	✔								✔		✔		
BRUKS Klöckner GmbH																
BRUKS Rockwood Inc																
BSP ENGINEERING S.R.L																
Bucket Mart Inc.	✔	✔	✔	✔		✔	✔			✔		✔	✔		✔	✔
Buhler AG, Grain Quality and Supply	✔	✔	✔	✔		✔		✔	✔	✔	✔	✔	✔	✔	✔	
Bühler GmbH	✔		✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔
Bulk Lift International	✔				✔									✔		
Buttimer Engineering	✔		✔	✔		✔		✔		✔		✔		✔	✔	
C Spencer Ltd	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
C Transport Maritime S.A.M.																✔
Cachapuz Bilanciai Group										✔		✔			✔	✔
Calim Grab Industry	✔					✔	✔					✔	✔			
Camar Mill Systems Ltd															✔	
Cambelt International Corp				✔								✔	✔	✔		
Caterpillar Inc												✔				
Cavotec Deutschland GmbH	✔			✔											✔	
Cavotec SA																✔
CDM Systems, Inc			✔	✔												
Cesur Packaging Corp					✔											
CHIA Espirales.es	✔		✔	✔		✔		✔			✔	✔	✔	✔	✔	
Chief Industries UK Ltd.				✔										✔		
Chief Industries, Inc.														✔		
China Huadian Engineering Co., Ltd																
Christianson Systems Inc.		✔		✔								✔	✔			
Cimbria Unigrain A/S	✔			✔				✔				✔	✔			
Civettini Italo & c sas (CFS Handling)							✔									
Clariant Corporation																✔
Claudius Peters Projects																
Cleveland Cascades Ltd	✔							✔				✔	✔	✔		
COBRA Europe SAS				✔												
Commodity Inspection Services																
Condepols S.A.					✔											
Conductix-Wampfler	✔	✔	✔	✔								✔				✔
Conductix-Wampfler Americas	✔	✔	✔	✔		✔							✔	✔		✔
Conservatek Industries														✔		
Continental Construction (Memphis)	✔	✔	✔	✔		✔		✔				✔	✔	✔		
ContiTech Antriebs-systeme GmbH																
ContiTech Transportbandsysteme GmbH				✔												
Conveyor Dynamics, Inc.				✔									✔		✔	
Cotecna Inspection SA									✔							
CPS Projects (Pty) Ltd	✔						✔					✔				
C-River Logistics																
CRS - Container														✔		✔
Rotation Systems Pty Ltd																
CST Covers														✔		
CST Storage						✔								✔		
DCL, Incorporated	✔			✔	✔			✔				✔	✔	✔		
De Regt Conveyor Systems				✔												

	S&BL	PS&BL	MS&BU	C	FB	H	G	DS	S&I	W&M	G&S	TL&U	RL&U	SS	EC	O
DeMarco Industrial Vacuum Corporation	✔	✔			✔							✔	✔			
Dinnissen BV				✔	✔	✔					✔					
DMN-WESTINGHOUSE					✔					✔						
Dome Corp of N America								✔						✔		
Dome Technology, LLC														✔	✔	
DOMTEC International														✔		
Donaldson Filtration Deutschland GmbH								✔								
Dos Santos International, LLC	✔		✔	✔											✔	✔
Dry-Bag A/S																✔
DSH Systems Ltd.	✔							✔				✔	✔	✔		
DURO FELGUERA, S.A.	✔		✔	✔		✔						✔	✔	✔	✔	
Dust Solutions Inc								✔								
E-Crane World Wide	✔		✔				✔									
E-Crane World Wide / E-Crane International USA	✔		✔			✔	✔								✔	
ECS Eurocargo Services									✔	✔						
EDGE INNOVATE. (NI)	✔			✔								✔	✔			
Elgin Engineering and Construction															✔	
EMS-Tech Inc	✔		✔	✔		✔		✔					✔	✔	✔	✔
Endress + Hauser Inc										✔						
Engicon nv	✔			✔		✔						✔	✔	✔		
Engineering System Solutions, ES2																
EQUIPO LLC							✔									
Esch Group bv																✔
ESI Eurosilo BV														✔	✔	
EUROMECC S.r.l. (HQ)							✔									
Euro-Tech Corporation							✔									
Euro-Tramco BV			✔	✔												
Fabtech International Ltd																
FAM GmbH	✔		✔	✔	✔	✔			✔			✔	✔	✔	✔	
FAMUR S.A.																
