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featuring...

DCi DRY CARGO international

Coal trade holding up

Although interpretations vary, it is arguable that prospects for global commodity import demand in 2019 and beyond have become less positive recently. World seaborne dry bulk trade still seems likely to grow, but expansion this year may be quite modest amid short- and longer-term restraining influences.

The International Monetary Fund's latest (April) forecast identified 2019 as a "delicate year for the global economy". World trade growth is expected to decelerate to 2.7% from 3.1% last year, against a background of a similar slowing in the world economic output trend. Despite recent signs of a pick up, China's economy looks set to continue slowing on an annual basis, while USA and Europe could see reduced growth rates.

Coal

Indications of the outlook for coal trade are mixed. While enough support to sustain the upwards trend this year is visible, great uncertainty surrounds import demand in China in particular. Elsewhere negative influences are abundantly clear. However, some positive changes in India and several smaller Asian country importers could provide substantial support.

A breakdown of steam coal imports by large importers in Asia is shown in table 1, suggesting limited growth in the total during 2019. Steam coal comprises four-fifths of all global coal trade, and Asia's imports comprise three quarters of that proportion. Recently Australia's Department of Industry, Innovation and Science estimated global steam coal trade (including land movements but mostly seaborne) at 1152 million tonnes this year, a 1% increase, including a 2% rise in Asia.

Iron ore

Some clues to possible changes in iron ore trade volumes result from estimates of steel demand, in producing countries which are importers of the main raw materials. The latest World Steel Association assessment for steel demand this year suggests that increases will be tightly constrained.

Based on demand for finished steel products, the WSA's calculations for 2019 show reductions of 1.0% in Japan and 0.4% in South Korea, while the European Union is expected to see a 0.3% rise. In China a 1% increase is indicated. By contrast, India's steel demand is expected to rise strongly by 7%, a strengthening more likely to be reflected in increased coking coal imports than in extra iron ore imports.

Grain/soya

Attention is now turning towards the new 2019/20 crop year for world grain trade starting in July. International Grains Council estimates point to another flat period, but many of the most significant import demand influences are not yet reliably predictable, because the effects of future weather conditions on crops is unclear.

On the basis of current signs global trade in wheat plus corn and other coarse grains is forecast to remain virtually unchanged in 2019/20 at just over 368mt (million tonnes), compared with almost 369mt estimated in the year ending June 2019. Among changes envisaged in importing countries are a marked reduction in the EU, while North Africa could see growth. Northern hemisphere summer domestic harvests in importing countries, for which estimates are not yet reliable, will have a big impact.

Minor bulks

Trade in agricultural and related commodities within the minor bulk sector appears to have ceased growing last year but could resume an upwards trend in 2019. This group includes a diverse range — sugar, oilseeds (excluding soya) and oilseed meal as well as rice, totalling over 170mt last year. A similar volume of fertilizer movements, just under 170mt is estimated.

Bulk carrier fleet

Within the world bulk carrier fleet, Capesize (100,000 deadweight tonnes and over) vessels, a category including many large ore carriers, comprises about 40% of the total. Table 2 shows how this fleet has been evolving. In 2019 substantial newbuilding deliveries are likely, but greatly increased scrapping could result in capacity growing at slower pace than seen last year.

TABLE 1: STEAM COAL IMPORTS IN KEY ASIAN COUNTRIES (MILLION TONNES)

	2014	2015	2016	2017	2018	2019*
Japan	114.2	120.1	115.8	121.0	119.8	120.0
South Korea	100.8	102.6	102.5	116.0	117.5	118.0
Taiwan	57.0	56.3	55.0	58.2	58.4	58.0
China	165.5	107.9	124.2	118.7	122.4	117.0
India	176.0	170.2	148.3	152.7	172.7	182.0
Total of above	**613.5**	**557.1**	**545.8**	**566.6**	**590.8**	**595.0**

source: various & BSA estimates **BSA forecast*

TABLE 2: CAPESIZE (100,000 DWT & OVER) BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2014	2015	2016	2017	2018	2019*
Newbuilding deliveries	18.5	16.9	20.0	15.3	14.3	15.5
Scrapping (sales)	4.2	15.4	13.3	6.4	3.1	7.0
Losses	0.0	0.0	0.2	0.3	0.0	0.0
Plus/minus adjustments	0.0	–0.4	–0.5	0.0	0.0	0.0
Fleet at end of year	**308.1**	**309.2**	**315.2**	**323.8**	**335.0**	**343.5**
% change from previous year-end	+4.9	+0.5	+1.9	+2.8	+3.4	+2.5

source: Clarksons (historical data) & BSA 2019 forecasts **BSA forecast*

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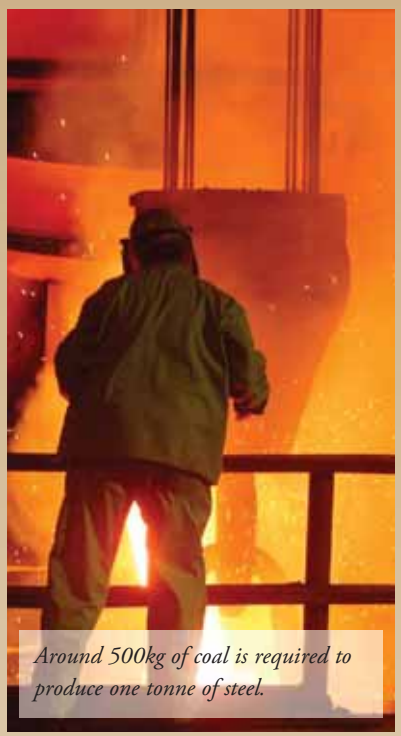
Coal rises in the East and sets in the West but responsible coal sourcing remains crucial

As Europe, and more broadly the OECD, moves away at different paces from coal for power generation, coal production and use is forecasted to remain significant especially in the East. Expanding economic growth has resulted in a rise of coal demand by 1% in 2017 according to the International Energy Agency, with this trend set to continue due to growth in India, China, Korea, Russia, and Indonesia.

The irony of a parallel growth in renewables and in coal consumption is not lost on producers who see that the drive for clean energy coupled with urbanization has led to somewhat of an Asian coal boom. This has two main reasons: firstly, developing and growing economies need to fulfil their promise for cheap and reliable access to energy for all and coal remains the short-term solution to this; secondly, urbanization has led to an increasing use of steel and cement, both of which require coal as part of their processing.

The media, politicians and environmental activists all seem polarized around the issue of coal for the generation of electricity and the emissions associated to that process. But rarely is coal discussed away from the emotionally charged conversation around climate change. And yet, it is essential to be able to take a step back and look at the realities of coal markets and the varied uses of coal. Yes, most of the coal mined is serving the electricity sector but the volumes of coal required for other activities are not negligible and neither are their carbon footprint. Numbers vary slightly, but it is commonly agreed that approximately 10% of global coal production is destined to the steel manufacturing sector with around 500kg of coal required to produce one tonne of steel. Close to 73% of steel manufactured today is manufactured in such fashion. It also takes about 200kg of coal to produce one tonne of cement and about 300–400kg of cement is needed to produce one cubic metre of concrete.

The tension between climate change imperatives and the need for nations to pursue economic growth is being felt in



Around 500kg of coal is required to produce one tonne of steel.

Asia more than anywhere else in the world. Developing economies have a right to affordable and clean energy. Currently coal provides the bulk of this, and only with investment in technology will this energy be cleaner. Building infrastructure is critical to fostering economic growth, again without steel or cement this will be a challenge. We need to work on how to make the use of coal in these processes efficient and cleaner.

But climate change is not the be-all and end-all. Yes, there is an inevitable imperative for our planet to reduce carbon emissions. But is it as simple as that? We would argue that whilst the world tries to wean itself off coal, we still have a significant responsibility to ensure that what coal is being used comes from responsible producers, no matter what the end use of that coal. We have a duty to communities living around coal mining operations to ensure that those operations respect best environmental, social and governance (ESG) standards. Other commodities are seeing growing scrutiny over their operations because of their link to a low carbon economy (such as cobalt, lithium and other rare earth metals) but coal seems to be less scrutinized as stakeholders want to 'wash their hands clean'. By refusing to acknowledge the realities of coal usage, especially in Asia, we are doing a disservice to those communities impacted by coal mining..

It is high time that we started looking at coal holistically and accepting that coal for power generation, whilst declining, will not decline at a sufficiently rapid pace in some parts of the world to reverse the trend on climate change. Investors should be looking not at shunning coal and burying their head in the sand but using their power to ensure that what coal is being produced is produced responsibly. That influence can be used on companies sourcing coal for power generation, steel and cement manufacturing to find new technologies to significantly reduce their environmental impact.

Ultimately, pressure to source coal responsibly will only increase as end users of products using coal want to know more about the exact provenance of the raw materials. For instance, car manufacturers want to be able to tell their consumers that their entire supply chain — and this includes coal — is responsible, and that the product they are buying is free from human rights violations, or that the exact emissions associated to its manufacturing can be known. To do this they will start asking their own suppliers to demonstrate they have measured and monitored the performance of their coal suppliers.

To remain ahead of the game, to remain competitive in the market, sellers of coal need to be in a position to reassure buyers that the coal they are selling them came from a responsible mine.

Bettercoal is currently the only organization which measures the ESG performance of coal sites throughout the world with over 20 mining companies (more than 35 sites) having undergone a rigorous assessment process. Using our assessment process, Members of our organization can truly monitor the ESG performance of the companies they are sourcing coal from.

By Anne-Claire Howard, Executive Director, Bettercoal, UK

Indian coal imports up in 2018/2019

Some provisional figures released by "mjunction services", which is a joint venture between Tata Steel and SAIL, show that coal imported by India in 2018/2019 increased by 8.8% from 214.61mt (million tonnes) in 2017/18 to 233.56mt in the last fiscal year.

As for non-coking coal imports, these rose by around 13.25% from 144.99mt to 164.21mt.

Coking coal imports, at 47.73mt were little different to the 47.22mt handled in 2017/18.

Barry Cross

Property market and infrastructure continue to drive cement demand

If you take any industrial commodity whether it is steel, aluminium, copper or cement, then capacity building, production growth and consumption rise are happening principally in Asia, *writes Kunal Bose*. There, leaving out Japan and South Korea, every other country from China to India to ASEAN members needs to develop infrastructure and focus on construction activities, including house building. With a combined population of 2.75bn, rapid urbanization in China and also India (but at a lesser pace), the need to establish better road and rail linkages between rural and urban centres to give farmers better market access, and industrial development, will continue to create growing demand for cement and other building materials.

After years of more and more cement being produced and used, backed by capacity enhancement, China's overall consumption of the binding material is sliding now because of slowing use of cement in the property development sector. According to a recent report of DBS Group Research, revival of activity in the infrastructure sector aided by stimulus programme will help in partly mitigating the slowing cement consumption linked to property investment. The report says after an estimated decline of 4% year-on-year in cement consumption in China in 2018, "we see a further contraction of 2% in 2019. Our 2019 growth projections for infrastructure (+1.6% from 2018), urbanization construction (+3.8%), are offset by a decline in property segment (–8.7%), which reflect our China Property Team's latest forecast of a 15–20% decline in the property sales volume."

Industry officials, however, say cement demand will get a major leg up in the wake of China's Belt and Road Initiative (BRI) likely to encompass infrastructure development in 152 countries that will "enhance regional connectivity and embrace a brighter future." All least developed, developing and emerging nations have very major to large infrastructure deficit and the BRI is ambitiously designed to address the issue. Infrastructure development encompassing road and rail development and promotion of sea trade routes on BRI scale will call for use of millions of tonnes of cement and steel in particular. Sought to be completed by 2049 coinciding with the centenary of founding of the People's Republic of China, DRI is seen by some countries, including India and Japan as an attempt by China to secure strategic advantage in trade and spread its sphere of influence.

What is relevant for cement is, China — which is now using 70% of the industry capacity of 3.13bn tonnes — will have occasions to step up capacity utilization as BRI gains in pace. Incidentally, China alone has a share of around 59% of global cement capacity. As the gigantic BRI programme to finance and build connectivity infrastructure across Eurasia is gaining traction, it is facing some competition in its backyard from Japan which is out to fund and develop 'quality' infrastructure in south and southeast Asia. Prime minister Shinzo Abe's infra development vision may reduce the pain of its cement industry, which too like its Chinese counterpart suffers from overcapacity. Japan has a very modern cement industry.

Cement is a low value bulk commodity and therefore, is a freight intensive industry. Its bulk transportation over long distances to be done without exposure to nature could prove to be uneconomical. Even then seaborne trade and distribution is an important part of the cement industry. Not every country is blessed with limestone resources and steel slag that go into the making cement. But there are

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seaside cement plants in countries with excess capacity that will find relief by exporting its surplus by using the water route to other countries. The higher the plant capacity utilization, the bigger the cost saving to which are to be added the margins available in trade and distribution.

Clinker and cement featuring in seaborne trade are largely handled in bulk having a share of close to 90%. The balance is packed in regular bags and big bags. The annual volume of cement seaborne trade ranges from 100mt (million tonnes) to 150mt. Cement producing countries also use inland waterways for bulk transfer of the commodity, which is both environment friendly and cost effective. China and India are crisscrossed by many rivers and it is only natural that for logistical considerations, cement producers there will be making optimum use of inland waterways for distribution of the bulk commodity.

China capacity consolidation

The world's king of concrete, which produces a lot more cement annually than the rest of the world, has structural weaknesses represented by too many producer groups. China Cement Association, under nudges from Beijing, has set out to correct this by speeding up the process of capacity consolidation. At the same time, the 3.13bn tonne industry is engaged in phasing out polluting and inefficient units and gradually stopping production of low grades of cement. By 2017, through a series of mergers, assets buy-outs and government-ordained capacity shedding, the country's top ten cement companies came to own 56.7% in terms of clinker capacity. The 2020 target is for leading ten groups to own as much as 80% clinker capacity and for the two largest to own 65% clinker capacity in the country's ten major cement producing provinces. DBS Bank believes, the industry concentration emerging from the merger of CNBM with SINOMA and BBMG with Jidong Cement will lead to "rationalization of cement and sustainable profitability."

According to DBS Bank, low grade cement constitutes around half the capacity of the Chinese industry. Generally, the making of such cement using old technology requires proof that it is energy inefficient and such capacity, therefore, is sought to be phased out progressively. For example, since 2014, there have been serious deliberations to stop production of low end PO32.5 and simultaneously promote the use of high quality PO42.5 on a nationwide basis. The DBS report says: "Given that PO42.5-grade cement products utilize more clinker (each tonne of PO42.5/PC32.5 cement products require 0.77/0.63tonne of clinker, respectively), the upgrade from low-end to high-end cement will increase overall clinker consumption by 333mt or 10% of the country's total cement supply."

A Reuters report last year said that China's ministry of industry and information technology had banned new cement capacity creation in 2018. What now obtains in China is that new capacity will be allowed but it has to be in conformity with rules that there is overall decline in capacity. Before the government will sanction building of a new cement unit, it has to be satisfied that bigger capacity has been eliminated. China Cement Association says by 2020 the industry will extinguish 393mt capacity and at the same time 540 grinding units. The twin objectives are: (i) Achieve capacity use of 80% for clinker and 70% for cement. (ii) Create condition for ten leading groups to have 70% share of clinker production and 60% of cement output.

As China remains engaged in squeezing out capacity within the country as part of the country's three-year action plan (2018–20) to curb pollution caused by major industries, its cement companies alongside the push given to President Xi's signature policy of a new Silk Road that is to link Asia with the Middle East, Europe and beyond, are — either independently or in partnership with local groups — setting up cement and other plants in countries to be covered by BRI. So what China is to shutter in its own land will be made good to some extent by its building capacity abroad, either on its own or in partnership with local groups. China is doing this primarily to spread its sphere of influence and also for economic gains.

India scene

India, the world's second-largest producer of the commodity, had a capacity of 502mt in 2018 and it is set to climb to 550mt by 2020 if all the greenfield and brownfield projects now under implementation get completed in time. In terms of capacity, the Indian industry is about one-sixth the size of what is happening in China. But unlike its northern neighbour where overall cement demand growth had actually been negative since 2014, here in India the growing pace of infrastructure development work and office and residential building construction across the country saw the industry recording a growth of 8.5% in 2018 against 6% in the previous year. Indian cement production rose 8% to 325mt in 2018 from 301mt in 2017.

For logistical consideration to avoid hauling cement over long distances, which proves to be uneconomical, the commodity is a regional play in India with the industry divided into five main geographic regions, namely, north, south, west, east and central. The industry is the largest in the country's south with a share of about one-third of the total cement capacity. According to ACC, the Indian subsidiary of Switzerland based LafargeHolcim, in the short and medium term, Indian cement demand is likely to be "driven by eastern, central and northern regions." Of these, the east will be holding best "opportunities for cement companies to ride out the crest of demand," according to ACC, which is now engaged in expanding capacity by 5.9mt by way of building a greenfield factory in Madhya Pradesh and at the same time expanding two operating units at Tikaria and Sindri. Like ACC, the other industry leaders are all engaged in building new cement plants and expanding the operational units in anticipation of sustainable demand growth.

The general expectation is that once the general elections in India are over and the new government settles down to work after the poll results are announced on 23 May, a push will be given to strengthening infrastructure to overcome its deficit in most parts of the country. The housing and real estate sector is the biggest demand driver for cement, accounting for 65% of total use of the material. House building, especially affordable shelter for

millions — following the launch of the affordable housing fund last year by the central government-owned National Housing Bank — is getting a major boost.. At the same time, the industry is laying hope for major demand generation once the new government gives a thrust to the already announced building of 100 smart cities.

The big question is, will the new government favourably consider the demand of the industry and consumers for lowering of the punitive 28% goods and services tax (GST) — equivalent to VAT in many countries — to 12% since the tag of 'luxury or sin' cannot be attached to the commodity? In the meantime, the Indian industry is seeing further consolidation of capacity and launch of many varieties of new generation of cement described as 'revolutionary cement' with superior strength, superfine quality and superfast setting.

Brazil hopeful of increase in cement sales this year

Brazil's cement industry hopes to sell 3% more cement this year than in 2018, after four years of decline, *writes Patrick Knight*.

At the end of last year, Brazil's 100mt (million tonnes) a year capacity cement industry, the world's tenth largest, predicted that about 3% more cement would be sold this year than the 52.7mt of 2018. This would take the total sold to more than the 60mt of 2010, but would still be at least 10mt less than the 71mt sold in 2013 and 2014. The new government, led by the right wing candidate Jair Bolsonaro, a surprise contender, promised a wide-ranging programme of privatizations, including new concessions to operate highways and airports, caused a wave of enthusiasm.

Since taking power, however, the inexperienced Bolsonaro has offended numerous potential allies with some of his radical proposals and, faced with still growing unemployment, optimism has evaporated. The best that can now be hoped for this year is economic growth of about 2%, possibly much less than that.

Last year, 52.7mt of cement was sold by the 24 companies which form the cement industry in Brazil, which between them own 100 mills, with capacity to make 100mt a year. This was about 3% less than the 53.8mt sold in 2017. The main reason was that Brazil's massive civil construction industry, the main market for cement, was still burdened by hundreds of thousands of unsold buildings. Although the industry claims that the number of unsold buildings has fallen significantly in recent months, and predicts that shortages could occur unless a start is made now to new building, there is little sign of movement yet.

About 30 cement mills are still shut down, the largest number being in Brazil's leading industrial state, Sao Paulo, where 13 mills are closed. Although the state's leading industry, the motor industry, seems to be recovering, several vehicle companies have decided to close their elderly high-cost factories in and around Sao Paulo, and move production to lower cost plants they have built in the North East and in the south.

Votorantim, by far the largest company in Brazil, with a total of 28 mills and cement plants, has announced that it has bought a terminal at the port of Manaus from the Cemex company. It has started to ship 300,000 tonnes a year to the Amazonian city from its plant in Sergipe. The cement will be carried in the 20,000dwt-capacity *Cement Carrier*. Votorantim is also to open a plant at the port of Santarem, 500km upstream from Belem.

Brazil's second-largest company, Intercement, owned by the Camargo Correo construction company, has sold its plant in Portugal in recent months, and will give priority to Brazil and Argentina, where it owns the Lomas Negro company. Intercement will continue to operate in the United States and Canada, as well as South Africa, Mozambique and Egypt. Intercement says it sold 15.5mt of cement in Brazil last year.

The Lafarge/Holcim company, the third largest in Brazil, and which was forced to dispose of four mills following the merger of the two, sold to the Irish CRH company, sold 12.5mt in Brazil last year. The long-established Nassau company, strong in the North East of the country, now has 11 mills, seven in the North East, and three in the north. The CSN steel company, which has unlimited access to clinker from its steel mills in Rio de Janeiro state, made 2.4mt of cement last year, but CSN confines its sales to the states of Rio, Sao Paulo and Minas Gerais. Relative newcomer Mizu, in Brazil since 1998, now has six plants, one each in Rio, Sao Paulo, Minas Gerais, as well as two in the north east, in Sergipe and Rio Grande do Norte, and one in Manaus.

The industry has been encouraging local administrations to consider using cement, rather than asphalt for road surfacing. But because of the difficult financial situation of all states and cities, little progress has been made with this idea so far. A state with particular difficulties is Minas Gerais, where following the collapse of the dam at the Brumadinho iron ore mine, with the loss of more than 300 lives, Vale has been forced to close ten mines with similar dams, following a wave of protests from people fearful of more collapses. This has meant that 100mt less ore will be produced in the state this year. The sharp rise in the price of ore which has followed the reduction in Vale's output, has caused the price of ore to rise by up to 15%, so the company will not suffer too much. But tax revenues in Minas Gerais, will be cut by about 7%. Many towns have suddenly become unable to pay their workforces, so work on road building and other construction there can be expected to be a casualty.