FELD Maschinen-und Industriebau GmbH																
FFE Ltd																
Figee Crane Services BV	✔		✔			✔		✔							✔	
Flexco				✔												
Flexco Europe GmbH				✔												
Flexicon Corporation																
Flexoveyor Conveyor				✔								✔	✔			
Franz Wölfer Elektromaschinenfabrik Osnabrück																
Ganz Danubius Trading	✔		✔				✔									
General Kinematics				✔							✔					✔
Geo - Chem Laboratories									✔	✔						
Geometrica Inc								✔						✔		
Geroldinger GmbH & Co				✔	✔	✔						✔	✔	✔		
Getriebebau NORD GmbH & Co. KG																
Golfetto Sangati s.r.l. (GEA Group)	✔	✔	✔	✔				✔		✔	✔			✔		
Goodtech AS				✔	✔	✔		✔		✔				✔	✔	✔
Grapplers India Pvt Ltd (Essar Industries)																
Gulsan A.p.					✔											
Guttridge Limited	✔		✔	✔	✔	✔		✔		✔		✔	✔	✔		✔
Guven Grab Machine Industry and Trade Inc.							✔									
Hanson Silo Company														✔		
Hapman																
Haskoning India Pvt Ltd																
HASLER GROUP SAS										✔						
Heavy Handling	✔															
Henry International Diplomatic Marine																✔
Heyl & Patterson Equipment Division of The HALL Group	✔		✔				✔	✔					✔		✔	
HIT S.r.l.																
HKD Blue																
Horizon Conveyor Equip				✔												

	S&BL	PS&BL	MS&BU	C	FB	H	G	DS	S&I	W&M	G&S	TL&U	RL&U	SS	EC	O
Hycontrol Limited										✔					✔	✔
IMASA																
IMGS																
Império Inteligência																
Inspectorate (Suisse) SA - Bureau Veritas Commodities Division									✔	✔						
Inspectorate America Corporation									✔							
Interjute BV					✔											
Intermodal Solutions Pty	✔													✔	✔	
Intersystems				✔					✔	✔				✔		✔
ISKAR Mühendislik Ltd																
Istop Spamat Srl																
Italgru S.r.l																✔
J & B Grabs b.v.							✔									
Jansen & Heuning																
JEM International				✔	✔	✔				✔						
Jenike & Johanson Inc.						✔		✔						✔	✔	
Jiangsu ZDPM Manufacturer Co.,Ltd																
Jimway Enterprise Co.				✔												
Joy Global Conveyors Inc				✔												
Kalenborn Kalprotect GmbH & Co. KG																
Kardesler Grab & Machine Co.																
Kinergy Corporation				✔		✔					✔		✔			
King Bag & Manufacturing					✔									✔		
KINSHOFER GmbH					✔		✔									
KOCKS ARDELT KRANBAU GmbH	✔		✔													
Komatsu Mining Corp.				✔												
Konecranes Port Solutions - Konecranes GmbH	✔		✔													
Kröger Greifertechnik GmbH & Co. KG																
Lachenmeier Monsun A/S				✔				✔				✔		✔		
Laidig Systems Inc						✔						✔		✔		✔
Langston Companies Inc.					✔											
Lawrence Industries, Inc.						✔								✔	✔	✔
Legacy Building Solutions, Inc.	✔			✔		✔								✔	✔	✔
Librawerk Maschinen-fabrik GmbH					✔					✔						
Liebherr-MCCtec Rostock GmbH	✔		✔													
Lion Bulk Handling b.v.																
Listenow GmbH & Co.	✔				✔							✔	✔			
Loeffler Engineering Gp	✔		✔	✔		✔	✔					✔	✔	✔	✔	
Loibl Förderanlagen GmbH Macawber Engineering, Inc				✔												
Mack Manufacturing Inc							✔									
Mantsinen Group Ltd Oy	✔		✔				✔					✔	✔			✔
Maquinas Condor SA	✔	✔	✔	✔			✔	✔								
Martin Engineering				✔				✔							✔	
Martin Engineering GmbH	✔			✔				✔	✔						✔	
Martin Engineering South Africa				✔												
Maschinen und Mühlenbau Erhard Muhr GmbH	✔											✔	✔			
Matrix PDM Engineering															✔	
MegaDome® Buildings by Harnois														✔		
MegaRoller																
Merrick Industries										✔						
Metso Brasil Industria e Comercio Ltda.																
Metso Minerals Industries	✔		✔	✔			✔						✔	✔	✔	
Mideco								✔								
Midwest International Standard Products, Inc.	✔							✔				✔	✔			
Mitsubishi Chemical Advanced Materials Inc.	✔					✔						✔	✔	✔		

	S&BL	PS&BL	MS&BU	C	FB	H	G	DS	S&I	W&M	G&S	TL&U	RL&U	SS	EC	O
Mole Master Services Corporation™						✔								✔	✔	
Monolithic Dome Institute														✔		
Motherwell Automation																
MRS Greifer GmbH							✔									
Mühlen Sohn GmbH	✔	✔										✔	✔	✔		
Muller Beltex BV				✔											✔	✔
MWI Silo Systems Inc.																
Nantong Rainbow Heavy Machineries Co.,Ltd.																
Natural Grabs																
NAVCO (National Air Vibrator Co)																✔
Nectar Group Ltd		✔	✔	✔	✔	✔	✔			✔		✔	✔	✔	✔	
Negrini Srl							✔									
Nemag BV			✔				✔	✔								
NERAK GmbH Fördertechnik				✔												
Neuero Industrietechnik GmbH	✔	✔	✔	✔												
Nilfisk SpA		✔		✔		✔										
NK Tehnologija SIA	✔			✔		✔		✔				✔	✔	✔	✔	
NKM Noell Special Cranes GmbH	✔		✔												✔	✔
NMH s.r.o																
Nordströms Konstruktionsbyrä	✔			✔		✔			✔			✔	✔	✔		
Nouvelles Graines																
O. B. Wiik AS														✔		
OPTION srl																
Orthos Projects Ltd.			✔	✔		✔		✔		✔				✔		
ORTS GmbH Maschinenfabrik							✔									
PAGE MACRAE ENGINEERING						✔	✔	✔				✔				
Pakiet																✔
Paul Hedfeld GmbH				✔												
PEBCO®	✔							✔		✔		✔	✔			
Peinemann Cranes																
PEINER SMAG Lifting Technologies GmbH							✔									
Peterson Agricare & Bulk Logistics BV									✔							
Pfister Waagen Bilanciai										✔						
PHB Weserhütte, S.A.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
PHOENIX Conveyor Belt Systems GmbH																
Pirnar and Savšek d.o.o.																
Pirs SAS														✔		
PLM Cranes B.V.							✔									
Pneumat Systems Inc												✔	✔	✔		
Polymer Industries - Ultrapoly Division																✔
Port of Amsterdam																
Portpack UK Limited					✔											
Port-Trade AS	✔		✔				✔						✔	✔		
Powertex Inc					✔											✔
PRADO SILOS																
Precia-Molen Nederland BV					✔	✔				✔						
PREMIER TECH				✔	✔	✔		✔	✔	✔						
Premier Tech - PT Systems and Automation				✔	✔	✔				✔						
Premier Tech Chronos b.v.				✔	✔	✔				✔						