CEMENT PRODUCTION BRAZIL

2018	52.7
2017	53.8
2016	57.6
2015	64.4
2014	71.2
2013	71.0
2012	69.3
2011	65.0
2010	60.0
2009	52.0

Source: Cement Industry

Up to 40% of the cement sold in Brazil is packed in 50kg bags, used mainly by 'self build' families and groups of people, who use the material to build or extend their homes. This business has tended to hold up better than the demand by the large-scale civil construction industry, and also by the infrastructure projects. There is one very good piece of news, which is that the southern section of the 3,000km 'North–South' rail system, has been sold at auction to the Rumo company, already the owner of 31,000km of the railway network in Brazil. The southern section of the North–South line links with Rumo's existing tracks, which run to Santos. To win the concession, which will last for 30 years, Rumo had to undertake to spend about $500 million on upgrading the line, and building dozens of new patios, and infrastructure works. This will allow the line to carry up to 20mt of goods by the mid 2020s, compared with the 2.5mt moved along the line last year. These works will require large amounts of cement, while it is also feared that many of the cement sleepers laid by the line's builders, will also have to be replaced.

Safina ship services agency: in every port in every way

In every Egyptian port there is a Safina presence: for a company that prides itself on being totally Egyptian in its history, processes and operations, it makes complete sense to ensure that it is available to any visiting ships in Egyptian waters no matter what port they arrive at. For a company that believes in a comprehensive network, it is not hard to see why Safina has gone to great lengths to make its Egyptian presence felt.

As a major Egyptian ship services agency Safina has an innate understanding of what it takes to provide ship agent services for all types of visiting vessels: its history as ship operators means that it knows what captains, crew, owners and operators demand from an agency — and it can provide it. Safina provides ship agency and maritime logistics services across all Egyptian ports — Alexandria Port, El-Dekheila Port, Abu Qir, Damietta Port, Port Said Port, East Port Said Port, Arish Port, Suez Port, Adabiya Port, Safaga, Sokhna Port — in addition to all Egypt petroleum terminals, mining and touristic ports. From the start of the Suez Canal in the north into the Red Sea, it is a network that has expanded along with the traffic into Egyptian waters.

Coverage is vital to give credibility to the Safina network and for the past four decades it has been a shipping services agency that has nurtured and developed a 'home-grown' operation that has become internationally recognized and respected in terms of living up to its claims. As a comprehensive ship services agency, Safina arranges berths in selected ports, handles documentation, clears vessels with the necessary paperwork and certifications with port and other authorities, as well as releasing or receiving cargo that includes dry bulk and project cargo as part of its normal operations.

With ships from across the globe visiting Egyptian waters on a daily basis and looking for cargo services, dry bulk forms a large and still growing percentage of the company's cargo operations. With a presence in every Egyptian port, Safina has the experience of handling dry bulk cargo in the major locations in the country. Among these are Adabiya, Safina's main home port, Alexandria which handles the bulk of foreign trade in Egypt, Port Said and Port Damietta with its terminals for general and bulk cargo.

Mohamad El Ahwal, CEO of IACC Holdings, which has Safina as one of its prominent divisions, understands the needs of ship owners and operators and their search for cargo services that can reduce transit times, costs and unnecessary delays.

"The traffic in and out of the Suez Canal is not purely coming from Egyptian ports. Many of the vessels we deal with are in transit but still looking for port agency services. Transit through the Canal is often preceded by waiting times that can be up to one day in some cases — more than enough time for husbandry services that Safina offers. As an agency that has operated its own vessels and understands what services are needed, this translates into comprehensive and flexible ship agency services that reflect the growth in the company over the past decades. We have the skills and experience of working with dry bulk operators both in Egyptian ports and those coming into the regional waters but the service is always the same — tried, tested, trusted and available on demand. We know time is money and so we see ourselves as a shipping services company that is available to suit our customers."

Safina has a strong empathy with ship owners and operators and its considers its roles as being facilitators in those matters that require knowledge and experience — crew management support, spare parts delivery, documentation, fresh water supply services and provision of cargo support services across Egyptian ports. Having a strong relationship with the local regulators and port authorities is considered a must for an Egyptian shipping services agency. With so many local and foreign vessels operating through the country's waters and heading in and out of the Suez Canal, Safina has developed as a major support agency for the dry bulk, oil & gas, container ships, chemical and general cargo vessels that use the Canal.

Despite the ongoing pressures of a weakening global economy and its impact on world shipping trade, Safina sees the current situation as more positive for shipping comes into its regional waters with specific rebates for ships using the Suez Canal: the Suez Canal Authority (SCA) is currently offering rebates for dry bulk carriers of 75% heading from Australia to north west European ports; there is a 40% rebate on normal Suez Canal transit tolls for vessels coming from South African ports into the Mediterranean and Black Sea ports and selected rebates for other locations.

The idea behind the rebate system is when Safina is able to prove to SCA that voyage through Cape of Good Hope or any other route has less cost than the Suez Canal, Safina agency can negotiate with authorities on behalf of customers to get a rebate percentage to attract ships to cross the Suez Canal.

With Safina acting on behalf of vessels arriving in Egyptian waters and sourcing the best rebates for these Canal transits, it is not hard to see why dry bulk operators see the region in a more positive light in terms of operational finances.

Now that the SCA has also decided to continue with the rebates for dry bulk vessels operating between American and Asian ports until the end of 2019, Safina sees a continuing dry bulk ship presence in Egyptian waters. As a highly respected Egyptian shipping services agency, that can only be regarded as a positive development in one of the world's busiest maritime highways.

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GB Railfreight celebrates launch of new state-of-the-art simulators in Peterborough

On 22 May, GB Railfreight (GBRf) celebrated the unveiling of two new cutting-edge simulators with a launch event at its recently renovated training facility in Peterborough, UK. As these are the UK's first and only full cab freight European Traffic Management System (ERTMS) simulators, GBRf is proud to be leading the way on digital innovation within the UK rail training sector.

GBRf was delighted to be joined by outgoing Mayor of Peterborough, Chris Ash, who assisted Managing Director John Smith in cutting the red ribbon to officially declare the new facility open. There was a race by attendees to be the first to try out the new simulators, which will be used for driver training going forward. All attendees left thoroughly impressed by the true to life simulator experience.

Speaking at the event, GBRf Managing Director John Smith emphasized the way in which the simulators will revolutionize driver competency, telling the audience:

"These simulators come out of a desire to change the way in which we manage the competency of our train managers, who drive our trains on a day-to-day basis.

At the moment, when you train someone to drive a train, they do a lot of classroom work, are then mentored in the cab, and then they're on their own out there. But every year we have to check they're still doing the job correctly. These simulators allow us to trial a number of circumstances in a very realistic environment that allows trainers and assessors sitting outside the cab to see how drivers react in different circumstances.

The ability to continually ensure that the competency of the individual is still full is massive, as well as testing how people react to different circumstances in a safe environment. The simulators will really develop how competency is managed."

Corys, GBRf's engineering partner in the project added: "We would like to thank GB Railfreight for giving us the opportunity to collaborate on the simulator project. It was novel for us to transform these two old locos into state of the art training simulators, we don't have that many projects like this and it has run very well… we have a very successful working relationship and we look forward to supporting you [GBRf] long term"

The new £1 million simulators represent the first stage in a huge programme of investment by GBRf in Peterborough, with a new regional HQ planned, along with the development of surrounding yards for operational purposes.

About GB Railfreight

Founded in 1999 and headquartered in London, United Kingdom, GB Railfreight is the third-largest rail freight operator in the United Kingdom, with a turnover in excess of £120m. GB Railfreight is one of the fastest-growing companies in the railway sector and transports goods for a wide range of customers.

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Carrying deck cargo, who is at risk?

Following consideration of a disputed clause by the English High Court, Lisa Clarke at UK P&I Club advises on the implications and risks of proposed carriage of cargo on deck:

"Carrying deck cargo exposes carriers to greater risks, with such goods considerably less protected against the elements than those carried in the holds.

"If the cargo carried on deck falls outside the definition of Goods found within the Hague/Hague Visby Rules, the Carrier will be deprived of the defences available to him under Article IV of the Hague/Hague Visby Rules, should the cargo be damaged or lost. It is prudent for the carrier to seek to exclude all liability for carriage of cargo on deck by inserting an appropriate clause into the bill of lading.

The Elin

"Recently, in The Elin [2019] EWHC [1001] (Comm), the English High Court considered the interpretation of a clause in a bill of lading excluding the bulk carrier's liability for deck cargo.

"A cargo of offshore production equipment was carried on deck and lost overboard in heavy weather. Cargo interests brought proceedings against the ship owner, arguing that the clause should be read as not excluding the carrier's liability for loss or damage, these being obligations which were not specifically addressed in the clause. The owner denied the claim citing the deck cargo exclusion clause.

The disputed clause reads: "loaded on deck at shipper's and/or consignee's and/or receiver's risk; the carrier and/or Owners and/or Vessel being not responsible for loss or damage howsoever arising".

"The Court agreed with the owner that as a matter of plain language and good commercial sense a clause providing that a carrier will not be liable for loss or damage to deck cargo 'howsoever arising' will be effective to exclude liability for the carrier's negligence or its failure to exercise due diligence to make the vessel seaworthy.

"It should be noted that had the Hague Visby Rules applied, the exclusion would have restricted the carrier from contracting on terms that relieve or lessen a carrier's liability from the duties in the Rules.

Club Rules

"The UK P&I Club Rules make no express exclusions with regard to the carriage of deck cargo. The carriage of cargo on deck, other than by custom (e.g. the container trade), or agreement, will constitute a deviation. It follows that there will be no cover for a member's liability for deck cargo unless:

- it is customary to carry such cargo on deck; or
- the proposed carriage has been approved by the managers in advance, possibly with additional cover arranged.

"Carriers are advised to consult with and utilize their Club's Loss Prevention Department when considering a voyage involving deck cargo. In order to check whether there are any practical considerations to take into account. It is also important to check that the relevant bill of lading has the correct protective wording."

About the UK P&I Club

The UK P&I Club is a leading provider of P&I insurance and other services to the international shipping community. Established in 1869 the UK P&I Club insures over 244 million tonnes of owned and chartered shipping through its international offices and claims network. 'A (Stable)' rated by Standard & Poor's with free reserves of $540m, the UK P&I Club is renowned for its specialist skills and expertise which ensure 'best in class' underwriting, claims handling and loss prevention services.

The UK P&I Club is managed by Thomas Miller, an independent and international insurance, professional and investment services provider.

About Thomas Miller

Thomas Miller is an international provider of insurance services.

Founded in 1885, Thomas Miller's origins are in the provision of management services to mutual organizations, particularly in the international transport and professional indemnity sectors; where today they manage a large percentage of the foremost insurance mutuals. Increasingly Thomas Miller applies its knowledge and expertise to the development of specialist businesses.

Principal activities include:

- management services for transport and professional indemnity insurance mutuals;
- managing general agency;
- professional services including legal services, claims and captive management; and
- investment management for institutions and private clients.

Jotun creates new standard for predictable, long-term antifouling

Jotun has unveiled the next generation of its popular SeaForce biocidal antifouling range, with three new products featuring breakthrough Hydractive™ technology. Developed in-house by the marine protective coatings specialist, the new solution provides predictable, long-term performance for diverse vessel needs.

Jotun originally launched its SeaForce range in 2004. Since that point the solution has established a prominent position, with some 27,000 vessel applications worldwide.

However, according to Dr Erik Risberg, Global Marketing Director, Jotun Marine Coatings, evolving customer needs have spurred Jotun to develop an innovative new solution to satisfy industry demands today, and far into the future.

"SeaForce is a cornerstone portfolio in our marine coating range," he notes, explaining; "but we felt the time was right to push its performance further, providing next level protection for our customers while consolidating its position within the marketplace. Shipping has changed over the past decade and a half, creating a different customer need, and we want to evolve with that demand to keep delivering optimal solutions. That, in essence, led to the idea for Hydractive™ technology."

Hydractive™ technology is unique. It effectively slows down the water uptake of the antifouling, meaning that biocides are released in a more predictable pattern over the lifetime of the coating. This results in stable, high quality performance for the long-term, with SeaForce keeping customers' vessel hulls cleaner, for longer.

The range features three core products: SeaForce Shield, offering effective protection; SeaForce Active, actively working to safeguard hulls even when vessels are not is use; and SeaForce Active Plus, delivering premium protection at an affordable price.

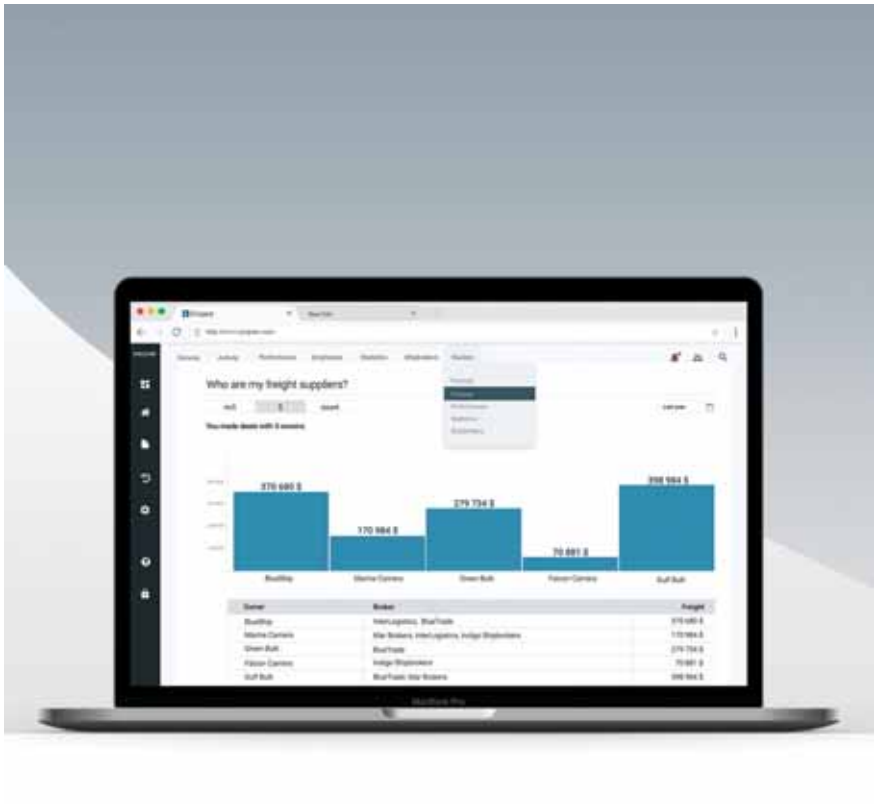
SeaForce Active and SeaForce Active Plus also feature a triple biocide package, one of which is the same popular biocide combination used in the top of the range SeaQuantum product portfolio.

"There is no 'standard' shipowner, so there is no one size fits all coating solution," states Risberg. "At Jotun it's our commitment to provide our customers with a variety of solutions to meet their individual requirements, budgets and performance needs. The SeaForce range is living proof of that ambition.

"With our proprietary Hydractive™ technology we can deliver a 'best in class' solution for long-term clean hulls and protection. That translates to competitive advantage for both our customers and us. We're excited to see industry reaction to what we regard as a significant step forward in anti-fouling performance within this market segment."

Renowned international marine coatings supplier Jotun has an extensive worldwide delivery network. The SeaForce product range is available now.

Enqlare's digital platform receives major upgrade in bid to streamline industry



In April, Enqlare released the first major upgrade to its digital platform for bulk freight. The new release by the Swedish software company is the result of almost a year of iterative design and development in collaboration with a handful of strategic clients and marks a significant milestone for the young company.

Faced with an increasingly competitive business landscape, a more onerous regulatory environment, and a slowdown in global economic growth, the shipping community seems to have woken up to the fact that the usual *modus operandi* of battening down the hatches and waiting for the next upturn isn't going to cut it any more. The need to cut costs and reduce inefficiencies are more urgent this time around and, by and large, the industry is looking to digitalization to meet these challenges.

As this second wave of digitalization washes over the shipping industry, a plethora of companies — both established industry players and startups — have launched new products aimed at different parts of the market. Shipping 1.0, circa 2000, was mostly limited to shipowners and operators. Shipping 2.0, on the other hand, seemingly cuts a swath across the entire industry. There are a number of well-established companies out there today with systems tailored to the needs of shipowners and operators," says Anders Carlsson, CEO of Enqlare. "Our focus is on charterers of bulk freight for, while a few companies have made significant strides in addressing the needs of the container market, surprisingly little has been done to tackle the challenges charterers face in the multibillion ton annual dry, wet and breakbulk freight market."

"The term 'transportation management system or TMS' gets bandied about a lot," says Chaz Shaw, Enqlare's Head of Sales, "but we refer to our product as a digital platform for bulk freight. TMS has an enterprise software connotation to it, whereas the Enqlare platform is cloud-based (SaaS). A lot of people are involved in the process of transporting a bulk cargo. At a minimum, it involves the marketing or procurement department, the chartering desk, operations personnel, and the finance department — and that's just internally. Then you have a whole bunch of external parties involved, such as the charterer's brokers, shipowners and operators, and agents of all sorts. Errors and delays are usually very costly in the transportation of bulk freight. Our focus is on building a platform that brings all these actors together in an effort to streamline the entire process and insure that everyone is on the same page.

"Enqlare is an end-to-end SaaS platform that enables charterers to digitalize their workflows from scheduling and planning to post-fixture operations and reporting," says Carlsson, "and to help them to move away from emails and spreadsheets onto a secure platform that is always up-to-date to improve collaboration, increase transparency and realize the value of their business data."

North Sea Port: major player in breakbulk handling

North Sea Port has over the years become a major player in breakbulk. With a cargo throughput of 11.7 million tonnes, the port is at the top of the Hamburg–Le Havre range, outnumbering the ports of Antwerp and Rotterdam.

When it comes to breakbulk, North Sea Port has an ideal location right in the heart of the European economic and industrial zones. An impressive 50% of Europe's purchasing power lies within 500km from the port. The Western Scheldt river estuary region alongside the Belgian–Dutch border is also of great interest to breakbulk clients. The port hereby has direct access to the deepsea and shortsea shipping lines. The growing number of transatlantic and shortsea (reefer) liners services show that more and more shipping companies are convinced by North Sea Port's strong market position.

On top of this, the port connects deep inland to the European rail, road, and waterways network.

Dedicated terminals

North Sea Port has reached top position thanks to the choice of dedicated breakbulk terminals providing large scale facilities for the handling, warehousing, and open storage of a broad range of breakbulk goods.

The terminals offer high-capacity storage, dedicated workforce, modern handling equipment, and ample quay space. Several RoRo facilities are also available for loading and unloading goods into trailers, cars, trucks, and other types of rolling stock.

These terminals annually handle a broad range of breakbulk, such as forest products, metals, fresh produce, and project cargo. ArcelorMittal, for example, is a main producer of steel and Kloosterboer is well-known for its partnership with Chiquita. Other breakbulk facilities that North Sea Port is proud to present are, in alphabetic order, BOW Terminal, Bulk Terminal Zeeland, Outokumpu, Ovet, Stukwerkers, Supermaritime, Verbrugge Terminals, and ZZColdstores.

The logistics service providers in North Sea Port have a leading market position in each of their dedicated markets. With regard to offshore wind components, cellulose, and conventional fruit, North Sea Port is the number one port, and one of the world's leading ports for the storage of aluminium.

Still, there is ample room for growth and the ambitions for further expansion are beyond dispute.

Important commodity

Although containerization of cargo has put breakbulk volumes under pressure, conventional packaging and transported goods remain important for North Sea Port. With a number of high frequency container barge shuttle services to the port, the two modes of transport are even complementary to each other.

Project cargo

Moreover, North Sea Port's leading position becomes even stronger when taking project cargo into account. Project cargo has gained a strong foothold at the port, witnessed by many companies active in the offshore industry: from fabrication sites to assembly yards, logistic marshalling yards, and maintenance sites.

North Sea Port has developed into a genuine offshore-wind port, with over 40 offshore windfarms installed over the past ten years. There is currently a big spin off thanks to offshore wind projects like East Anglia and Borsele, and the role of North Sea Port in offshore wind is expected to further expand in the upcoming years. Thanks to the flexibility, space, dedicated workforce, and easy nautical access, North Sea Port has exactly what clients are looking for.

Barge transport makes progress in breakbulk

Antwerp Slitter, a company that processes steel coils in the port of Antwerp, now uses only barges for transport within the port. Other companies too are increasingly making use of barge for breakbulk transport. The modal shift that Port of Antwerp aims to achieve is in full swing!

The coils handled by Antwerp Slitter arrive in Antwerp from overseas. From the deepsea terminal they go to the service centre on Quay 118 where Antwerp Slitter cuts them up and prepares them for European customers. Until recently the transport from the terminal to the service centre was by truck, but Antwerp Slitter has now switched entirely to barge.

Barging Solutions, a subsidiary of Manuport Logistics, has also seen more and more companies opting for barge to carry breakbulk, not only steel coils but also construction materials, for example. Recent investments such as raising the height of bridges have given extra impulse to this development.

Modal shift

Port of Antwerp is putting great efforts into bringing about a modal shift, with greater amounts being carried by barge and rail. The aim is to substantially increase the volumes carried by these more sustainable modes. Transport within the port also plays an important role in achieving the necessary modal shift.

Growth slows at major Indian ports

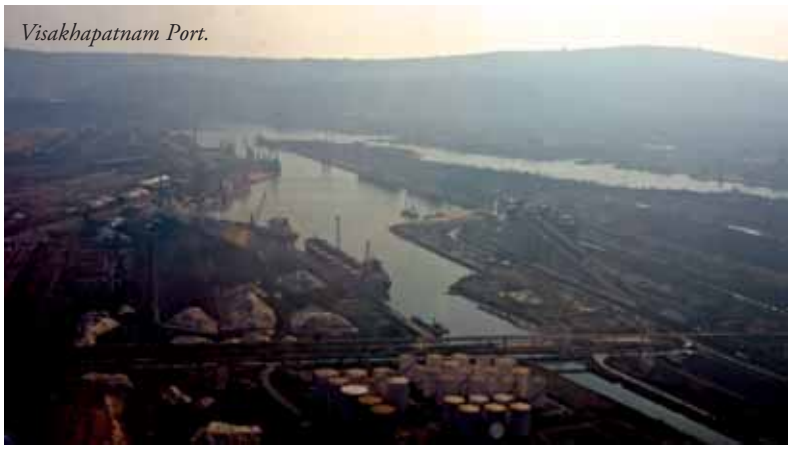
Coal shipments concentrated at India's 12 Major Ports rose by 10.81% in 2018/2019 to 161.34mt (million tonnes), says the Indian Ports Association (IPA). In 2017/2018, the same ports reported handling 145.59mt.