Premier Tech Chronos Ltd				✔	✔	✔				✔						
Procon Engineering Ltd										✔						
ProStack																
Protan International																
PT Armada Rock Karunia Transshipment																
PT. Bando Indonesia				✔												
QML Services																✔
R & S Srl / Roncuzzi - WAM Group	✔	✔		✔	✔	✔		✔		✔		✔	✔	✔	✔	✔
RAM SMAG Lifting Technologies (UK) Ltd	✔						✔	✔						✔		

	S&BL	PS&BL	MS&BU	C	FB	H	G	DS	S&I	W&M	G&S	TL&U	RL&U	SS	EC	O
Rapat Asia																
Rapat Corporation																
Rapidpack Corporation	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	
RBL-REI France	✔		✔	✔	✔	✔						✔	✔	✔		
RC Inspection B.V																
REEL Alesa Ltd	✔	✔		✔		✔						✔	✔	✔		
REEL Alesa Ltd	✔	✔		✔								✔	✔	✔		
REMA TIP TOP AG				✔					✔					✔	✔	✔
Representaciones Alfredo Brand y Cia. Ltda																
RHC Deutschland GmbH	✔	✔	✔	✔		✔		✔	✔				✔	✔	✔	
RIKON A/S							✔									✔
River Consulting															✔	
Robson Handling Technology Ltd				✔		✔				✔		✔		✔	✔	
Ronin System Solutions									✔	✔	✔			✔		✔
Royal Haskoning DHV															✔	
Rubb Buildings Ltd														✔		
RULMECA HOLDING SPA				✔												
SAMSON Materials Handling Ltd (AUMUND Group)	✔		✔	✔		✔		✔				✔	✔			
Saxlund International Ltd																
Schenck Process UK Ltd				✔						✔	✔					
Scorpio Engineering Pvt.	✔	✔		✔	✔	✔		✔		✔		✔	✔	✔	✔	
Screw Conveyor Corp				✔								✔				
Seabulk Inc	✔			✔											✔	
S-E-G Instrument AB										✔						
Sempertrans				✔												
SENNEBOGEN Maschinenfabrik GmbH	✔		✔		✔		✔					✔	✔			
Servo Berkel Prior										✔						
SESCOTRANS For Developed Logistics (SAE)	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔		✔	✔	✔
SEW-EURODRIVE																✔
SGH Equipment Limited				✔	✔	✔		✔		✔	✔	✔		✔	✔	
SGS (Nederland) BV									✔							
SGS Australia Pty Ltd									✔							
SGS Minerals Services																
Shanghai Global Machinery Co Ltd							✔									
Shanghai Guanbo Machinery Equipment Co																
Shanghai Janus Grab						✔	✔									
Shanghai Qifan Co., Ltd.	✔						✔									
Shanthi International		✔	✔	✔		✔	✔							✔		
Shi.E.L.D. Services srl															✔	
SIG Società Italiana Gomma Spa				✔												
Siwertell AB	✔		✔	✔								✔	✔	✔	✔	✔
Sly Incorporated																
SMB International GmbH	✔		✔	✔	✔					✔		✔		✔	✔	✔
Smiley Monroe Ltd				✔												
Sobemai by IRI nv	✔					✔	✔					✔	✔	✔		
Solimar Pneumatics														✔		
Sotecma inc	✔	✔	✔	✔		✔		✔		✔		✔	✔	✔	✔	
South Africa Cargo Services	✔	✔		✔												
STAG AG				✔												
Stemm Equipos Industriales, S.L.							✔									
Strudes Inc	✔	✔	✔	✔	✔	✔		✔	✔	✔		✔	✔	✔	✔	
Suomen Viljava Oy	✔	✔		✔	✔	✔		✔	✔	✔	✔	✔	✔	✔		
Supercargo, Lda									✔	✔				✔		
Superior Industries																
Superior Industries, Inc.	✔			✔		✔						✔	✔	✔	✔	✔
Svendborg Brakes USA																
TAIM WESER, S.A.	✔		✔	✔		✔	✔					✔	✔	✔	✔	
TBA Doncaster										✔				✔	✔	
TBA Group															✔	
TBMA Europe BV	✔				✔				✔	✔		✔	✔	✔	✔	✔
TD Micronic				✔		✔				✔						
techNaero aps								✔								
Telestack Limited	✔		✔	✔		✔		✔				✔	✔			
Terex																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The Grab Specialist b.v.							✔									
Thermo Fisher Scientific									✔	✔						
thyssenkrupp Industrial Solutions AG	✔		✔	✔		✔		✔	✔	✔		✔	✔	✔		
TMSA Tecnologia em Movimentação S/A	✔	✔	✔	✔		✔	✔	✔	✔			✔	✔	✔		✔
Topcon Technology Ltd										✔						
Tramco Europe Limited	✔		✔	✔									✔			
Tramco, Inc				✔												
Translift Port Equipment Services Inc		✔		✔		✔										
Transship LTD																
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TSP Korea																
Tsubakimoto Bulk Systems Corporation				✔												
TTS HuaHai Ships Equipment																✔
TVH Parts Holding NV																✔
UK Bagging					✔					✔						✔
V D D B (Pty) Ltd																✔
Veenstra Machinefabriek	✔							✔								
Vendig AB																✔
Verachtert Nederland B.V.							✔									
Verstegen Grijpers BV							✔									
Vibco Inc				✔		✔					✔	✔	✔			
Vibrafloor																
VIGAN	✔	✔	✔	✔								✔	✔	✔	✔	
VIVO consult s.r.o.								✔								
Vortex Global	✔							✔				✔	✔			✔
W&R Barnett																
WeatherSolve Structures	✔	✔	✔	✔		✔		✔				✔	✔	✔		
Webster Griffin Ltd					✔											
Windmöller & Hölscher KG					✔											
Wolf Point Engineers & Contractors																
Worley Parsons Canada (Westmar)	✔	✔	✔	✔		✔		✔				✔	✔	✔	✔	
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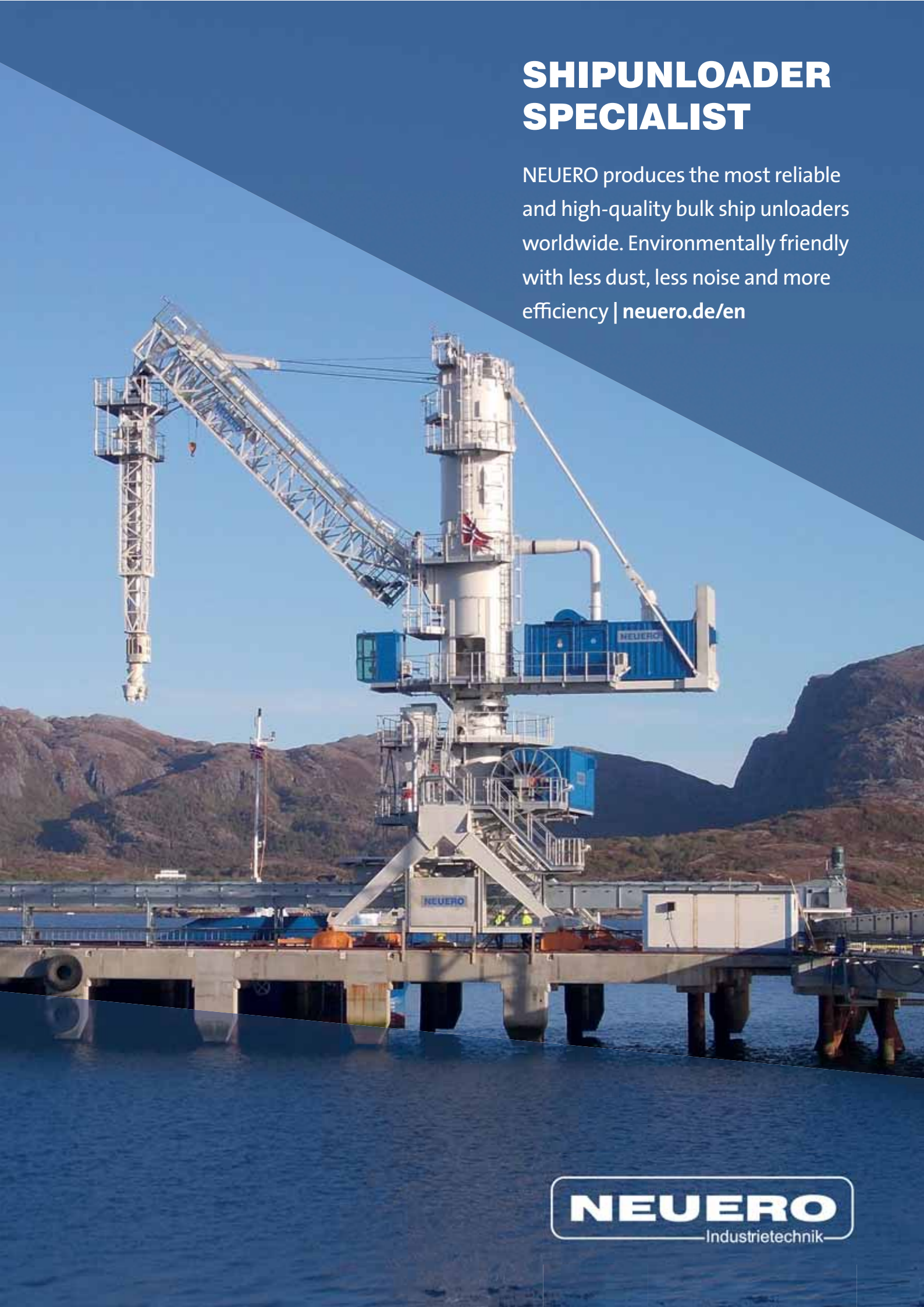

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