Breaking this down by thermal/steam coal and coking coal, the former rose by 9% and the latter by 14.25%. The Major Ports handled 103.84mt of thermal/steam coal compared to 95.26mt the previous fiscal year.

The IPA report indicates that the 12 leading ports had accounted for 57.50mt of coking coal in 2018/19 compared with 50.33mt in 2017/2018.

In India, thermal coal is used to generate 70% of the nation's electricity, while coking coal is mainly used by the domestic steel industry.

In global terms, India is the world's third largest coal producer, behind China and the US, with 123 billion tonne of reserves, sufficient for 100 years of production.



Visakhapatnam Port.

According to IPA statistics, the same ports achieved total throughput growth across all sectors of 2.9% for the year in question, handling a combined 699.04mt. This growth mainly came from handling more coal, fertilizer and containers. Growth in 2017/2018, at 4.77%, had been significantly higher, thanks to increased demand from coal, containers, fertilizer and liquid bulk.

India's 12 Major Ports:

Kandla Port; Nhava Sheva; Mumbai Port; Marmagao Port; Panambur Port; Cochin Port; Port Blair; Tuticorin Port; Chennai Port; Visakhapatnam (Vizag) Port; Paradip Port; and Haldia Port.

Barry Cross

ABP's Port of Ipswich celebrates opening of new fertilizer blending and bagging plant

In early May, Associated British Ports (ABP), in partnership with national grain, seed and fertilizer company COFCO International UK, hosted an official ceremony to unveil a new fertilizer blending and bagging plant at the Port of Ipswich.

Representing an investment of £700,000, the new plant will be based in the port's Coldock Bulk Bagging Terminal and will allow COFCO to increase the range of fertilizers offered to UK farmers, develop new products and improve distribution efficiency.

Presiding over the ceremony was Lord Lieutenant of Suffolk, Countess of Euston, Clare FitzRoy, who was appointed as the first female Lord Lieutenant for Suffolk in December 2014. Other guests of honour included Adam Henson, presenter of the BBC's popular television programme, *Countryfile*, who was the keynote speaker at the event.

The delivery of the new plant marks the completion of the latest phase of a £2 million investment project which has seen ABP create new jobs and purchase two high speed bagging lines, which will primarily be used for fertilizer handling.

The ceremony was also attended by ABP's CEO Henrik Pedersen, the UK Managing Director of COFCO International UK Mark Dordery and ABP's Short Sea Ports Director, Andrew Harston.

Andrew Harston, ABP Short Sea Ports Director, said: "We are delighted to be able to announce this latest investment in value-adding port facilities which will help grow the business of our customers, COFCO International UK.

"Together with ABP's other two East Anglian ports of Lowestoft and King's Lynn, Ipswich plays a vital role in supporting the regional economy and local jobs and we look forward to continuing to do so in future."

Mark Dordery, COFCO International UK Managing Director, said: "The new facilities at Ipswich are key in helping us develop our range of fertilizer products and services to our growing customer-base across East Anglia and into the whole of the UK.

"Growers face increasing challenges to produce crops as cost-effectively as possible to meet consumer demands whilst being increasingly aware of environmental requirements.

"The modern and highly efficient facilities at the new plant will help us refine our current fertilizer products whilst allowing us to develop and introduce exciting new options including Limus Nitrogen Management, BASF's latest urea inhibitor technology, to help UK growers achieve greater production efficiency in the future."

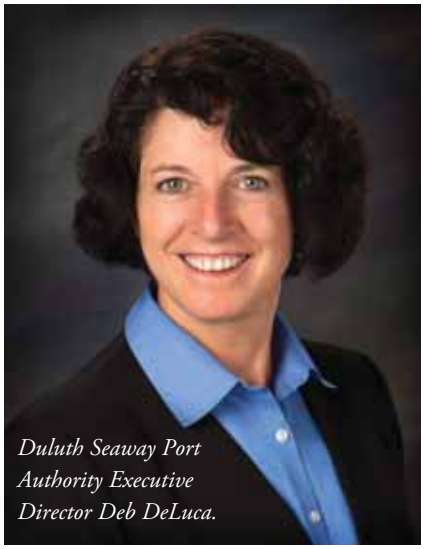
Port of Duluth-Superior berths Pacesetter Award

On 22 May, the United States Saint Lawrence Seaway Development Corporation presented its 2018 Pacesetter Award to the Port of Duluth-Superior as part of the region's National Maritime Day festivities. The award salutes Great Lakes St. Lawrence Seaway System ports that registered international cargo tonnage increases during the 2018 shipping season.

Duluth Seaway Port Authority Executive Director Deb DeLuca accepted the honour on behalf of the Port of Duluth-Superior, which last season registered an 11.5% season-over-season gain in international tonnage shipped. The increase was driven primarily by a 19% jump in grain tonnage.

"In terms of total tonnage, the 2018 season was Duluth-Superior's best since 2014, so it was a solid season overall," said DeLuca. "International shipping, the Pacesetter Award criterion, certainly played a role in that 2018 success, with a slight uptick in the number of international vessels and a double-digit increase in the percentage of international tonnage shipped through the port."

Duluth-Superior was one of eight ports to earn 2018 Pacesetter honors, joining the Erie-Western Pennsylvania Port Authority, Port Milwaukee (Wisconsin), the Port of Monroe (Michigan), the Port of Muskegon (Michigan), the Ogdensburg Bridge and Port Authority (New York), the Port of Oswego (New York), and the Toledo-Lucas County Port Authority (Ohio).



Duluth Seaway Port Authority Executive Director Deb DeLuca.

"The 2018 season saw the highest cargo tonnage on the Great Lakes St. Lawrence Seaway System in more than a decade, with nearly 41 million tonnes of cargo shipped — a 7% increase over 2017," said St. Lawrence Seaway Development Corporation Deputy Administrator Craig Middlebrook. "Our ports are making great contributions to the region, the nation and the world, and we're certainly pleased to recognize Duluth-Superior among the eight Pacesetter Award recipients."

The St. Lawrence Seaway Development Corporation established the Robert J. Lewis Pacesetter Award in 1992 to recognize achievements of US ports whose efforts resulted in increasing international tonnage shipped through the Seaway, excluding Canada, in comparison to the previous shipping season. Since the award's inception, only the Toledo-Lucas County Port Authority has earned more Pacesetter Awards (18) than the Port of Duluth-Superior (17).

About the Port of Duluth-Superior

Approximately 900 vessels and 35 million short tonnes of cargo move through the Port of Duluth-Superior each year, making it the Great Lakes' largest tonnage port and one of the nation's top 20. The port supports 8,000 jobs and contributes $1.4 billion in business revenue to the regional economy.

TMS creates second berth

In Mexico, the Hazesa Maritime Terminal (TMH) is to expand the quay line at its Mineral Bulk and General Cargo Terminal, which is situated in the North Zone of Polygon II at the Port of Manzanillo. This will effectively create a second berth and allow the company to offer a better service to its clients.

According to Hazesa, the work will cost in the region of $24 million and finance will be provided in the form of a loan from the National Bank of Works and Services (Banobras). In the initial stage, piling will take place at the base of the quay extension. Work will be completed within approximately seven months, after which the new area will be put into operation. *Barry Cross*

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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

Phoenix Lighting launches versatile crane and terminal light

Phoenix has introduced the latest addition to its durable LED product line – the Wayfinder. Built with custom optics specifically for ports, the Wayfinder has the highest lumen/watt output in its class, delivering 1,100 lumens to access ways, walkways, stairways, platforms and other small areas. This powerful yet compact light projects a wide beam angle, allowing fewer fixtures to cover more surface area for effective and efficient lighting.

The Wayfinder includes a built-in emergency battery backup (EMB) option to keep the fixture illuminated during a power interruption. Operators can rely on the Wayfinder's EMB to keep access ways lit for a minimum of 120 minutes during outages.

As with all Phoenix LED products, the Wayfinder increases efficiency, eliminates untimely maintenance, supports green initiatives and is built with its signature rugged construction.

When safety is the top priority, having a reliable light source is critical.

About Phoenix Lighting

Originally founded in 1892, Phoenix has evolved alongside the city of Milwaukee and is still proud to call it home. Over 126 years later, Phoenix Lighting continues to be a prominent manufacturer of high quality, durable lighting solutions built to withstand even the harshest of conditions.

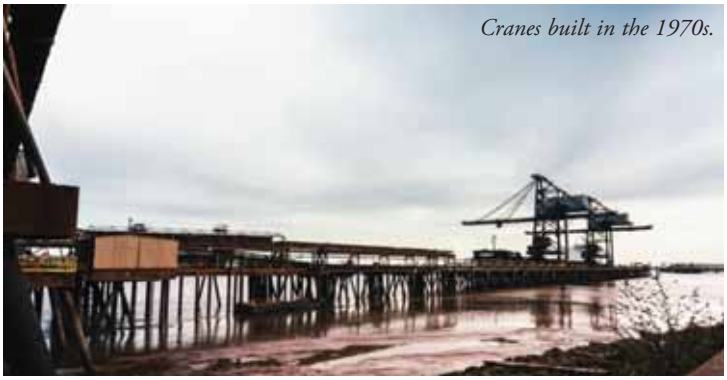
New high-capacity grab cranes commissioned for Immingham's Bulk Terminal

ABP has commissioned crane manufacturers, Kocks Ardelt Kranbau, to supply three new high-capacity grabbing cranes for the Immingham Bulk Terminal (IBT).

IBT handles raw material imports for British Steel. The operations were taken over by ABP from British Steel in November 2018. The crane purchase is part of the previously announced £65 million investment, committed by ABP to the terminal and site facilities.

The investment will help to support the long-term future of steel manufacturing in the Humber region.

Martin Downey, Head of Immingham Bulk Terminal said: "Within six months of taking over the operations at IBT, we've made significant improvements to the site. We're keen to improve our handling rate and these cranes will enable us to do just that."



Cranes built in the 1970s.

Ardelt Tukan K 3000 working for Voestalpine LLC, Portland, Texas.

The new Ardelt cranes, Tukan K, model 3000 – 50, will provide a grabbing capacity of 50 tonnes at 50m radius. The cranes have been ordered to replace the existing ship unloaders and are expected to provide a step-change in capability. The Tukan Ks will handle in excess of six million tonnes of iron ore and coals each year.

The Ardelt Tukan K was selected as it provides a cost-effective solution in addition to high performance, design classification and energy efficiency, along with the benefit of local support provided through the UK office of Kocks Ardelt Kranbau.

In addition, the Tukan K has its hopper built into its structure allowing a linear load path – the most efficient of any jib crane, ensuring the shortest possible cycle time and energy curve.

The bespoke cranes are anticipated to be complete and online by the end of 2020.

Ashdod ship unloader to handle meals, grains and grain derivatives

Following the supply of three dust free eco-hoppers mobile on rubber tires (for clinker, grains and grains derivatives), Bedeschi has been awarded by Ashdod Port a new contract for the supply of a mechanical ship-unloader.

This new ship-unloader, mobile on rails, will be operating at a capacity of 1,200tph (tonnes per hour) on grains, grain derivatives and meals and will be able to deliver material to a quay conveyor and to trucks.

The scope of supply consists of a fully erected machine delivered to the quay of Ashdod Port: this solution eliminates the need for dedicated erection area on site, minimizes assembly and commissioning time and grants minimum possible unavailability of the quay for others uses.

The unloading system is based on the proven chain elevator technology, which grants lowest power consumption, gentle handling of the material, compliancy with the most stringent environmental regulation, simple and inexpensive maintenance.

The main technical feature of this machine is a cutting system with rotating blades that can effectively de-compact non free-flowing materials like meals and grain derivatives. The cutting system is designed on a plug-and-play basis which allows the machine to easily remove the cutting device and increase unloading efficiency on free flowing materials (wheat, corn, soya beans, rice barley and oilseeds).

Bedeschi is able to provide a state-of-the-art line of mechanical continuous ship-unloaders for grain and grain derivatives and other materials ranging from 300tph to 1,500tph, able to operate on rails or rubber tyres on any quay or jetty, able to unload ships with dimensions of up to 150,000dwt, and tailor-made to meet the needs of each specific project, either from a performance or erection/manufacturing point of view.

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Taking the best from the past to build the future.

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Maputo Ports prepares for growing demand with new Liebherr cranes

Maputo Ports recently decided to add two more LHM 550s to its MHC fleet.

Liebherr recently handed over two Liebherr mobile harbour cranes type LHM 550 to Maputo Port Development Company (MPDC). The LHM 550 delivers high capacity and fast movements for an outstanding productivity in bulk handling operation.

Maputo is the capital of the East African state of Mozambique. The port city on the Indian Ocean is one of the most important transshipment points for goods of all kinds on the east coast of Africa. The central port operator, the Maputo Port Development Company (MPDC), already invested in two Liebherr LHM 550 in 2015. Due to the high satisfaction and convincing productivity of the existing LHM 550s, Maputo Ports recently decided to add two more LHM 550 to its MHC fleet.

The remarkable growth of the Port of Maputo and its activities in recent years and the increasing demand from its customers have been the key drivers in the choice of the mobile harbour crane numbers three and four. Especially in the Port of Maputo, the LHM 550 is an ideal crane when it comes to high professional bulk handling. Its high capacity and fast movements offer an outstanding productivity, also of high-density bulk material like ferrochrome, which is one of the main products being handled at Maputo Ports. The two existing cranes have proven to be drivers of productivity growth. By adding another two units to the fleet, Maputo Ports is prepared to continue its successful development in the future.

The investment in equipment also includes the training of several operators and technicians for the handling and maintenance of the new machines. In addition, the existing service contract between Liebherr and Maputo Ports was extended to include the new devices. Liebherr thus guarantees the best possible reliability and availability of the cranes.

"In addition to the two mobile harbour cranes, we have recently acquired 14 payloaders, eight tractors, eight forklifts and two rail excavators (for wagon unloading operations). This investment is in line with the need to improve the berth usage and the rehabilitation and deepening works that are taking place at the moment," said Chief Operations Officer, Marla Calado.

Liebherr also provides extensive training of operators and technicians of Maputo Port Development Company (MPDC).

First Liebherr branch outside of Europe

Liebherr Africa was built in 1958 and is the first Liebherr branch outside of Europe. Liebherr Africa has its main bases in South Africa with more than five branches and nearly 500 employees. Since 2011, the company Liebherr Mozambique has been in place, allowing Liebherr to be on site with the shortest distance to its customers. Liebherr has a long-term commitment to local markets and this applies in particular to Mozambique with its great potential for future growth and development.

Experience the progress.

Mobile Harbour Crane

- Manoeuvrability and versatility – for all areas of application in the harbour
- 360° mobility – absolute outstanding in the MHC market
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- Extensive range with load capacities of 42 tonnes to 308 tonnes
- Proven Liebherr quality and full support for our products and services

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LIEBHERR

Bulk material handling giants come together in major acquisition

Bulk material handling company, Mitchells Group, has acquired Lincolnshire, UK-based Guttridge in a deal which further cements the company's global presence.

Privately owned Mitchells is one of the world's largest bulk material handling manufacturers, supplying specialist conveying solutions and handling equipment to agri-food companies worldwide.

The deal will see the combined revenue of both companies surpass $30 million.

The acquisition vastly increases Mitchells' scope and engineering capacity which already sees the group service customers in six of the world's seven continents, with equipment installed in 46 countries.

The deal will expand the breadth of Mitchells Group's service offering, allowing it to supply small capacity systems to local farmland through to large commercial port terminals.

Established in 1962 and employing 100 people, Guttridge will retain its name and continue to trade as part of the Mitchells Group.

Commenting on the acquisition, Mitchells Group CEO, Mic Mittasch, said: "The acquisition of Guttridge is a significant milestone in the continued growth of Mitchells and our forever expanding bulk handling capacities.

"As a group, we are now in a stronger position globally to offer our customers a much wider scope and range of products, particularly for projects requiring smaller capacities which is in growing demand in developing economies which is a strong focus of the group.

"The synergy of both companies, more than anything, made the acquisition most attractive. With our current and future customers in mind, we see the deal as a giant step to support even more customers in expanding territories and cater to more industries — specifically biomass, waste, recycling, chemicals and minerals.

"We look forward to the beginning of a strong and successful relationship with Guttridge and its employees."

In 13 years of Australian ownership, Mitchells has grown from a small original equipment manufacturer in China, supplying solutions to customers in Asia and North America, to a leading global brand supplying material handling equipment to the world's largest agri-food companies.

Peter Guttridge, Chairman at Guttridge said: "We are delighted with the acquisition and joining Mitchells Group marks a culmination of 50 years of hard-work and continued high-quality design and build of bespoke handling solutions.

"The deal will allow us to support both new and existing customers with a greater range and scope of products and materials, ensuring we provide the highest quality to meet their needs.

"The high-level of skilled engineers and technicians in global locations at both companies complement each other and by working together we can further establish our global presence and become true leaders in our field.

"The future looks incredibly bright and we're looking forward to a prosperous and successful relationship with Mitchells."

Operating in 46 countries, across six continents, Mitchells Group is one of the world's largest bulk material handling companies, designing and manufacturing bespoke solutions to support a vast range dry material handling needs.

About Mitchells Group

- Mitchell Mill Systems Canada (MMS Canada) founded by Paul Mitchells in 1978.
- Mitchell Mill Systems Canada established a manufacturing base in China in 1998.
- Mitchells Group (Mitchells Holdings Asia – MHA) purchased Mitchells Mill Systems (SanHe) Co. Ltd in 2006.
- After 15+ years of manufacturing in Yanjiao, China Mitchells opened a new 13,000+m^2 engineering & manufacturing centre in Nanjing, China and 2018.
- Under private Australian ownership since 2006.
- Mitchells is one of the world's largest bulk material handling companies.
- Mitchells designs and manufactures high-quality and specialized conveying and bulk materials handling equipment.
- Employs 125 people with offices in Europe, Singapore and China
- Equipment installed in 46 countries, servicing the grain handling and storage sector along with oilseed processing, food processing and the animal, aqua and pet feeding industry

About Guttridge

- Founded in 1962, Guttridge manufactures and designs bespoke bulk handling equipment, servicing the grain storage and processing industry along with Industrial applications, food and chemical processing and Laserfab. (Laserfab serves customers with requirements for high quality CNC Laser cutting, bending and fabricated components to a variety of sectors including farm machinery, commercial trailers, road vehicles, dust filtration systems, water treatment equipment and general industrial equipment).
- Based in Spalding, Lincolnshire, UK, Guttridge employs 100 people and supplies bulk handling equipment and solutions to a wide range of European and global companies.
- Guttridge supplies single machines through to fully integrated handling solutions, manufacturing in both stainless steel and mild steel
- In 2004, Guttridge acquired Carier. The Carier range of equipment is aimed primarily at the commercial grain store and small to large farm markets where the requirement is for intensive use during the harvest period and lighter duty use throughout the remainder of the year. Carier conveyors and ancillary equipment are supplied in a galvanized finish and offer throughputs from 20tph (tonnes per hour) to 100tph.

L-R Guttridge Managing Director Noz Talukdar, Mitchells CEO Mic Mittasch, Peter Guttridge Chairman of Guttridge

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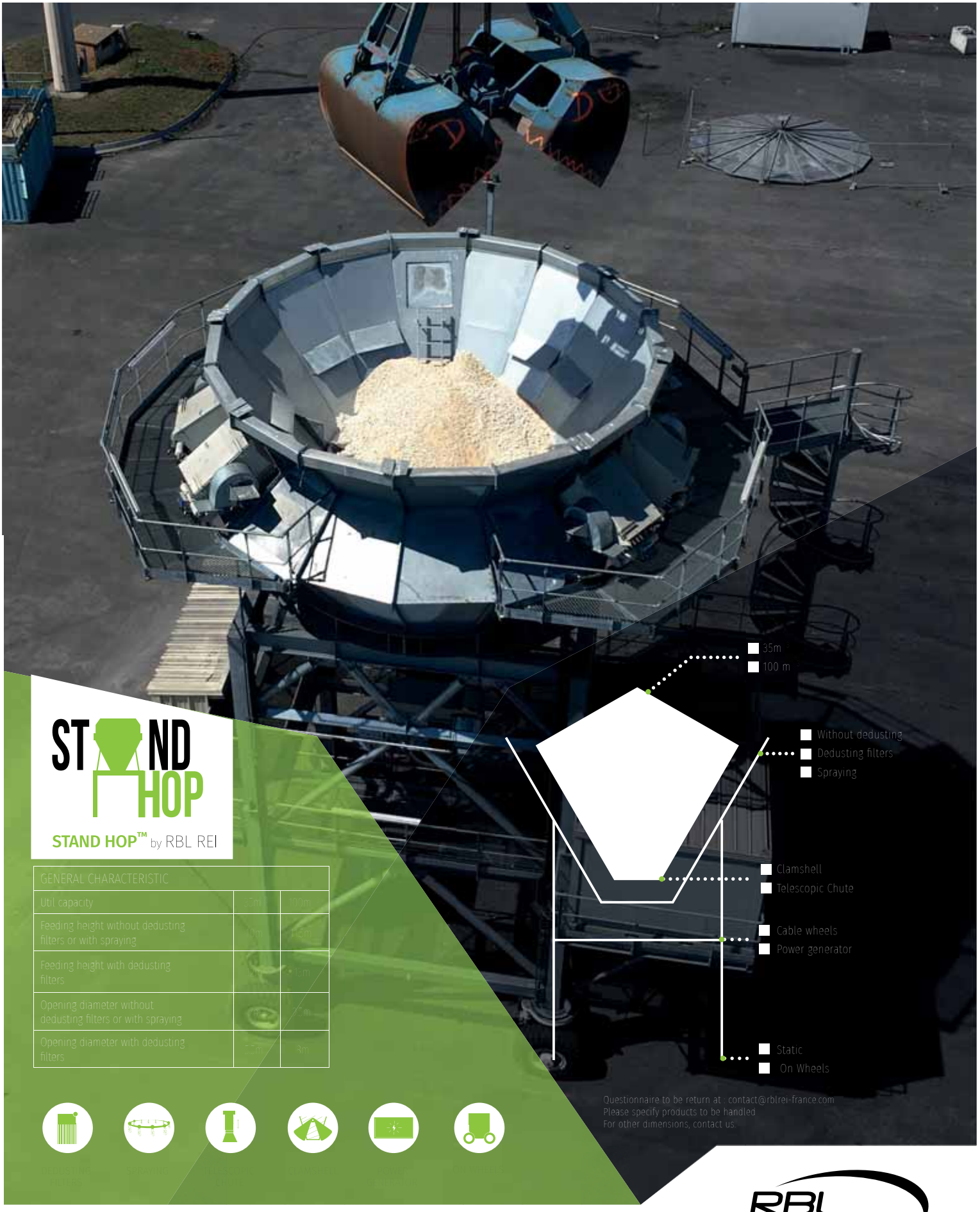
BULK UNDER CONTROL



STAND HOP

STAND HOP™ by RBL REI

GENERAL CHARACTERISTIC		
Util capacity	35m	100m
Feeding height without dedusting filters or with spraying	10m	15m
Feeding height with dedusting filters	10m	15m
Opening diameter without dedusting filters or with spraying	2m	2,5m
Opening diameter with dedusting filters	2,5m	3m

- 35m
- 100 m
- Without dedusting
- Dedusting filters
- Spraying
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2,000th Konecranes Gottwald mobile harbour crane celebrated

On 8 May, the 2,000th Konecranes Gottwald mobile harbour crane was inaugurated in a formal ceremony at the Ership terminal in the Mediterranean port of Cartagena in southeastern Spain.

The crane is Ership's new eco-efficient Konecranes Gottwald Model 6 mobile harbor crane, in the G HMK 6407 B four-rope variant. Ership will use it mainly for continuous-duty bulk handling, and also for general and project cargo up to 100 tonnes.

with Ership in Cartagena

Attended by representatives of Ership, Konecranes and other interested parties, the inauguration event was a celebration of mutual achievement. The popularity of Konecranes Gottwald mobile harbour cranes is the result of the success of its customers and strong, lasting customer relationships. A good example of this is the relationship with Ership.

With roots going back more than 100 years, Ership offers a wide range of shipping services in more than 40 international ports. Some 20 years ago, it purchased its first Konecranes Gottwald mobile harbour crane. Since then, it has bought over 20 cranes in total, a success story for both Ership and Konecranes.

Gonzalo Alvargonzález, CEO of Ership, is very satisfied with Konecranes Gottwald mobile harbour cranes. "These are very reliable cranes," he explains. "They are very high-performance and extremely solid. That helps us to serve our customers, who expect their cargo to be unloaded quickly. Time is a very important factor in our work. So, the faster a ship is unloaded, being careful with the cargo, the better."

It's success stories like this that illustrate what has kept Konecranes going in the 63 years since it invented the mobile harbour crane. Since then, increases in cargo handling rates, technological developments and strengthening customer demands have shaped the market. Konecranes has introduced many innovations, including this four-rope variant, and sold over 300 units of the versatile Model 6 crane, its bestselling model. In total, Konecranes Gottwald mobile harbour cranes have been sold to more than 100 countries. Number 2,000 is a milestone worth remembering.

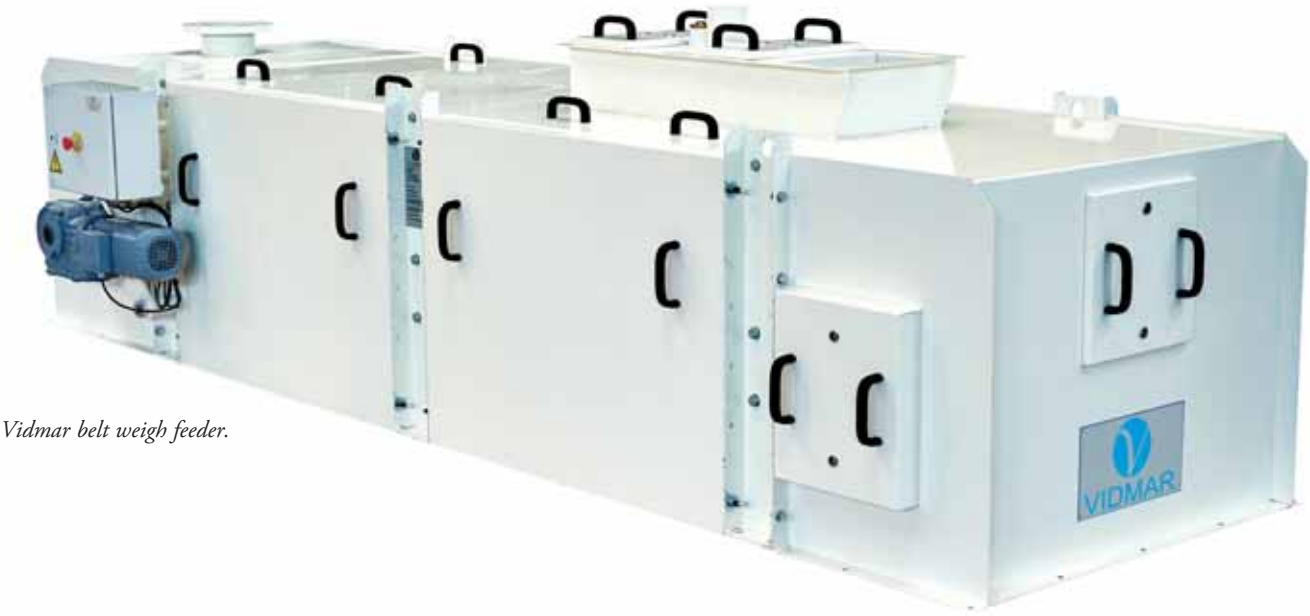
"Our mobile harbour cranes offer added value for customers and the port industry," says Heribert Barlage, Senior Vice President for Konecranes Mobile Harbor Cranes. "The 2,000th crane is a sign of our commitment to both. But just like every other important milestone we reach, this one is also an incentive for us to constantly develop our cranes and in so doing, make them fit for the future."

About Konecranes

Konecranes is a world-leading 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 2018, Group sales totalled €3.16 billion. The Group has 16,100 employees in 50 countries.

Weighing in on the bulk market

accurate weighing systems remain vital



Vidmar belt weigh feeder.

Vidmar offers expertise in weighing and dosing worldwide

Vidmar, was established in Barcelona (Spain) in 1985. Since its beginnings, more than 30 years ago, Vidmar has proven to be capable of adapting to market demands, going from being a manufacturing and commercialized company of accessories for computer equipment to becoming, today, one of the specialized suppliers in the industrial weighing and automation sector.

Thanks to its years of experience, it can proudly state, that it by far exceeded expectations, working side by side with its clients and comprising a highly qualified team that gives solutions to client needs, guaranteeing a fast and efficient customer service.

International presence

In 1994 the company opened up all over the world, exporting its equipment to new markets, proving to be a company capable of taking on the challenges and carrying out projects in Asia, North and Central America (United States, Honduras, Guatemala, Dominican Republic, etc.) and the African continent (Algeria, Tunisia, Morocco, Egypt and Jordan).

Mexico

In 2009, Vidmar México was created, initially dedicated to the maintenance of weighing and measuring equipment. In 2011, the direction of the company changed and it focused on industrial automation and process control. Large projects of modernization of cement and chemical plants were undertaken. Since then, Vidmar Mexico has evolved with constant growth.

Colombia

Colombia represents an important export destination for Vidmar. It is there that the company implemented the automation of an entire cement production line in a major company. For this reason, Vidmar Colombia was created right there in 2015 and became the second headquarters of the group abroad.

USA

The year 2017 arrived full of challenges for Vidmar. In recent years, Vidmar has had great demand for projects in the United States and, for this reason, the group decided to continue with the expansion and to establish Vidmar USA in order to be able to gain greater recognition and representation in that country.

Nowadays, Vidmar exports more than 70% of its products to up to 25 countries in Europe, Latin America, Asia, Middle East, Africa and the United States.

A proof of Vidmar's constant growth and solidity, is the increasing in human

capital; the company has not only overcome previous and current moments of crisis and economic uncertainty, but it has built synergies too. The group is able to rely on a versatile and strong team, who all help to boost the company's name and reputation, and who work to grow and adapt its products and services to the market requirements.

In this way, Vidmar is the product of a vision of a revolutionary commercial and technical team, and it is also proved of the tenacious spirit of those who have managed to lead the company with passion and professionalism.

Vidmar Group is a respected company in the manufacture and supply of equipment for weighing, dosing, control, automation and industrial software, always using its own equipment and the latest available technologies.

Weighbridge terminal.

Vidmar's range of products

Continuous dosing and weighing

Vidmar takes care of the design, development, manufacturing, installation and commissioning of the necessary equipment in the dosing process.

- **belt weigh feeders** for granular and powdery products:
  - BWG and BWP Series; and
  - HG Series
- **belt weigh feeders for alternative fuels**;
- **belt scale**;
- **weighing worm gear**;
- **loss-in-weight-feeder**;
- **impact flow meter**; and
- **control equipment**.

Static weighing

- own technology for the development of any weighing system;
- **manufacture of special weighing systems**;
- **weighbridges for trucks and FFCC:** completely metallic or mixed models (steel + concrete). Can be installed in pit or above ground; and
- **weighing hoppers and silos**.

Process automation

- industrial equipment and process automation;
- design of process flow diagrams;
- wiring diagrams and manufacturing of power and control cabinets; and
- programming of control systems (PLC, SCADA, HMI, etc.)

Industrial software

- development of software solutions for industrial applications;
- applications to improve the management, traceability, control and

Apron feeder.

Admixture plant.

visualization of industrial processes;

- **TRS.Net:** logistic and truck's flow management inside of a plant;
- **ICE.Net:** automatic ice dispatch system at trade fishing markets;
- **OREMOL:** electronic ear for loading level in ball mills; and
- **CEMLAB:** automatic management of laboratory samples

Conveying and storage

Design and manufacture of equipment for the storage of industrial products as well as equipment for the transportation of products.

- **apron feeder**;
- **armour conveyor**; and
- **vertical and horizontal silos.**

Turnkey projects and facilities

Vidmar innovates constantly in order to satisfy the needs of its customers. It invests in technological improvements in the development of equipment and industrial processes specialized in weighing and automation systems, and executes integral solutions from the engineering, manufacturing, sales, assembly, installation to maintenance. Therefore, with all of this co-ordination, Vidmar avoids co-ordination difficulties and follow-up of suppliers with resulting delays and problems during the execution of projects.

Supply for a complete cement line.

Customization

According to each client's particular needs, Vidmar can either design solutions for new equipment or it can adapt existing equipment. It can develop specific equipment for:

- ferrous sulphates;
- alternative fuels;
- complete installations;
- solid and liquid additives; and
- waste treatment.

Industries served

The main industrial sectors where Vidmar's services and products are distributed are:

- cement;
- chemistry;
- feeding;
- construction materials;
- automotive;
- mining;
- iron and steel industry;
- transport;
- energy;
- engineering;
- pharmacy;
- solid urban waste; and
- fertilizers.

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

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

Cable Chain
- Rugged design for demanding environments
- Long operating life
- Custom-configured

Rugged Energy & Data Transmission Systems

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

www.conductix.com

CONDUCTIX wampfler

DELACHAUX GROUP

Premier Tech Chronos: specialist weighing & feeding systems for the bulk market

Premier Tech Chronos (PTC) was born in 1989 as an engineering department, manufacturing equipment to support internal technological needs. PTC soon decided to sell its equipment outside the company and became a renowned international presence in the design, manufacture and marketing of state-of-the-art industrial equipment. Mostly involved in the horticulture industry at the beginning of the 1990s, PTC quickly expanded into other diversified markets through its extensive R&D programmes and the acquisition of Chronos Richardson. By adding this 125-year-old German company to its team, PTC paved the way for major growth in the food, chemical and mineral industries while complementing its product lines with new packaging technologies. With its wide range of products and innovative solutions tailored to its customers' specific needs, PTC is now internationally respected in the field of industrial flexible and rigid packaging equipment.

Premier Tech Chronos is driven by innovation: in the past decade, the company has developed several advanced technologies which are still at the forefront today. Premier Tech Chronos engineers packaging equipment for the lawn and garden, food, feed, and pet food industries, and offers high-quality solutions for chemicals, minerals and dairy products. PTC offers turnkey solutions and the most complete range of equipment in the industry, including weighing and feeding systems, bagging systems such as open-mouth bagger, valve bagger, FFS systems, FIBCs, bottom-up-filler, and compression bagging systems. PTC also offers robot and conventional palletizers as well as load securing systems such as stretch hooders and stretch wrappers.

In PTC's vision, more innovations are scheduled to arise in the coming years and change the way you look at packaging.

At PTC, people are driven by innovation without compromising on customer satisfaction. The entire team is dedicated to supporting the growth of its customers by putting their interests at the heart of their daily activities. Premier Tech Chronos' knowledge and ability to provide its customers with adapted solutions ensures that its equipment fits the needs of its customers. Moreover, PTC's Client Services Department is committed to providing customers with the most valuable services in the industry, including free lifetime technical support 24/7, 365 days a year, a quick spare parts delivery thanks to eight spare parts depots worldwide. Over 140 field technicians are travelling around the world to customers' sites, offering immediate assistance to keep production uptime. PTC also provides retrofits and modernization, periodic maintenance programs, and numerous operator training program. The company's WECARE guarantee offers every customer a passionate team driven by a unique client services philosophy.

Premier Tech Chronos is a well-known specialist for weighing and feeding systems with an innovative product portfolio for diverse weighing and control applications meeting the highest demands for accuracy and performance. The company's product portfolio includes field-proven feeding systems, innovative electronic nett weigh bagging scales for high and standard capacities and hygienic applications, reliable gross weigher, state-of-the-art micro-processor-controlled electronics for bulk weigher and bagging scales, advanced throughput weigher for precise data collection in modern mills, electronically controlled hopper scales for receiving and shipping bulk materials as well as state-of-the-art electronic weigher controller. PTC's systems are perfectly adapted for a wide variety of industries such as food, feed, seeds and crops, lawn and garden, chemicals, minerals, etc.

Solutions for bulk cargo weighing

Design specifically for the weighing of bulk cargo, systems from Premier Tech Chronos includes many features and benefits for the clients. PTC developed the W series Bulk weighing systems. These electronically controlled weighers for receiving and shipping free-flowing bulk materials are typically used in grain silos, the feed/food industries, mills, warehouses, etc. The weigher output is dependent on the size of the weigh hopper, which can be up to ten tonnes in capacity. The weighers are manufactured in welded steel and are dust-tight. Infeed and weigh hopper are equipped with pneumatically operated (twin) gates. The weigh hopper has an inspection door and frame on which to place calibration weights. The pure full loadcell systems reduces maintenance costs and the system fulfils today's weighing requirements for accuracy, performance and reliability.

The weighers are equipped with removeable doors allowing easy access and simple clean-down. Premier Tech Chronos puts a lot of efforts into its design to build cost-effective equipment for its clients. Many options are available such as level indicator, pneumatic – anti-freeze, duplex infeed, etc.

Premier Tech Chronos recently completed a few contracts for big players in grain silos around Europe and Asia.

Powerful bulk weighing controller is ideal for ports and terminals

UK-based Weightron Bilanciai has introduced its DD2050HS hopper scale terminal, a powerful and versatile PC-based instrument, specifically designed for controlling and managing discontinuous hopper scales. Such totalizing weighers are used extensively for the bulk weighing of free-flowing granular materials in a diverse range of applications including: shiploading and offloading*, silo material transfer and batch feeding.

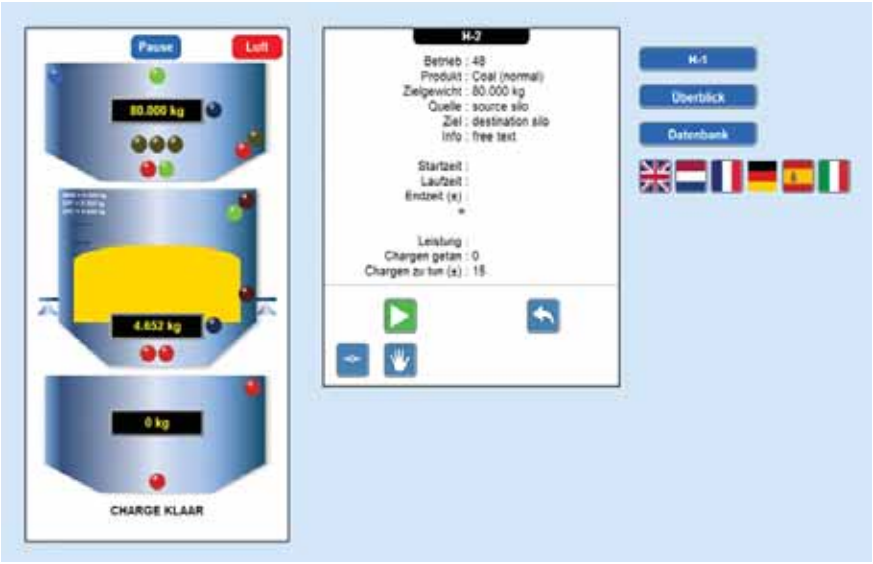
In a typical system, material is loaded into the bulk weigh hopper using a variety of methods, weighed and then discharged ready for the next batch. The individual batch weights are totalized to provide the total weight of material transported over a given time. Accuracy and speed are crucial for optimum throughput efficiency.

Based on Weightron's well-established DD2050 touch screen weight terminal, the weights and measures approved HS version has been specially developed to meet the demands for high-speed and accurate weighing of bulk materials at ports and terminals. The instrument features a large, user-friendly 300mm touch screen that provides a comprehensive graphic interface for the operator with full alphanumeric capability for data entry together with images of the hopper scale. The operator can clearly follow the weighing process on screen and in addition, the USB interface can be used for the connection of a remote keyboard and printer. Print-outs can be set up to provide all key data from a particular run.

The controller is ideal for new installations or upgrading existing discontinuous hopper scales which use outdated and standalone technology. The DD2050HS connects directly with existing load-cell based hopper scales, without the need for additional instrumentation. It provides all the necessary inputs and outputs to control the whole weighing process. Versatile fine and coarse set-points ensure pinpoint material flow cut off accuracy and speed.

The full capabilities of the multi-lingual DD2050HS can be realized when one or more hopper scales are connected via Weightron's powerful CenterPoint software, which can be installed on a standard Windows PC or Windows Server. It supports orders, planning operations and product route control, whilst handling stock management. CenterPoint collects the Start report, each Batch report and the Stop report of each operation. For added versatility, the software can integrate with third party ERP systems such as SAP providing the user with extensive data import/export capabilities at single or multiple locations, both online and offline.

In addition to supplying the instrumentation and software, Weightron can also assess the condition of the existing load cells and mounting hardware supporting the hopper and carry out upgrades as necessary. The DD2050HS systems can also be covered by Weightron's extensive service and support packages, ensuring optimized productivity and up-time.



** For granular and solid bulk products such as grain, animal feeds, soya meal and sugar, discontinuous bulk weighers provide an effective solution for verifying loading and unloading quantities, commonly known as draft weighing data. For over a century, draft surveys have been internationally accepted as an accurate and convenient means of establishing the weight of bulk cargoes, providing the basis for the preparation of bills of lading and assessing various charges and port fees.*

Continuous weighing sets new standards for international trade

HzLd-72-4.4-3i Weighframe.

The international trade of dry bulk material is commonly done utilizing bulk cargo ships, *writes Lorne Danielson, A.Sc,T., President of TD Micronic*. Shipments can range from 10,000 — 200,000 or more tonnes with commodity values of $50 — $4,000/tonne.

Regardless of the specific commodity being traded transactions values are in the $10s millions and the recorded accuracy of the weight of each shipment is paramount.

Static weighing systems are commonly utilized to determine the weight of dry bulk products. A bin is filled, weighed, emptied, tare observed, and repeated as required. The total product weight being the sum of the gross weights less the sum of the tares. This method can be very accurate (<0.1% error) and is commonly used in determining the value of grain and like commodities for export. This method of fill/empty requires large capacity bins, considerable space, additional material transfer, risk of product damage, and ongoing maintenance of various automatic gates. Most importantly, each step requires time.

A typical weigh bin of 10 tonnes and a cycle time of 15 seconds results in a maximum loading rate of 2,400 tonnes/hr. For many ship-loading facilities this is on the low side and would result in keeping a ship at dock longer than preferred.

For many loading facilities the alternative has been time proven ships draught survey. The survey crew will typically perform initial, near end and final draught readings. This requires no additional capital equipment but does require a few extra hours of ship's time and results in reduced accuracy relative to precision weighing systems.

The accuracy of a ships draught has and remains the subject of many discussions and a few research papers. It is acknowledged the accuracy is very dependent on weather conditions. Studies conclude an optimal measurement of ±1.8cm can be determined in ideal conditions. However even ideal port conditions will see wave action of 20cm or more so considerable skill is required to achieve a 1.8cm uncertainty. In summary, most sources agree a ships draught survey will produce an accuracy of ±0.25-0.75% under ideal conditions. The ±1.8cm uncertainty and ships tonnes/cm displacement result in an 'absolute' uncertainty (i.e. ±1.8 cm @ 50 tonne/cm = ±90 tonnes). The generally accepted ±0.25-0.75% uncertainty applies to ships loaded to their net tonnage. Partial shipments (i.e. ship loaded with multiple commodities or sources) will have proportionally higher uncertainties (i.e. ±0.5-1.5% for evaluating a product that is only half the ship's capacity).

Continuous weighing utilizing belt scales is a good alternative. Belt scales utilize a weigh frame incorporated into the existing conveyor as well as a belt motion/speed sensor to measure belt travel. The advantages of a belt scale include:

- weighing is done at maximum loading rates;
- weighing equipment is incorporated into existing conveyors — no addition site real estate required;
- evaluation of quantity loaded is continuous and instantaneous — no ship delays to obtain the quantity; and
- no reduction in accuracy for partial shiploads.

Traditionally belt scales can be certified for trade with accuracies of 0.25% to 0.50% (depending on jurisdiction). These uncertainties are about the same as those for a draught survey, such that it is not uncommon for the buyer to have a draught survey at the disport. If results indicate a lesser quantity the time proven draught survey often won and the shipper lost.

During the 20+ years of installing & maintaining belt scales TD Micronic identified ten common problems that limited the accuracy and reliability of existing belt scales. Four of these 'improvement needed' areas are tachometry related and were eliminated with the newly developed 'Prt' tachometer. It is a belt driven tachometer of laser cut design to provide exactly one pulse for every 60.0mm. of belt travel.

The remaining six areas of 'improvement needed' were addressed by the innovative HzLd weighbridge. A new concept in weighbridges it too is laser cut and utilizes integrated scale quality idlers sets. The idler sets incorporate adjustable rolls for precise scale alignment and are of a plate construction to eliminate areas of product buildup. Material/dust build up results in zero calibration errors and is a major source of scales errors in day-to-day operation. The HzLd design also provides for longer weigh lengths and extremely low deflections which are a primary requirements of accurate belt scales.

The above improvements have resulted in a true 0.1% performance on test day and during day to day loading of ships. Measurement Canada now provides certification to ±0.1% for continuous weighing devices. Field tests are thorough and test the lowest to highest limits of operation. Field certification at these rates ensure day to day accuracy.

With an accuracy of 5X that of draught surveys precision belt scales now provide significant advantages in determining the exact quantity and value of dry of bulk commodities.

In recognition of the above improvements TD Micronic anticipates Metrology Standards worldwide will up their accuracy classes for belt scales. DCi

Cement handling: a hot topic

constantly evolving technologies help ensure a safer and more efficient industry

The narrow and weight-reduced design of the GSZF reduces the costs for steel structure and freight. The operator was able to save considerably on costs (all photos: BEUMER Group GmbH & Co. KG).

Louise Dodds-Ely

BEUMER Group delivers belt apron conveyors for reliable and economical transportation of cement clinker

Blazing the trail in reliability

From a kiln cooling system to silos: the safe and economical transportation of hot materials like clinker is crucial in cement plants. The material can have extremely high temperatures of 500° to 800° Celsius. Reliable plant operation requires a robust conveying system. The BEUMER Group supports cement manufacturers with system solutions tailored for this industry, with apron conveyors for example. A special variant offered is the belt apron conveyor (GSZF): using a belt instead of a chain as the traction element allows higher speeds and a slimmer design while still delivering the same level of performance. The GSZF is therefore particularly suitable for modernizations, as can be seen with the Turkish cement manufacturer Göltas Cemento.

Why are apron conveyors particularly efficient for the transport of clinker? André Tissen doesn't need to think long: "The cement plant operators are still not able to ensure with one hundred percent certainty that the material does not leave the clinker cooler at temperatures of 500° to 800° Celsius." Tissen is a sales manager for customer support at BEUMER Group and is familiar with the demands of the

customers. In general, the clinker should cool down to the ambient temperature plus 80°, but during the process, a so-called raw meal flash can occur in the shell section of the preheater tower, caused by breaks in the kiln outlet sealing. "It doesn't happen often, but it does happen. It can't be completely avoided," explains the expert. Within a few seconds, several tonnes of raw meal or clinker run through the cooler. The material cannot cool down and arrives on the conveyor at extremely high temperatures.

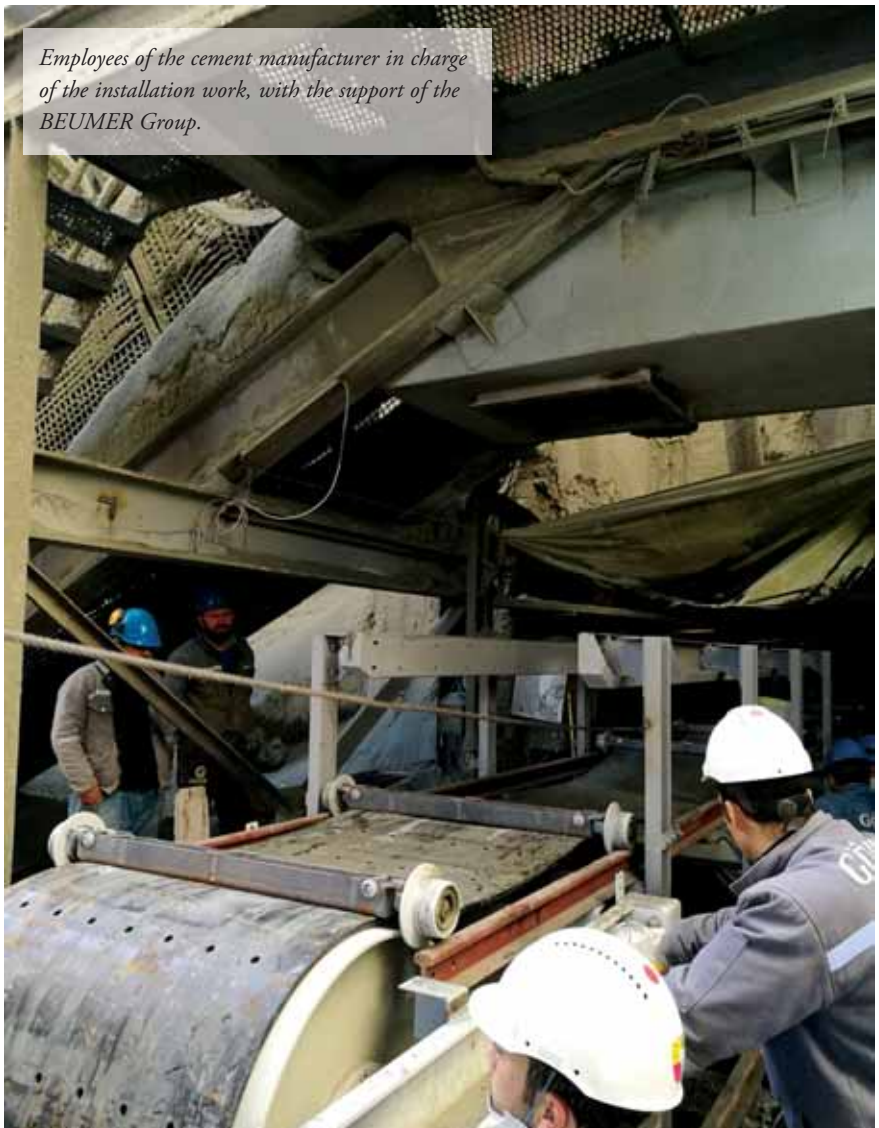
BEUMER Group apron conveyors provide robust and reliable solutions that are completely heat resistant. The specific design of the cells allows safe, low-friction transportation of any hot material. Sealed and overlapping side walls and bottom plates in the cells prevent the clinker from exiting and minimize the escape of dust. Operators get the BEUMER apron conveyors SZF and GSZF with cell width gradations from 500 to 2,000 millimetres, centre distances of more than 250 metres and conveying capacities of over 1,300 cubic metres per hour.

BEUMER Group supplies belt apron conveyor to the Turkish cement manufacturer Göltas Cemento.

Angles of inclination up to 60°

The angles of inclination on the SZFs and GSZFs depend on the height of the silo and the conveying distance. The systems come in three different designs. "We have an open cell design where the bulk material is transported at an angle of up to 30° without rolling back,"explains Tissen. The cells on the second design are equipped with baffle plates. Inclinations of up to 45° are possible. The design as steel box conveyor allows extreme inclinations of up to 60°. "This design is perfect for steep inclinations and small curves, but also for smaller inclinations when transporting clinker with a high content of fine particles," he describes.

And this is becoming more and more important for operators. Instead of using fossil fuels like coal and gas, they are opting for alternative fuels in order to reduce greenhouse gas emissions and production costs. Besides liquid materials like waste oil or solvents, the majority of the solid alternative fuels are composed of municipal and industrial waste, such as plastic, paper, composite material and textile mixes. This also changes the chemical process. "Clinker grains are spherical with a diameter of ten to 30 millimetres and the content of fine particles is less than five percent when using fossil fuels. This content increases however to 30% when using alternative fuels," explains Tissen. "In order to handle this safely, the boxes need to be completely enclosed."



Employees of the cement manufacturer in charge of the installation work, with the support of the BEUMER Group.

Belts — the economical alternative

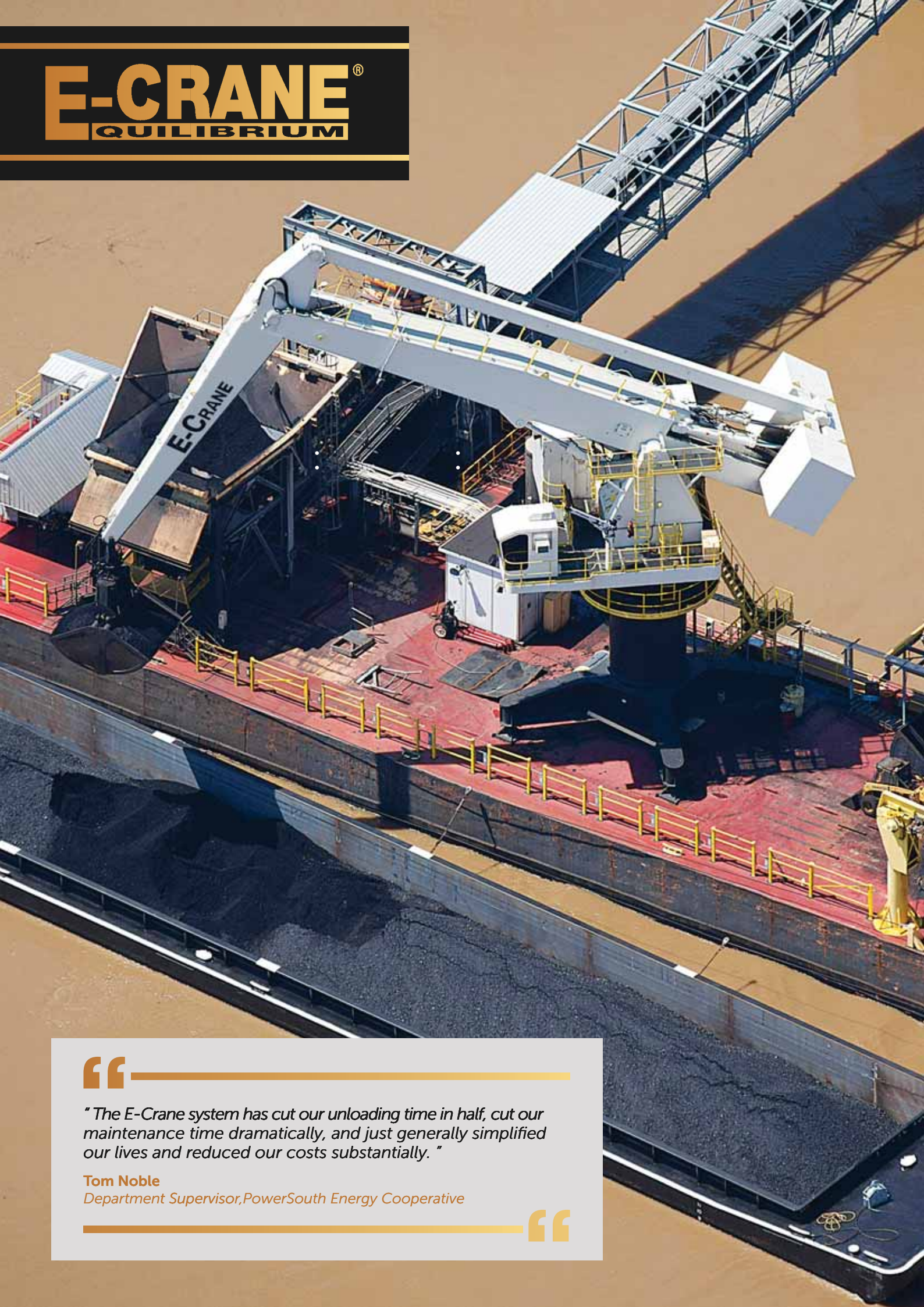
The traction element in the conveyor is usually a single or double strand sprocket chain, designed as steel-bushed roller chain with a pitch of 315 millimetres. Finely regraded versions for breaking forces ranging between 250 and 2,700 kilo newton ensure optimum adaptation to the required parameters. The maximum conveying speed is 0.3 metres per second.

"Instead of a chain we also offer the apron conveyors with our tried and tested BEUMER steel wire belt coming from the bucket elevator technology," reports the expert. Here the cells are attached to the low-wear, long-lasting and steel-wire reinforced belt in a way so that the heat of the clinker in the steel cells is not transferred on to the belt. A special profile between the steel cells and the belt prevents this. Partition plates are attached in the material feeding area below the cooler and can be easily removed for maintenance, protecting the belt against hot clinker in case of a kiln flash.

Perfect for retrofitting

One decisive advantage of the belt apron

E-CRANE® QUILIBRIUM



" The E-Crane system has cut our unloading time in half, cut our maintenance time dramatically, and just generally simplified our lives and reduced our costs substantially. "

Tom Noble
Department Supervisor,PowerSouth Energy Cooperative

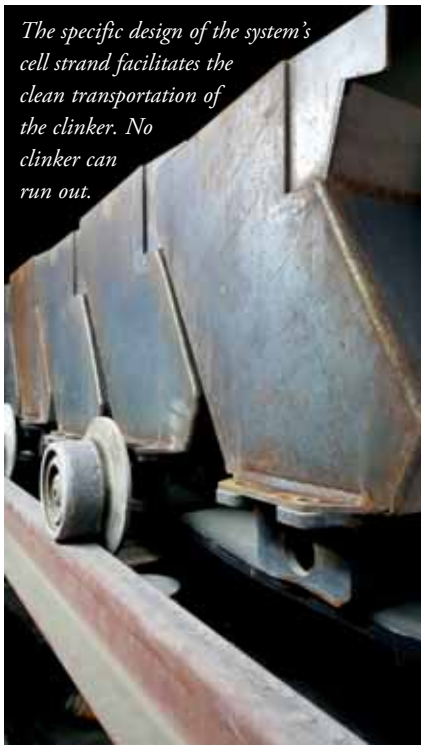
conveyor: with 0.6 metres per second, it can reach double the conveying speed compared to apron conveyors with a chain. "This makes it perfect for retrofitting and modernizations," says Tissen. If the operator wants to increase the kiln capacity for example, he can replace an existing apron conveyor with an belt version of the same size. It means double the capacity without having to change anything on the steel structure or the conveyor bridge.

The operator also benefits of a new construction application: the thinner, lighter design of the GSZF reduces costs for the steel structure and freight. Furthermore, the decreased net weight lowers the static and dynamic loads which affect the clinker silo and the foundations for example. "A new construction project can be designed for a smaller load and is therefore more cost-effective to build," explains the expert. "The lightweight design also lowers operational costs."

Quiet, low in maintenance, reliable

As the entire belt lies with its surface on the drive and return pulley, the unwanted polygon effect on the chain is avoided. The particularly smooth running of the machine also reduces noise emission considerably. The noise is less than half as loud as conventional SZFs with chains. This is good for the employees, the environment and the surrounding area.

The use of the durable BEUMER steel wire belt instead of a chain lowers the maintenance costs, and extends maintenance intervals. Chains can also break, if preventive maintenance is not performed properly, which will lead to the conveyor collapsing. "The belt with the steel wires only ages and the rubber becomes brittle, but it would never completely break," describes Tissen. Lubrication is also not required for the belt, whereas used frequently on a chain, if for no other reason than to reduce noise levels. Grease and oil are not only a cost factor, but also detrimental to the environment and the conveyor. The clinker dust gets stuck on it and settles in the chain links, which accelerates the wear and tear.



The specific design of the system's cell strand facilitates the clean transportation of the clinker. No clinker can run out.

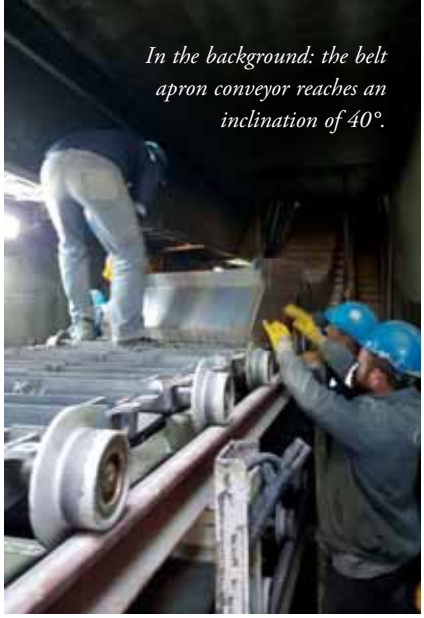
Göltas Cemento opts for GSZFs

BEUMER belt apron conveyors have been in operation for nearly 150 companies. One of these is the Turkish cement manufacturer Göltas Cemento, located close to Isparta, approximately 130 kilometres north of Antalya. In the wake of a building boom in Turkey and the growing demand for cement, the cement manufacturer opted for modernizing its kiln and increasing the performance. An increase from 250 to 400 tonnes per hour of the conveying technology capacity was required, for a chain apron conveyor that transports the clinker from the kiln cooling system to the silo. And for an economical production, Göltas Cemento has been increasingly opting for alternative fuels over the last several years, which meant that the content of fine particles also increased continuously. The existing conveyor already transported high quantities of material, and the process had become extremely dirty. Personnel was constantly needed to perform cleaning work.

To find an efficient solution and a suitable partner on their side, Göltas Cement turned to the BEUMER Group. The two companies have been working together since 1996. The system provider has supplied two clinker transport systems and four belt bucket elevators over the course of their partnership. So, the cement manufacturer was already familiar with the advantages of the BEUMER steel belt technology. The project phase began mid-2015, the contract was awarded in the beginning of 2016, followed by the installation and commissioning in the fall.

Modernizations without extensive reconstruction work

"For a more powerful chain apron conveyor, we would have needed to take down the entire system including the building structures and the concrete tunnel," says Tissen, who was responsible for this project with his team. "This wasn't necessary when opting for the belt version. It reaches double the conveying speed, so that the BEUMER Group engineers could design the system for an increased capacity while keeping the same width. The conveyor bridge and the self-supporting steel structure, as well as the concrete foundations remained. Göltas Cement was able to considerably reduce costs, and put the system quickly into operation. "The silo is 50 metres high. In order to overcome an inclination of 40°, we installed a steel box conveyor," explains the expert. It releases almost no material to the environment, despite the higher content in fine particles, creating a cleaner work environment.



In the background: the belt apron conveyor reaches an inclination of 40°.

For the installation work, BEUMER Group provided the supervisor, the assembly was carried out by the client personnel. "Our collaboration went great," sums up Tissen. "The assembly only was a little trickier in the very narrow concrete tunnel, where the conveyor is located. But the installation was well-prepared. So we were still able to stick to the set schedule." Göltas Cemento and BEUMER Group are already discussing future modernization projects.

About BEUMER

The BEUMER Group is an international manufacturer of intralogistics systems for conveying, loading, palletizing, packaging, sortation, and distribution. With 4,500 employees worldwide, the BEUMER Group has annual sales of about €900 million. BEUMER Group and its subsidiaries and sales agencies provide their customers with high-quality system solutions and an extensive customer support network around the globe and across a wide range of industries, including bulk materials and piece goods, food/non-food, construction, mail order, mail and airport baggage handling.

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MANTSINEN 300 is the first in its class, paving the way for large-scale heavy-duty material handling machines. Fast and precise Mantsinen 300 is challenging traditional rope cranes with the fastest work cycle on the market and the best productivity in its size class.

Mantsinen 300 is designed to meet the requirements of handling bulk materials up to Panamax vessels, but it can also handle heavy breakbulk cargos and containers. Despite its massive size Mantsinen 300 is just as agile and precise as any smaller material handler.

Burnley® Baffles for cement and clinker applications at port facilities

Environmental pollution is a major issue for ports handling dry bulk materials.

The uncontrolled loading and discharge of the dry bulk cargoes generate a lot of dust. The dust is also released during the transfer of dry bulk product via clam cranes. It can affect not only the workers' health but decrease the air quality for the residents of the nearby areas. The grab cranes and simple belt conveyor technologies used by ports to transfer the product need to be equipped with appropriate dust control devices to limit the amount of dust released during dry bulk materials handling. The port operators must ensure the staff are also using personal protection equipment. The failure to control the air pollution in ports can have serious consequences, resulting in litigation and sometimes closing of the facility.

It is a well-known fact that prolonged exposure to dust can cause serious health problems. During cement manufacturing, dust is released at every stage of the process, including handling and transportation of the ready product. Breathing cement clinker dust over a period of time may, in some cases, result in cancer and other diseases.

Mideco's dust-control solutions can help port operators with any dust-related problems associated with the dry bulk material unloading such as cement and clinker.

Mideco is an Australian-owned company that specializes in providing innovative, efficient and cost-effective dust control products and solutions for mines, quarries and any commercial environment where dust is problem. In over 60 years in the industry, Mideco has successfully completed many projects that involved design and supply of quality dust suppression and collection systems for wharf bulk load and unload facilities in ports.

Mideco's internationally patented dust suppression device Burnley® Baffles is specifically designed to reduce the escape of dust from dump hoppers and chutes handling dry granular bulk raw materials such as grains and ores. Burnley® Baffles are utilized in ship unloading, rail unloading, truck unloading, bag tipping, drum tipping, and front-end unloaded material transfers. It is a perfect solution for any dust-related problems at port facilities and the demand for this system at port project sites is on the rise.

Burnley® Baffles have been already installed at cement processing and port facilities across Australia, New Zealand and even Uzbekistan. The following is just one example of Mideco's dust control solutions for port operators.

Case study

In 2014 Mideco was approached to assist QUBE Ports Pty Ltd in Kwinana port, WA. The client required a dust control system for a wharf hopper that dealt with cement and clinker. The unloading of the product resulted in considerable amount of dust, causing delays and creating a hazardous work environment for the staff. In this particular situation, the dust-suppression device was required for two large hoppers, each 5.8m long and 6.8m wide. The hoppers were loaded via a 10m³ clamshell grab, and the material bulk density quoted to Mideco was specified as 3,200kg/m³. Mideco had all the information to design and supply a perfect dust solution for the project.

After reviewing the data and consulting with the client, Mideco recommended Burnley® Baffles, Model 2. It then built and supplied the client with 80 baffles in total, 40 baffles for each hopper, together with two frames. Using a frame on top of a hopper is fairly common. The frames are installed

for safety and to facilitate staff access to the hopper surface area if required.

Mideco also advised the client that a dust collector mounted on the hopper would increase the effectiveness of the proposed design. The dust collectors are frequently used to enhance the dust control system, and Mideco has various types on offer for a project of any complexity. When applied to a hopper alone, Burnley® Baffles can eliminate up to 80% of dust. With an additional dust collector applied directly to a hopper 100% of dust can be eliminated.

To deal with the volume of cement and clinker unloaded and to accommodate for the large size of the hoppers in this project Mideco supplied an Economy Dust Collector consisting of 48 of rectangular, envelope style filter bags 1.04m long and 0.90m wide.

The system was delivered and implemented at Kwinana port in July, 2014. It is still at work today. This is just one of the examples of Mideco's innovative and effective dust-control equipment managing air pollution at port facilities for cement and clinker applications.

Burnley® Baffles is one of Mideco's best known products as they are easy to install, virtually maintenance free and can be customized to a hopper of any size. With five models available in various sizes to suit different types of dry granular bulk raw material, Mideco can address dust issues during handling of any product whether it's cement, phosphate, coal, grain, feed, ores or powders.

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This year Nectar is set to offload and bag over 2 million tonnes of bulk commodities, that's over 40 million bags!... But more importantly we will do it quickly, efficiently and accurately so that you can be confident that what it says on the bag is in the bag.

And that's because our bagging machines have been designed by leading engineers and our fleet is maintained by top notch technicians, ensuring it's constantly fit for purpose... in the right place... at the right time.

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...you can take a load off.

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Cement is just one commodity handled by RBL-REI's Stand Hop™ hopper

Today, making the decision to invest in a harbour hopper means that the hopper should meet the following criteria:

- the hopper should satisfy all latest environmental standards;
- it should be easy to deliver and commission, particularly in developing countries;
- it should be suitable for use with a range of bulk products;
- it should be easy to use, but still robust;
- the delay between placing the order and the commissioning of the hopper should be as short as possible; and
- the investment cost should be reduced, with a fast ROI (return on investment) as markets are shorter.

RBL-REI aims to meet all the above requirements, to satisfy its customers. It has therefore developed its Stand Hop™, a dedusted hopper for port applications that can be used with a variety of bulk materials, including cement.

With experience gained delivered nearly 30 wharf hoppers worldwide, as well as responding to previous requests, RBL-REI designed its Stand Hop™ to have the following characteristics:

- conical hopper, so there is no retention of product;
- cone and structure are completely covered with a hot galvanizing, providing better resistance than a coat of paint;
- the possibility to mount up to eight bag filters on the first model, and 12 bag filters on the second model;
- the hopper is totally containerizable in 40ft, containers, which can be delivered almost anywhere in the world;
- the hopper is fully boltable, with no welding required on site;
- the hopper is delivered as a kit, which can be assembled directly by the customer, either under the supervision of RBL-REI or without.

A number of options are available to customize the Stand Hop™ to adapt it to the specific requirements of the customer. These are:

- cone with two exits;
- spraying and not bag filters;
- extraction by belt conveyor or clamshell — if by clamshell, it is possible to adapt a telescopic chute;
- fixed or mobile — if mobile, can be on wheels or on bogies;

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The answer to your bulk handling questions

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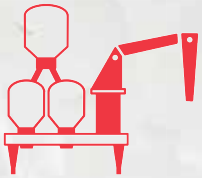
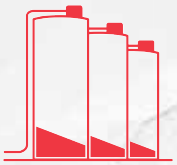


Road mobile ship unloaders

Storage & reclaim



Convey units

Truck loading

Ship loaders

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- access by ladder or staircase;
- power supply by hose reels or by power generator; and
- cover for cones.

Orders placed/completed

The first two Stand Hop™ hoppers were commissioned in Ghana for CBI last September.

A completely autonomous Stand Hop™ has just been commissioned in France for Cem'In'Log.

Two others are being erected for Lafarge Holcim in Cameroon.

Finally, three hoppers are being studied for Albioma in Guadeloupe.

About RBL-REI

RBL-REI maintains a close relationship with its clients and its partners throughout a project, from the very early stages to the final commissioning.

It has decades of experience and unique skills, allowing it to design innovative bulk handling solutions.

The company has used its skills on specific product ranges, such as:

- Curvoduc™, an engineering technology dedicated to overland curved conveyors;
- Stand Hop™, the dedusted hoppers for port applications;
- ZZ Belt™, an engineering technology dedicated to mount bulk vertically with two belts; and
- extendable conveyors for TBM application; Pile stocking stackers; Weighing towers and automatic train loading, and so forth.

RBL-REI's equipment can be used to handle any kind of bulk materials including cereals, cement, fertilizers, clinker, aggregates, coal, pellets and more.

SDLG loader optimizes operations at Holcim's Indonesia plant

Indonesian contractor PT Sarana Karya Cipta Transindo chose the SDLG LG936L wheel loader to handle aggregates at Holcim's concrete plant, noting the machines value proposition as a key reason.

A SDLG LG936L wheel loader is proving vital to operations at a Holcim concrete plant in Bandung, Indonesia. Contractor PT Sarana Karya Cipta Transindo is using the fuel-efficient LG936L to produce high quality concrete products for Holcim, one of the world's foremost suppliers of cement and aggregates.

"The LG936L has really improved efficiency and operations at the plant," said Rieko Stevanus, owner of PT Sarana Karya Cipta Transindo. "It's smooth and reliable performance allows us to move up to 65m^3 per hour."

On site since April 2018, the LG936L works between 15 to 20 hours daily, primarily transporting materials such as limestone, crushed stones and sand, from the stockpiles to the concrete plant's hopper, to help produce 3,000m^3 of concrete monthly for Holcim.

"The SDLG wheel loader is a reliable workhorse and needs only one minute and 20 seconds to pick up the materials from the stockpile and unload at the hopper 30m away," Stevanus said.

With an air-conditioned steel cab with wide visibility and a large operating space, the operator is protected against the elements and enjoys optimum comfort. With the option to install rollover protective structures and falling object protective structures, contractors have flexibility to adapt the lightweight wheel loader to meet changing job site needs.

Powered by a 92kW Weichai Deutz engine, the 3 t-rated LG936L is highly-manoeuvrable. The 1.8m^3 bucket on the unit can be raised to a dumping height of 3.3m, and the maximum breakout force is 96kN.

PT Sarana Karya Cipta Transindo owns a fleet of seven SDLG LG936L, which were all purchased from PT Indotruck Utama, SDLG's distribution partner in Indonesia.

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Back on track: cement manufacturer achieves significant savings with PTEZ Belt Trainer from Flexco

Operators of belt conveyor systems can prevent material losses by correcting the belt tracking. Flexco offers a number of belt trainers for this purpose, one of which is the PTEZ. It detects belt misalignment and realigns the belt correctly, in this way also preventing damage to the belt edges. One cement manufacturer that opted for this system has not only cut back its material losses dramatically, it has also significantly reduced its costs for maintenance and spare parts.

Flexco is an internationally renowned specialist for mechanical conveyor belt fastener systems, belt cleaners, belt trainers, impact beds and drum coatings. An application engineer at the company explains the situation: "Our customer, who operated a conveyor system for cement clinker, was constantly having problems with belt misalignment." This was not only causing major losses of clinker, it was leading to premature wear. And that endangered the operation of the belt and the efficiency of the entire system. When material accumulates in the rollers of such systems, they jam, creating tension in the belt and at the fastening points. If the belt tears, the system comes to a stop. Production ceases until the conveyor is up and running again. That costs money, and the safety of the system cannot be guaranteed.

The PTEZ Belt Trainer detects belt misalignment and realigns the belt correctly. This also prevents damage to the belt edges (all pictures: Flexco Europe GmbH).

A US cement manufacturer uses this belt trainer to reduce its material losses and cut costs for maintenance and spare parts.

Expensive wear

The cement manufacturer's service technicians had to perform frequent maintenance and repair the belts by means of vulcanization — usually after only four to six weeks. In vulcanization the ends of the belts first have to be prepared and afterwards the connection has to harden — a process that takes four to six hours. During this whole time the system cannot run. Another problem was that when the belt wandered, it pressed against the supporting structure, which acted like a saw. Owing to this wear, the operator had to replace the belt every 14 to 16 months — an

The unit responds immediately to misalignment and corrects it. It also ensures that the belt does not touch the structure.

Flexco took a close look at the application and recommended a belt trainer from the PTEZ series.

expensive process. The cement manufacturer tried out a number of belt trainers from different providers in order to reduce its costs. But none of the systems was able to correct the belt misalignment. Finally the company turned to Flexco. "We took a close look at the application and recommended our PTEZ series," reports Flexco's application engineer.

No more deviations

The PTEZ Belt Trainer is suitable for light to medium-duty applications and for reversible belts with widths of up to 1,200mm. The station is very quick and easy to install thanks to the simple design of its brackets and components. Operators can also use this system on belts with worn or damaged edges.

The PTEZ corrects belt misalignment on one or both sides. No sensor rollers are required as the tapered rollers initiate movement of the tracking system. The unit responds immediately to misalignment and corrects it. It also ensures that the belt does not touch the structure, thus reducing the risk of damage and significantly cutting maintenance costs.

A special feature of this solution is its pivot and tilt movement. Pivoting affects the direction while tilting increases the tension on the incorrectly guided side. These two forces therefore move the belt quickly back to the centre. The belt trainer is suitable for belt speeds of up to five metres per second.

Big savings

"We installed the belt trainer on the clean side of the conveyer belt," explains the technician. "And since the PTEZ is protected from dust, the pivot and tilt movement is very reliable. Fine material can't get deposited in the guides and jam them." Flexco's solution reduced wear both at the edges and at the fastening points. "Our system has considerably extended the service life of the conveyor belt." This has resulted in big savings for the operator. "Now that the belt can be used longer, we don't have the expense of replacing it." The belt trainer also reduces wear on other important components such as rollers and pulleys. This enhances the safety of the entire system and reduces maintenance expenditure.

About the company

Flexible Steel Lacing Company (FLEXCO), headquartered in Downers Grove, Illinois in the USA, is a respected international specialist for mechanical conveyor belt fastener systems, belt cleaners, belt positioners, impact beds and pulley lagging for light- and heavy-duty applications. With the company's innovative solutions, end-users can substantially reduce downtime and increase productivity. FLEXCO Europe GmbH is the German subsidiary of FLEXCO, and is headquartered in Rosenfeld, where the company currently has about 60 employees.

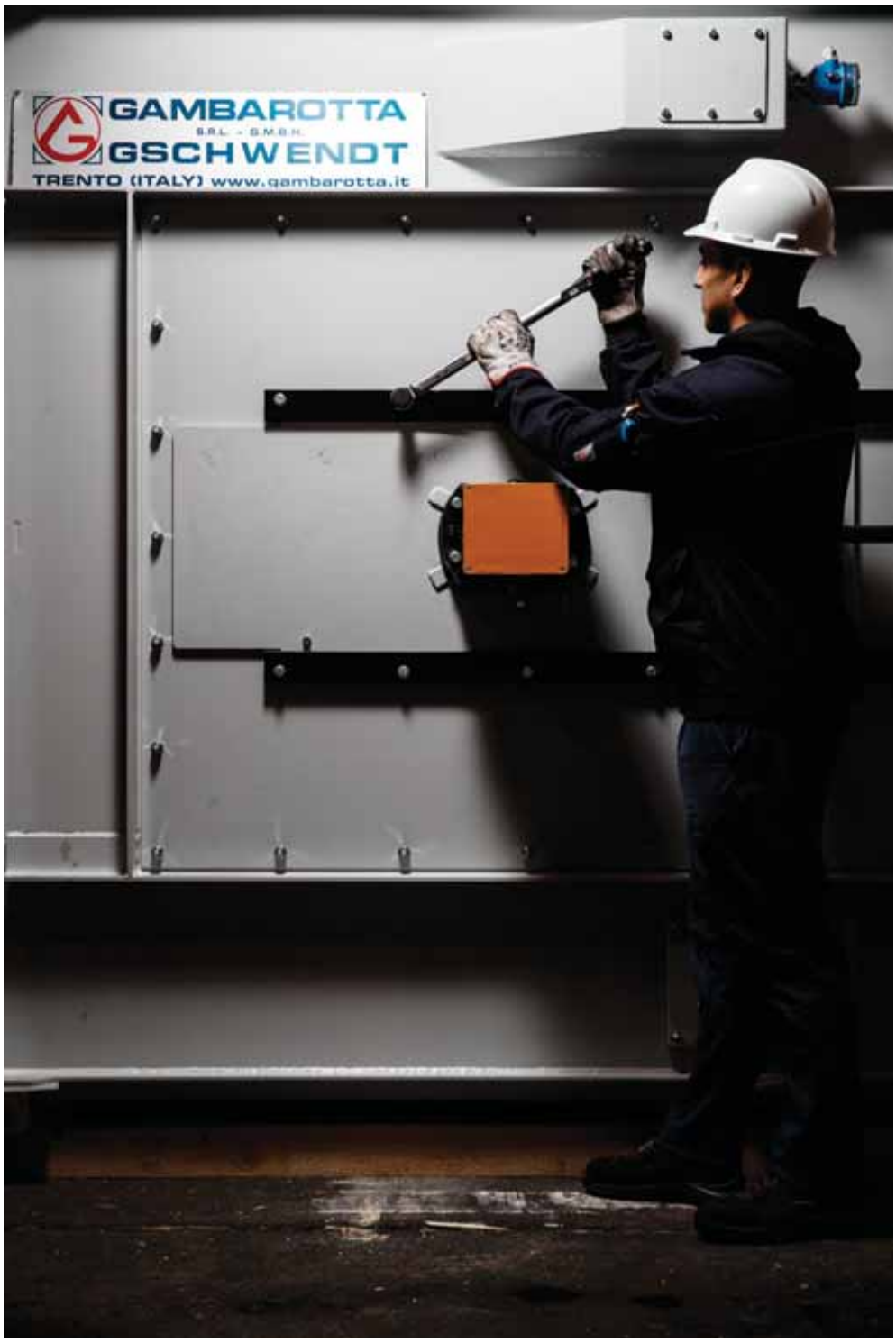
Gambarotta Gschwendt – the power of experience

Gambarotta Gschwendt is a respected worldwide manufacturer of solid bulk material handling equipment and provides conveying solutions for every sector.

With its almost 100 years of experience and thanks to its continuous Research & Development efforts, Gambarotta Gschwendt has been developing, designing and constructing hundreds of elevators, drag chain conveyors, pan conveyors, belt conveyors and other types of equipments suitable for the most different and severe requirements. The company's equipment is used to handle a wide variety of commodities, including cement.

Through mining, cement, steelwork and waste industries experience, the company has developed a wide range of equipment, in order to face several different conditions and to guarantee the continuous operation of the factory.

Conveying machines and the other equipment supplied by Gambarotta Gschwendt are calculated to withstand the most severe environmental conditions and are able to handle even abrasive or hot material, operating 24/7 without any stopping. This makes it an ideal supplier to the cement industry.



Gambarotta EP-N 'TIREX': the multipurpose solution

The handling of material characterized by heavy specific weight, high dust content and big sizes has always represented a big challenge for bulk material equipment suppliers. This is especially the case for cement, mining and steel industries, which require a mechanical system that is able to withstand heavy loads and material. Other significant requirements in these fields typically concern the ability to receive different materials from trucks or off-tipper lorries at yard level, minimizing spillage in the unloading area.

There is another important point about the needed civil works: apron feeders and other types of conveyors usually require an appropriate project and an on-size concrete construction.

The answer to this big challenge has been found with the new Gambarotta Gschwendt EP-N Surface Feeder, the so-called 'TIREX', a new robust machine with a strong structure able to withstand the typical hard work encountered in mining areas and heavy industries. This special conveyor has been specifically designed for efficient discharge operations, with the possibility to adjust the flow rate of the conveyed material on demand optimizing the process time.

Strong design for great performances

The main structure of the 'TIREX' can withstand both large material unloading and the weight of the trucks which are placed on the rear side of the machine for discharge operations. Two wheel stoppers are installed on a service platform with the aim to keep the truck stand still, allowing the material to drop on the conveying pathway in total safety.

The service platform can also be designed to accept up to three trucks,

operating on the three sides of the surface feeder at the same time.

The big inlet steel hopper is internally protected with anti-wear material and can include, depending on the EP-N model, one or more service chute, specially developed to slow down the dropping material before reaching the transport group.

A de-dusting cover placed on the overall top side of the 'TIREX' guarantees no dust leakage during the discharge and conveying operations, keeping the outer area clean and totally safe for workers. This cover includes a tall plastic curtain on the inlet section allowing the off-tipper truck to unload the material without any leakage, keeping the inner side protected from any contamination. At the top of the cover, a filter system can be placed for the de-dusting, including a top service platform for maintenance operations.

The EP-N transport group consists of a train of high quality steel plates, connected to a high strength steel chain on both sides and surrounded by a strong shear proof rubber belt. Basically, the pathway is composed of a straight horizontal track, where the material is initially discharged, followed by an inclined track in which the material is conveyed to the outlet chute. The width of the transport group goes typically from 2.6m to 6m and storage versions of the conveyor are even available. A layer limiter is properly positioned on the inclined section with the aim to level the material and to control the flow rate.

The hauling is provided by a reliable and powerful variable frequency drive system, placed on the top of the pathway of the surface feeder. Depending on the required machine capacity, the drive station can be supplied with single or double motorization and the feeding speed can be regulated according to the customer's needs. The drive group, with its own powerful planetary gearboxes, can efficiently withstand the peaks of power during the transportation guaranteeing continuous work and high reliability of the whole conveying system. The outlet side of the surface feeder includes a discharge chute made in anti-wear steel, which can be supplied with material concentrator, a mechanical device that allows to group the conveyed material in a certain point of discharge.

The overall structure does not require any special civil works, but only a solid concrete base and a ramp for the truck arrival. The machine has been designed with the option to be moved from one place to another without any permanent fixing to the ground. This feature makes the Gambarotta Gschwendt EP-W conveyor extremely versatile and flexible, a feature very appreciated by the customers.

The whole conveying system can be supplied also according to ATEX requirements when needed.

Quality first

The EP-N 'TIREX' surface feeder has been requested by mining plants, cement and steel industries getting a great success and customer's satisfaction. Recently Gambarotta Gschwendt won two orders for the supply of five EP-Ns for China and a further four EP-Ns for South America.

The main technical features include:

- high strength structure;
- completely customizable;
- suitable for any kind of material, even abrasive or big sizes;
- no civil works required;
- mobile construction for extreme versatility;
- with de-dusting cover and filter system;
- no dust during the discharge of the material;
- anti-spillage platform underneath truck area available;
- conveying widths from 2.6m to 6m;
- weighing version available;
- restricted outlet version available;
- able to manage the discharge of three trucks at the same time;
- storage version available;
- high performance VFD drive system with single or double motorization; and
- available in ATEX versions.

Storage and reclaim made simple: Dome Technology develops Drive-Thru DomeSilo that debuts in cement market

Dome Technology developed its Drive-Thru DomeSilo for companies to fill truck or rail directly from the storage structure and to speed up the process of product reception to delivery, *writes Rebecca Long Pyper for Dome Technology*.

In general the Drive-Thru DomeSilo incorporates a fill pipe, storage vessel, stair or ladder access, scale and appropriate foundation. Companies save by building a single drive-through storage facility that eliminates the need for multiple mechanical systems, operators, and structures.

This model allows for direct load-out, where stored product flows through a spout for direct load-out into the truck or rail. The dome provides 100% reclaim utilizing a fully aerated floor.

The system directly competes with bolted steel tanks and drive-through concrete silos. Due to unique construction techniques, this storage vessel is quickly constructed and price competitive.

Featured project: Continental Cement Company

In 2018, Dome Technology built its first Drive-Thru for Continental Cement Company at a recently acquired site in Memphis, Tennessee, USA. While the existing silo and adjacent scale had not been used for some time, complete upgrades of these assets along with a new barge unloader, dock upgrades and, as mentioned, the Drive-Thru dome has allowed Continental Cement to become the leader in service in the Memphis market.

With dimensions of approximately 100 feet tall and 50 feet in diameter, the Drive-Thru can be supplied by barge from any one of Continental Cement's plants. The new barge unloader discharges into either the Drive-Thru dome or the 3,000-tonne existing steel silo. New aeration in the existing silo allows for a much-increased truck-loading rate. A bridge between the dome and silo provides access between the two.

The Drive-Thru delivers 100% live reclaim using a fully aerated floor. Product flows through the truck spout into the truck; the same system could be used for a rail loadout system. An in-line lump crusher on the loadout stack-up ensures that lumps passed through the receiving system do not make it into trucks. The dome can receive 350mtph (metric tonnes per hour) from the barge unloader and load out at 320mtph.

Meeting a need in the marketplace

With a portfolio full of projects with capacities as large as 200,000 metric tonnes, the Dome Technology team was eager to pursue opportunities for smaller storage.

Steel and concrete silos have made the most of the drive-through concept for decades. The Dome Technology team set a goal to take this concept and improve on it. Borrowing from the success of its DomeSilo model, a tall and narrow dome with drive-through capability was designed to store more product on a smaller footprint than a silo of comparable dimensions; this increased storage is made possible by the dome itself, which can be filled to the top since it can support the pressure of product at all points of the structure, combined with a nearly flat floor rather than a steep cone.

Key benefits

The Drive-Thru is cost competitive with steel and concrete silos. Each one is customized, designed for ultimate product

protection and streamlined for efficient conveyance and low maintenance.

The Drive-Thru's dimensions can easily vary by project and customer need; the silo size will likely range from 1,500 to 15,000 tonnes and work well storing the typical drive-through capacity of 4,000 to 10,000 tonnes.

"The Drive-Thru DomeSilo provides a much-needed solution to the cement industry, unlimited diversity in shape and storage capacity. Customers are no longer required to choose a storage system solely based on what vendors can supply due to limitations on a silo or tank diameter or total storage capacity," said Dome Technology CEO Bradley Bateman. "The Drive-Thru DomeSilo shape, diameter and height can be unique based on actual site and customer requirements, and there is no practical limit on the amount of storage for the DomeSilo. In addition, the exterior of the DomeSilo is protected from the elements with a waterproof membrane, eliminating the concern of a leaky silo, and this also significantly prolongs the life of the structure itself."

PPC contracts highlight Takraf Africa's cement expertise

Key equipment supplier TAKRAF Africa, part of the global Tenova TAKRAF group, is nearing completion on two major material handling contracts for a prominent African cement producer, PPC Cement Ltd. The projects, one of which is for the PPC Slurry Plant in South Africa's North West province, whilst the other is for the PPC Port Elizabeth Plant in the country's Eastern Cape province, are interlinked. This means that precise scheduling and planning is required to ensure that the hand-over of both material handling systems are synchronized with one another and the client's production schedule.

The projects comprise, respectively, upgrade of the material handling system for the loading of clinker onto both rail and road transport systems at PPC Slurry and, on the receiving side, the material handling for rail offloading at PPC Port Elizabeth. Both projects cover design, engineering, construction, installation and commissioning, including all civil works. The systems also need to be tied into existing facilities during a limited shut down period to avoid production disruptions.

PPC Slurry

Increased manufacturing capacity at PPC Slurry, a clinker manufacturing plant traditionally servicing the PPC Gauteng plant, has meant that additional clinker can also be supplied to PPC Port Elizabeth. As a result, an upgraded clinker loading facility to load clinker onto both road and rail trucks was necessary for PPC Slurry to achieve the required clinker dispatch capacity. The upgraded system comprises a high capacity rail loading system and a separate installation for road transport loading.

The system provided by TAKRAF Africa features a fixed conveying system operating at 300tph (tonnes per hour) to offload into trucks with a loading accuracy of ±1%; whilst the rail system comprises a shuttle conveyor operating at 800tph and offloads into rail wagons with an accuracy of ±0.5%.

A challenge associated with clinker material handling is the potentially high dust levels generated from the handling of such material. Both the fixed and shuttle conveyor systems are equipped with Cascade chutes in addition to Tenova Reverse Bag Filters, resulting in reduced dust levels to within regulatory limits of 20 mg/Nm^3. The Cascade chute prevents particle separation and minimizes material degradation, thereby eliminating dust generation at source.

The contract for PPC Slurry was awarded in February 2018, with completion of the road and rail offloading systems by June 2019.

PPC Port Elizabeth

The PPC Port Elizabeth Plant is a fully-fledged clinker manufacturing plant, which currently produces cement but, for various reasons including the age of the plant and future environmental emission requirements, is being converted into a cement-milling depot. Clinker will therefore be brought from other PPC clinker producing factories including PPC Slurry, thus requiring facilities to be established at the plant for the offloading of clinker.

TAKRAF Africa's material handling system to offload clinker into a storage building prior to it being milled comprises a 400tph belt feeder, hopper and two Redler en masse chain conveyors. TAKRAF Africa is also modifying the clinker storage facility to enable it to meet the extra capacity requirements.

Establishing a new facility on a brownfields site added to the complexity of the project as much of the material handling system had to be designed and erected to cross over existing buildings.

As with the PPC Slurry plant, dust control was another focus area and dust extraction systems have been provided at all transfer points to reduce levels to within regulatory limits.

The contract was awarded in April 2018 and will be completed, as per contract, in April 2019.

Extensive track record

Known as Bateman Engineered Technologies prior to Tenova acquiring the Bateman group in 2012 and being integrated into Tenova TAKRAF, TAKRAF Africa's reference list in the cement industry stretches well back into the last century and includes projects with all of South Africa's leading cement producers.

The extensive business relationship with PPC includes, in recent years, the supply of Tenova Reverse Bag Filters to replace existing electrostatic precipitators at PPC's Slurry facility and at its De Hoek cement plant. In addition, a 29.5m side arm scraper reclaimer installed at PPC's Dwaalboom factory, as part of a contract to provide conveyors and reclaimers for the plant's expansion, was one of the largest of its kind in the world. Seven Tenova Reverse Bag Filters were also supplied as part of this project.

"The award of these two important material handling projects for PPC's Slurry and Port Elizabeth plants highlight the continuing wide acceptance of our expertise in the cement sector," says Richard Späth, General Manager – Technologies, TAKRAF Africa. "Our services to the cement industry cover the complete process chain from collecting, through conveying, storage and conditioning, to classification and 'outloading'. Our advanced design skills are further complemented by our access to world class licences, such as the Redler conveyors, as well as our own in-house developed technologies."

About TAKRAF

TAKRAF, a Tenova company, is an integrated solutions provider to the global mining, bulk material handling, minerals processing and beneficiation industries, offering innovative technological solutions as well as process and commodity knowledge along the industry value chains. With the integration of the well-known DELKOR and, Tenova Advanced Technologies (formerly Bateman Advanced Technologies) brand of products into TAKRAF as specialized product lines, our portfolio for the mineral processing and beneficiation sectors has been considerably enhanced.

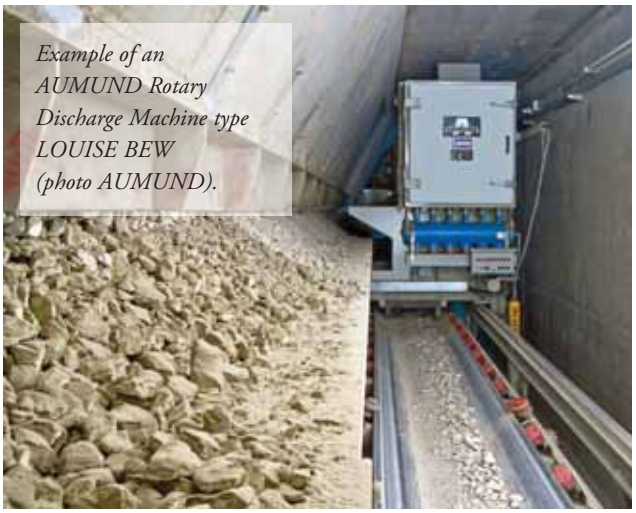
About Tenova

Tenova, a Techint Group company, is a worldwide partner for innovative, reliable solutions in metals and mining. Leveraging a workforce of over 3,000 forward-thinking professionals located in 22 countries across five continents, Tenova designs technologies and develops services that help companies reduce costs, save energy, limit environmental impact and improve working conditions.

Aslan Cement relies on AUMUND machines for its upgrade

AUMUND Fördertechnik has won a significant order from Turkey. The order from Aslan Cement Inc. comprises nine machines. The company is part of the OYAK Cement Group, one of the leading Turkish cement producers, and an important customer to AUMUND Fördertechnik for many years.

The order is part of the complete modernization project at the Aslan plant, which is in Darıca, Kocaeli Province, approximately 60km from Istanbul. The production capacity is to be increased to up to 6,600 tonnes per day of clinker. The extensive AUMUND supply includes a bucket elevator with central chain type BWZ-L (L=low capacity) with a capacity of 225tph (tonnes per hour) and a centre distance of 27m to feed the raw meal mill, as well as three different models of BWG belt bucket elevators with capacities up to 500tph and centre distances up to 132m. The belt bucket elevators will also be used for raw meal silo feed, as well as to transport raw meal to the dosing hopper and the heat exchanger.



Example of an AUMUND Rotary Discharge Machine type LOUISE BEW (photo AUMUND).

The order is completed with three pan conveyors type KZB, each with capacities of 350tph and centre distances of up to 77.2m, to convey clinker from the cooler to the silo, as well as two Rotary Discharge Machines type LOUISE BEW, each with a diameter of 3m and a capacity of 400tph.

The machines are due to be dispatched in September, and commissioning is planned for the beginning of next year.

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 15 locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.

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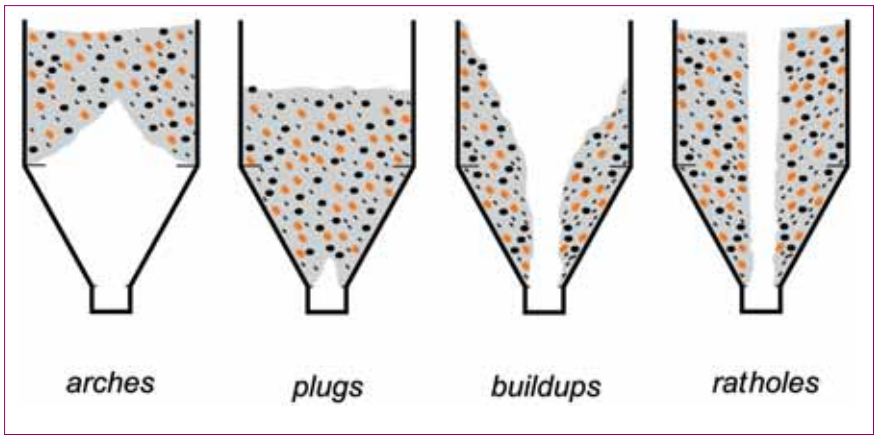
Keep the flow going: preventing accumulation in cement processing

Efficient material flow is a critical element of dry-process cement manufacturing, and accumulation or blockages can put a choke hold on a plant's profitability, *writes Brad Pronschinske, Global Director of Air Cannons Business Group/Martin Engineering*. Hang-ups in storage systems and build-up in process vessels can impede material movement, causing bottlenecks that interfere with equipment performance and reduce process efficiency. Poor material flow also raises maintenance expenses, diverting manpower from core activities and in some cases introducing safety risks for personnel.



Most systems suffer from some amount of accumulation on vessel walls, which can rob plant owners of the storage systems in which they have invested. These build-ups reduce material flow, decreasing the 'live' capacity of the vessel and the efficiency of the bulk handling system. The accumulations tend to take one of several forms: arches, plugs, build-ups or 'ratholes'.

If they become severe enough, flow problems can bring production to a complete stop. Although many plants still use manual techniques to remove build-up, the cost of labour and periodic shutdowns has led some producers to investigate more effective methods for dealing with this common production issue.

Build-up vs. throughput

Even well-designed processes can experience accumulations that have a significant impact. Changes in process conditions, raw materials or weather can all have an effect on material flow, and even small amounts of accumulation can quickly grow into a serious blockage.

Build-up can occur in many places, and in several forms. For example, it can be found as dry material that clings to the walls of pre-heater towers, or as ash that adheres to boiler tubes, SCR units and vessels. Accumulation often appears in riser ducts, feed pipes, cyclones, transfer chutes and storage bins, as well as kilns and coolers. The accumulation can be particularly severe when fuels with high sulphur or chloride content are used, such as petcoke. In extreme cases, massive build-ups can suddenly break loose and suffocate the process, potentially causing significant damage to equipment.

Lost production is probably the most conspicuous cost of these flow problems, but the expense can become apparent in a variety of other ways. Shutdowns to clear the restricted flow cost valuable process time and maintenance hours, while wasting energy during re-start. Refractory walls can be worn or damaged by tools or cleaning techniques. When access is difficult, removing material blockages may also introduce safety risks for personnel. Scaffolds or ladders might be needed to reach access points, and staff can risk exposure to hot debris, dust or gases when chunks of material are released.

Many of the most common problem areas for accumulation are classified as confined spaces, requiring a special permit for workers to enter and perform work. The consequences of untrained or inexperienced staff entering a silo or hopper can be disastrous, including physical injury, burial and asphyxiation. Disrupted material adhered to the sides of the vessel can suddenly break loose and fall on a worker. If the discharge door is in the open position, cargo can suddenly evacuate, causing unsecured workers to get caught in the flow. Cleaning vessels containing combustible dust — without proper testing, ventilation and safety measures — could even result in a deadly explosion with as little as a spark from a tool.

What is confined space entry?

The Occupational Safety and Health Administration (OSHA) defines 'confined space' as an area not designed for continuous employee occupancy and large enough for an employee to enter and perform assigned work, but with limited or restricted means for entry or exit.[1] 'Permit-required confined space' means a confined space that has one or more of the following characteristics:

- The vessel contains or has the potential of containing a hazardous atmosphere such as exposure to explosive dust, flammable gas, vapour, or mist in excess of 10 percent of its lower flammable limit (LFL). Atmospheric oxygen concentration below 19.5% or above 23.5%;
- There is the potential for material to engulf, entrap or asphyxiate an entrant by inwardly converging walls or by a door which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized serious safety or health hazards.

Permit-required confined space entry entails cumbersome and costly — but necessary — safety procedures, including special personnel training, safety harness and rigging, extensive preparation and added personnel for a 'buddy system.'

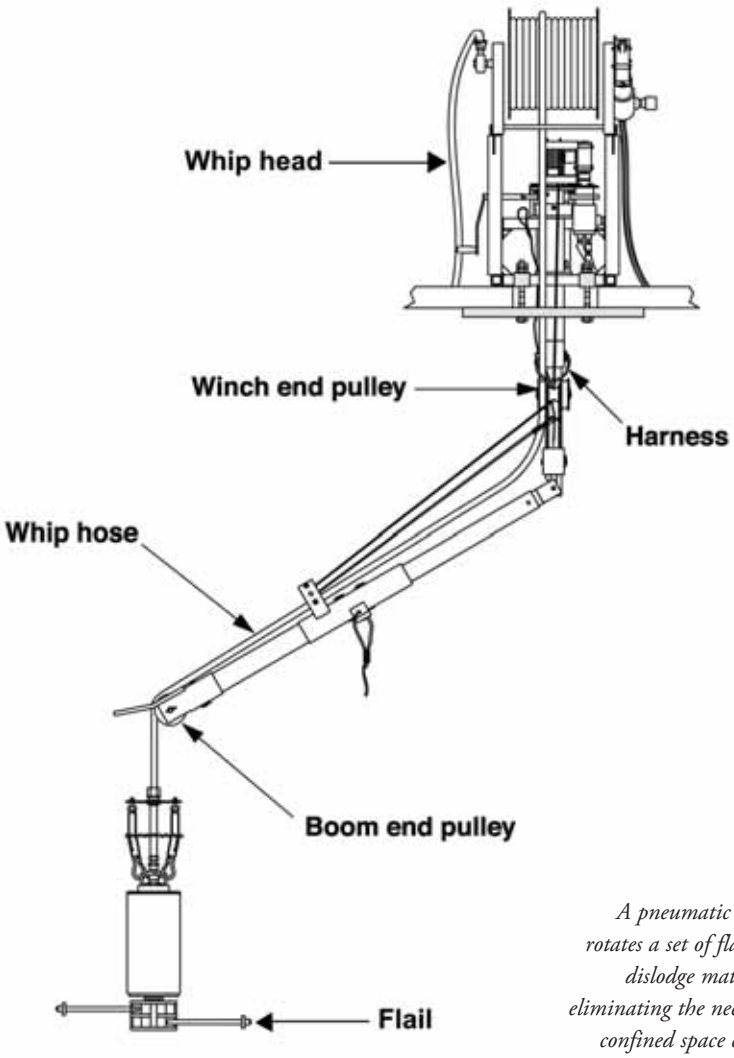
Getting professional help

While some large facilities choose to make the capital investment to purchase their own cleaning equipment to clear process equipment and storage vessels — as well as train personnel — others are finding it more sensible to schedule regular cleanings by specially-trained contractors. Given the costs of labour, lost time and potential risk to employees, this can often be accomplished for less than the total investment of in-house cleanouts.

At one plant, for example, a cleaning crew cleared a silo in two weeks that had been out of use literally for years, adding 3,500 tonnes of 'live' storage capacity. At another plant, the cleaning crew was able to remove enough 'lost' material — which had been written off as a loss over the years — that the value of the recovered material actually paid for the cost of the cleaning. In short, the cleaning of storage capacity can quickly turn into an economic

[1] Dougherty, Dorothy, "Permit-Required Confined Spaces," Occupational Safety and Health Administration, Department of Labor, Dec. 12, 2011. https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9797&p_table=STANDARDS

Safe, effective cleaning requires tools that work inside the silo from the top, controlled by personnel outside.



A pneumatic whip rotates a set of flails to dislodge material, eliminating the need for confined space entry.

benefit — not an expense, but rather an investment with a measurable ROI.

The costs of cleaning

Most cleaning projects are bid on a 'time and materials' basis. It's difficult to give a firm estimate, because the length of time can vary significantly depending on the amount and characteristics of the material in the vessel. And some of those details cannot be determined until the cleaning has actually begun.

There are several types of equipment that can be used for this purpose. One operates like an industrial-strength 'weed whip', rotating a set of flails against the material in the vessel. Abrasion-resistant steel chain is best suited for most applications, with non-sparking brass chain for combustible materials. Urethane flails can also be employed to protect lined vessels that could be susceptible to damage from metal tools. This approach eliminates the need for confined space entry and hazardous cleaning techniques such as CO_2 blasting, water and air lancing, typically allowing the material to be recaptured and returned to the process stream.

The whip can be set up quickly outside the vessel, and it's portable enough to move easily around various bin sizes and shapes. Typically lowered into the vessel from the top and then working from the bottom up to safely dislodge accumulation, the pneumatic cutting head delivers powerful cleaning action to remove buildup from walls and chutes without damaging refractory linings. Technicians lower the device all the way down through the restricted opening, starting at the bottom of the buildup and working their way up, undercutting the wall accumulation until it falls by its own weight. In extreme cases, a 'bin drill' can be used to clear a 12-inch (30.5cm) pathway as deep as 150 feet (45 metres).

In general, an efficient silo cleaning crew can clean the walls in a 30 x 60 foot (9 x 18m) vessel — removing up to 150 tonnes of material — in a day of working time, excluding travel and setup. It may be possible to reduce the mobilization charges for bringing a vessel cleaning contractor to a plant by scheduling a cleaning project in conjunction with other facilities nearby that also use large bulk storage vessels. If the cleaning is scheduled before accumulation becomes too severe, plants may be able to hold down costs even further by allowing the cleaning service the option to schedule the cleaning at its convenience and/or during scheduled downtime.

Flow aids

Regular cleaning is one approach to keeping materials flowing freely by removing buildups from silo walls, but there are other flow aids which may reduce the need for cleaning or even eliminate it. One method is through industrial vibrators designed for bin and chute applications.

Electric vibrators are generally the most efficient, delivering the longest life, low maintenance and low noise. The initial cost for an electric vibrator is higher than for pneumatic designs, but the operating cost is lower. Turbine vibrators are the most efficient and quietest of the pneumatic designs, making them well suited to applications in which low noise, high efficiency and low initial cost are desired.

Air cannons are another approach to maintaining good material flow, particularly in larger vessels. Also known as an air

Industrial vibrators for bin & chute applications can reduce or eliminate the need for cleaning.

blaster, the air cannon is a flow aid device that can be found in cement manufacturing, coal handling and many other industries. Applications vary widely, from emptying stagnant bulk material storage vessels to purging boiler ash to cleaning high-temperature gas ducts.

In the cement industry, air cannons are frequently specified to eliminate build-ups in preheater towers, often at points such as the riser ducts, feed pipes, kiln inlets and cyclones. They can also be found in extensive use on clinker coolers, in material transfer chutes and in storage bunkers.

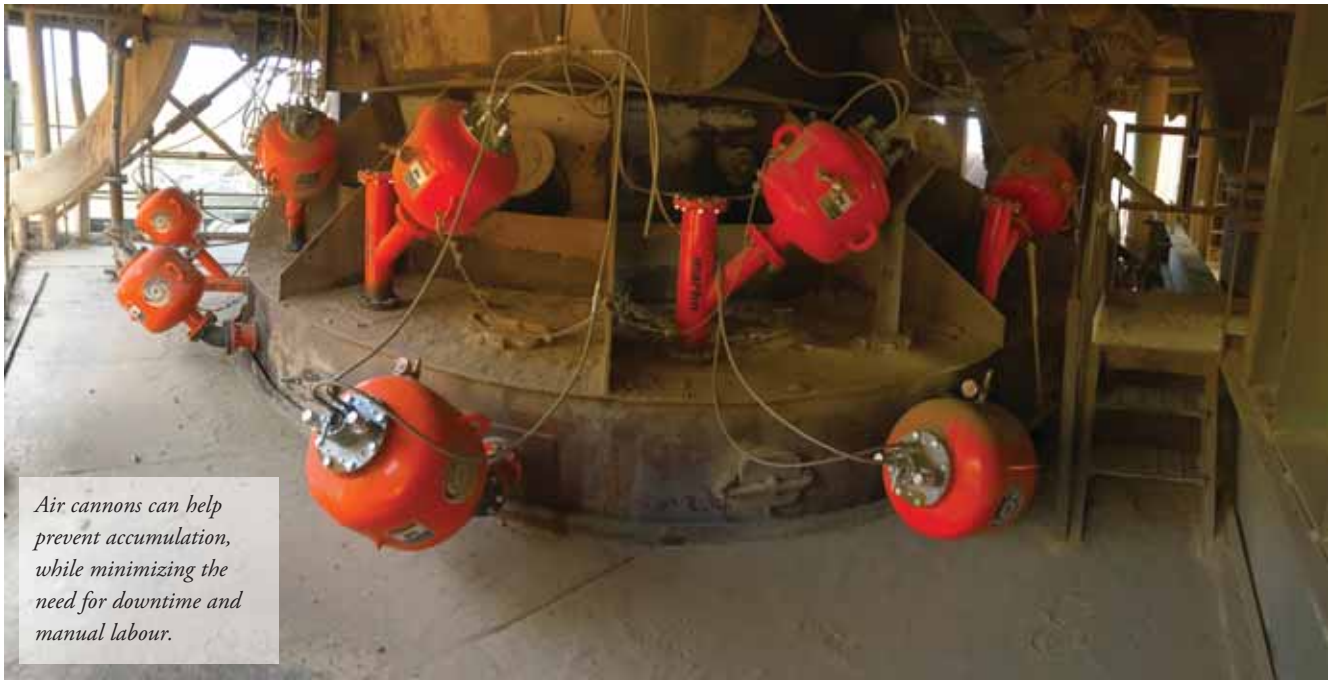
Air cannon technology has a long history of service in cement manufacturing, helping to improve material flow and reduce maintenance. The timed discharge of a directed air blast can prevent accumulation or blockages that reduce process efficiency and raise maintenance expenses. By facilitating flow and minimizing build-up, air cannons help companies minimize the need for process interruptions and manual labour.

The two basic components of an air cannon are a fast-acting, high-flow valve and a pressure vessel (tank). The device performs work when compressed air (or some other inert gas) in the tank is suddenly released by the valve and directed through a nozzle, which is strategically positioned in the tower, duct, cyclone or other location. Often installed in a series and precisely sequenced for maximum effect, the network can be timed to best suit individual process conditions or material characteristics.

In many applications, an engineered firing sequence will relieve the build-up problems. The air blasts help break down material accumulations and clear blocked pathways, allowing solids and/or gases to resume normal flow. In order to customize the air cannon installation to the service environment, specific air blast characteristics can be achieved by manipulating the operating pressure, tank volume, valve design and nozzle shape.

In the past, when material accumulation problems became an issue, processors would have to either limp along until the next scheduled shutdown or endure expensive downtime to install an air cannon network. That could cost a business hundreds of thousands of dollars per day in lost production. But a new technology has been developed by Martin Engineering for installing air cannons without a processing shutdown, allowing specially-trained technicians to mount the units on furnaces, preheaters, clinker coolers and in other high-temperature locations while production continues uninterrupted.

The patent-pending technology is designed to dramatically reduce expensive downtime associated with traditional installation methods, which require that high-heat processes be halted to allow core drilling and mounting of the cannons. This new approach allows specially-trained technicians to add air cannons and nozzles to an operation while it's in full swing, without disrupting the process. It's been proven in dozens of installations to date, helping high-temperature processes maintain effective material flow and minimize shutdowns, improving efficiency

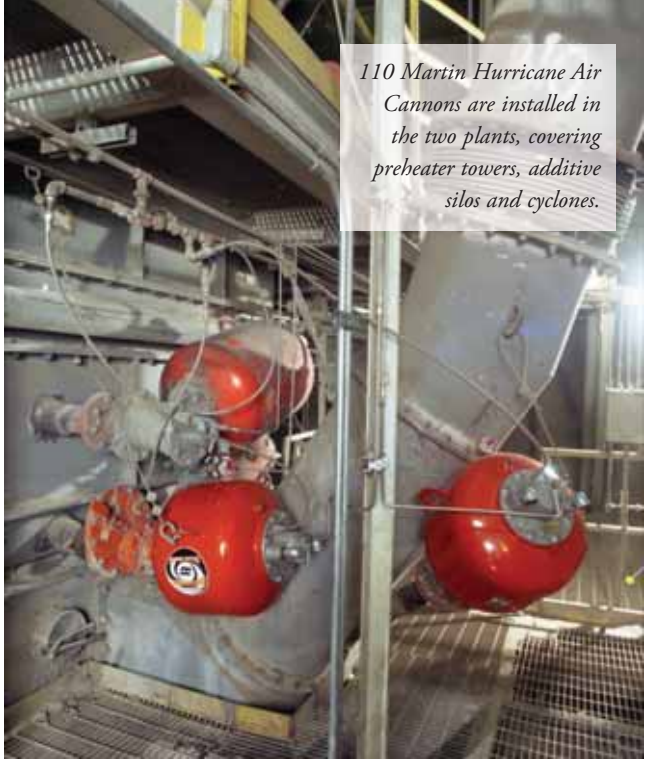


Air cannons can help prevent accumulation, while minimizing the need for downtime and manual labour.

while reducing lost production time.

Case study

One of the world's leading manufacturers of cement, concrete and aggregates has specified a total of 110 air cannons to facilitate material flow in two new plants in Brazil. Starting in the early design stages of the project, Votorantim Cimentos has maintained an intense focus on efficient material flow, with engineers carefully researching the latest technologies to maximize efficiency and reduce maintenance expenses. Company officials anticipated that the cannons and their high-efficiency valves would prevent blockages that could slow production, while minimizing air consumption.



110 Martin Hurricane Air Cannons are installed in the two plants, covering preheater towers, additive silos and cyclones.

The two new plants were part of a massive R$2 billion investment to enhance production throughout Brazil, producing approximately 8,500 tonnes of clinker per day between them. In designing the processes, Votorantim engineers wanted to take all reasonable measures to prevent accumulations in vessels and storage systems. They contacted Martin Engineering to conduct an audit of the two processes, and a joint effort was developed to determine the optimum solution, including air cannon design, nozzle selection and specific locations to maintain high throughput.

One of the primary reasons Votorantim officials selected Martin Engineering for the air cannon work is the low operating cost of the company's equipment. Compared to other sources of energy, compressed air is relatively expensive. As energy costs continue to rise, so does the value of cannon technologies that can reduce compressed air consumption.

The new cannon designs optimize compressed air use by employing advanced valve technology, with more efficient valves mounted on smaller tanks able to deliver higher discharge forces than less efficient valves mounted on larger tanks. The work is performed more effectively by the high-efficiency design, and the compressed air savings is equal to the difference in tank volumes.

Because larger tanks deliver longer blast durations from the greater air volume being discharged, there's a temptation to assume that the larger tanks perform more work. In reality, peak force is generated only during the first few thousandths of a second following the valve opening, so in applications requiring high output force to move material, the duration of useful energy is extremely short. The subsequent discharge of compressed air is actually wasted.

The new family of positive-action valves from Martin Engineering produces about twice the blast force output of the valve generation introduced just a decade ago, while using about half the compressed air volume. If the two designs were set to deliver the same discharge force, the new valve would operate at about half the pressure of the preceding design. Firing only in response to a positive surge of air, the specially-designed valve allows the control solenoid to be positioned as far as 200 feet (60 metres) from the tank, keeping critical components away from harsh service environments.

The units fire a powerful discharge of compressed air in a prescribed pattern to remove material that sticks to vessel walls and ductwork. In the Cuiabá plant, 56 cannons are being installed, with 54 being placed at Rio Branco. The benefits of specifying the new technology for air cannon networks include reduced energy costs, improved system performance and increased uptime, with greater availability of compressed air for other processes within the plant.

New technology allows air cannons to be installed and serviced without a process shutdown.

Conclusion

Material accumulation issues in bins, hoppers and silos are common, and a number of factors can contribute, including a high level of friction between the material and the bin wall and high cohesive strength within the material. Wall friction is dependent upon the wall angle, wall material, smoothness, temperature, moisture, corrosion, abrasive wear and the time the material remains at rest in the cone where the blockage is located.

Material flow problems can exist for many reasons, and eliminating them can be difficult. But silo cleanings using professional equipment and services can resolve blockages, and routine scheduling can help prevent emergency charges. Flow aids such as bin vibrators and air cannons can help maintain adequate flow in between cleanings, and in some applications can be installed to resolve accumulation issues without a system shutdown. DCi

Biomass in focus

equipment suppliers adapt to growing popularity of green solutions with advanced technologies

The boiler is fired with wood chips and waste wood and the biomass has to be processed accordingly.

Louise Dodds-Ely

Vecoplan supplies waste and fresh wood dosing, storage and conveying technology for a biomass cogeneration plant

A HUGE AMOUNT OF WARMTH

Biomass CHP (combined heat and power) plants, also known as biomass cogeneration plants, generate electrical energy from biogenic solids and a great amount of additional heat that can be used efficiently. The biomass must be mechanically processed in advance to obtain a homogeneous unit that is free of impurities, ensuring that the combustion process runs smoothly. The Swiss energy supplier EBL (Elektra Baselland) develops, builds and operates CHP plants. The energy supplier relies on Vecoplan's tailor-made storage, conveying and dosing technology to supply and process waste wood and forest chips for the boiler of the large-scale heat network in Pratteln, a municipality in the Swiss canton of Basel-Landschaft.

Sustainable, renewable and emission-free — today's energy supply is changing. The phase-out of nuclear energy is under way — but what about conventional energy sources such as lignite (brown coal)? The answer is that CO_2 emissions from brown coal are simply too high. Sources such as wind, water, photovoltaics and of course biomass are on the increase. The combustion of untreated wood chips, waste wood, agricultural waste and branch cuttings at over 1,000° Celsius not only makes it possible to generate environmentally-friendly electricity in biomass CHP plants without generating additional greenhouse gases, it also generates huge amounts of heat. EBL is building on this efficient and ecological combination in Liestal in the Swiss canton

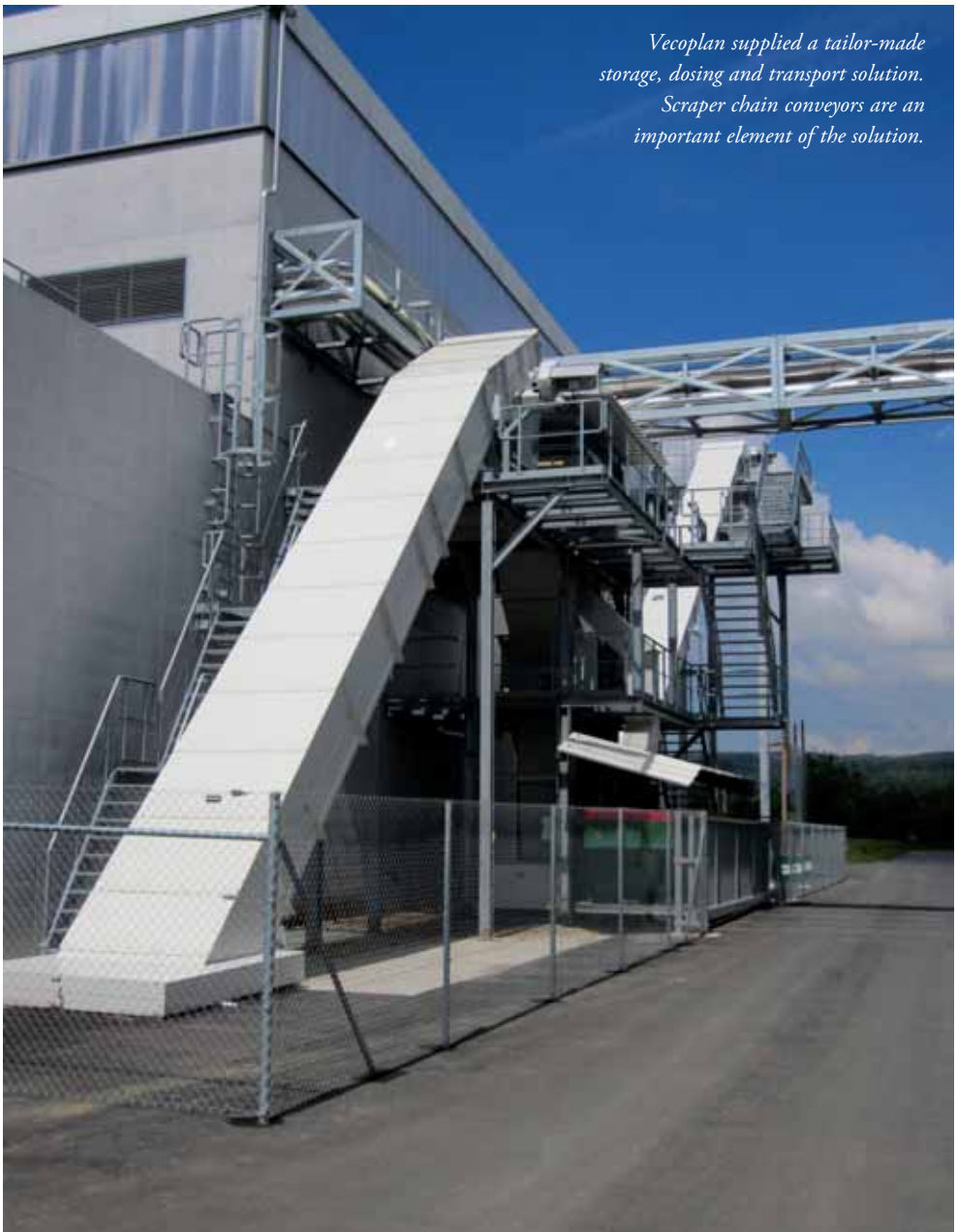
The biomass CHP plant in Pratteln: sustainable, renewable and emission-free.

of Baselland. For decades now, this energy supplier has been specifically promoting the use of renewable energies. EBL's noble vision? To improve our quality of life and enable future generations to enjoy an intact environment that is worth living in. EBL develops, builds and operates several CHP plants at various locations, one of which is Pratteln. The supplier feeds the generated heat into its district heating network and supplies it to several municipalities.

The CHP plant is fired with wood chips from the forest and with quality class A1 and A2 waste wood. The source material is available in size P 100, so the maximum length of the particles is less than 350 millimetres.

Correct storage, conveying and dosing

EBL relies on Vecoplan AG to store, convey and dose the various bulk materials. Vecoplan AG, the German company based in Bad Marienberg in Westerwald, develops and manufactures machines and plants for the resource and recycling industry. "Our tasks encompass services such as



Vecoplan supplied a tailor-made storage, dosing and transport solution. Scraper chain conveyors are an important element of the solution.

A powerful magnet above the conveyor pulls ferrous metals like screws and nails out of the mass.

planning, consulting, integrated project management, comprehensive services and installation, plus commissioning and maintenance," explains Michael Mützel, Area Sales Manager, Wood I Biomass Business Unit, Vecoplan. Several challenges had to be overcome in this project. "With the limited space available, we had to develop a solution that would allow a large storage volume and efficiently convey the material to the boiler."

This meant that off-the-shelf systems were out of the question. To transport the old and fresh wood safely and reliably, the various conveyor components had to be precisely matched. "We changed the original crane concept for the intermediate storage of the delivered material and developed a variant with loading and unloading conveyors," says Michael Mützel. To enable the necessary large-scale implementation, all the documents for the building permit had to be changed. Vecoplan supplied all the machinery, from material intake and storage to the boiler, including the control systems. The company's specialists supervised the engineering, steel construction and assembly operations and subsequently instructed the employees in the plant's operation.

A SAFE AND RELIABLE PROCESS

Trucks with a loading volume of 90m³ deliver the biomass and deposit it on a push rod discharger. This consists of hydraulically-driven push rods which lie next to each other and alternately move forwards and backwards slowly,

transporting the biomass to interim storage in boxes at a volume of 270m³ per hour. On its journey to the boxes, foreign bodies such as metals or excess lengths must be removed from the biomass. To achieve this, a powerful magnet was installed above the moving biomass to pull screws and nails out of the material. A disc screen then removes wood pieces that are too long. The sorted excess lengths go directly to a container.

The processed material is stored in a storage structure with a volume of three times 1,000m³. Dosing screws then feed exact quantities of the material to the conveyor system. A drag chain conveyor transports the material to the boiler house, where another conveyor deposits the bulk material into a feed hopper equipped with a discharge screw at a volume transfer rate of 50m³ per hour. The screw then feeds the boiler with the fuel at a rate of 25m³ per hour. "By individually combining high-quality components, we have ensured that the plant operates efficiently and safely," says Vecoplan project manager Michael Müller. "We dimensioned all the components of the processing line to match material intake cycles and fuel requirements."

Markus Vögele, Project Manager Heat at EBL, is very satisfied with the result. He particularly praised Vecoplan's efficient project management: "In October 2014 we approved the plan, the technicians installed the plants from March to August 2015 and in December we were able to start the controlled boiler operation." EBL now benefits from an efficient conveyor system and from efficient use of space. "For us as operators, it's vital that the plant runs well... and it does," says Vögele.

The disc screen removes wood pieces that are too long. The sorted excess lengths go straight to a container.

The material reaches the storage structure via a chain conveyor.

About Vecoplan

Vecoplan AG is a major manufacturer of machines and systems for the resources and recycling industry for shredding, conveying and reprocessing wood, biomass, plastics, paper and other recyclable materials such as domestic and industrial waste. Vecoplan® develops and manufactures the systems and components, and sells them worldwide in the wood reprocessing and waste processing industries. It currently has around 380 employees at its locations in Germany, the USA, Great Britain, Spain and Poland.

A drag chain conveyor transports the biomass to the boiler.

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Using alternative fuels at cement

The new business segment AFR systems at BEUMER Group makes it possible for cement and lime plants to use alternative fuels.

Reliable energy supplier

Cement manufacturing is particularly energy-intensive. In order to reduce the use of expensive primary fuels like coal and oil, cement plant operators focus increasingly on alternative fuels and raw materials (AFR). The use is generally focused on the fuels. Neither the manufacturing process, the end product, nor the emissions may be affected. Therefore, high-caloric wastes that cannot be further recycled, e.g. from plastic and packaging residues, paper, composite material or textiles, have to be treated beforehand to be ready for incineration.

In order to help customers efficiently convey, store and dose the treated fuels, BEUMER Group has established the new business segment AFR systems.

Germany, October 1973: for political reasons, Arab countries reduced their oil production, which caused oil prices to skyrocket. This was a very precarious situation, because crude oil was an important energy source, also for the cement industry to operate their rotary kilns. With this first oil crisis, plant operators started to shift towards using cost-effective fuels and raw materials.

Besides mineral waste that can be used as alternative raw material, the market primarily employs the use of fuel alternatives, because approximately 30% of production costs are spent on energy. In addition to fluid alternative fuels, such as used oil or solvents, the majority of solid fuels consist of complete or shredded scrap tyres, scrap wood, or mixtures of plastic, paper, composite materials or textiles. After they have been treated and quality-controlled, they show calorific values similar to brown coal. The calorific value of scrap tyres is even comparable to that of stone coal. When producing cement, it is also necessary to ensure that the quality of the ash residues matches the quality of the end product. As all material components are completely incorporated into the clinker and mineralized. Their use makes for an economic production process. In addition, primary raw and fuel supplies are conserved and landfill volume is reduced.

Pre-treated secondary fuels are mostly supplied from external vendors, ready for incineration. BEUMER Group now offers tailor-made AFR systems to lime and cement plants for the safe transport and storage of solid materials.

and lime plants, thanks to technologies from BEUMER Group's AFR systems

The alternative fuels are conveyed from the storage to the main burner, low in noise and dust-proof.

Based on wide-ranging experiences and the customer's requirements, the systems comprise the entire chain, from receiving and unloading the delivery vehicle, up to storing, sampling, conveying and dosing solid alternative fuels. BEUMER Group, provider of intralogistics, supplies its customers worldwide now with three systems, from one single source.

Tailored to every application

BEUMER Group's program includes the starter system that is used at the main burner. In the cement and limestone industry, primary fuels are usually ground to grain sizes of less than 100 micrometres and fed via the burner. At the end of the rotary kiln, the burner heats up to 2,000°C, the temperature that is needed for limestone, sand, clay and ore to react and become clinker as an intermediate product. In order to use solid secondary fuels in the clinkering zone burner, they should deliver a calorific value that is at least similar to brown coal (ca. 22 ± 2 MJ/kg), have grain sizes of less than 30 millimetres and burn out while being fed.

The oven-ready material is usually delivered in moving-floor trailers. BEUMER Group provides a docking station that also serves as storage on site. Once the trailer is emptied, it is completely replaced or refilled in the large tent using a wheel loader. The material is metered volumetrically and conveyed to the clinkering zone burner. This solution is deliberately designed as a test system. This way, the operator can test their suppliers, the quality of the fuels and their furnace behaviour.

Solution for the calciner

With the second system, the calciner can be fed with more coarse alternative fuels, such as tyre derived fuel or the fuels described above, but in a more coarse state. They are generally less processed, contain three-dimensional particles and therefore require more time to burn out than for example the more intensively processed, exclusively two-dimensional secondary fuels for the main burner.

The coarse calciner fuel is delivered in moving-floor trailers or tippers. The secondary fuels are quickly unloaded and stored temporarily in a dust-proof way. Another storage serves as a flow buffer, which can hold the overall capacity of 900m³ of the preceding bunker. From here, the pipe conveyor transports the material to the calciner in the preheater tower. Here, the secondary fuel is weighed and dosed. During the feed towards the hearth in the calciner, there is often the risk that the material or the conveying system can catch fire due to thermal radiation or pulsations. For this reason, the valveless special feed was developed, so the material can be safely fed to the calciner.

In order to ensure safe and automatic fuel supply after successful testing, BEUMER Group provides systems for permanent operation with high thermal substitution rates. The systems consist of the receiving area and a storage system, where the crane system can store material of different quality into different storage zones and boxes. Experiences so far have shown that you always have to calculate with disruptives or quality deficits in the fuel. This is why the entire storage and conveying technology in the hall can be provided with equipment that is able to separate metal, wet and three-dimensional disruptives from the fuel for the main burner and keep disrupting oversized grains from the calciner fuel.

Equipped with the necessary sensor technology, the operation runs automatically. The crane can be used independently for homogenization, in order to minimize quality variations or feed the lines towards the main burner and the calciner.

Pipe conveyor stands the test

Schwenk Zement AG's product diversity and production capacity make their plant in Bernburg one of the largest and most

efficient cement plants in Germany.

In order to reduce energy costs, the cement plant is increasingly using secondary fuels that are engineered in external processing plants into high-quality fuels with defined product parameters.

Until now, the manufacturer had been using drag chain conveyors. After almost a decade of use and numerous modifications however, more and more maintenance was required. The fuel quality also improved over time, so that, due to its density of 0.2t/m³, the existing technology was no longer sufficient to convey the required quantities towards the main burner. This created the need for a reliable, eco-friendly and low-maintenance solution. In addition, the new conveyor needed to be optimally adapted to the curved routing in the plant.

Schwenk Zement KG opted for the BEUMER AFR system with its pipe conveyor to feed the main burner with alternative fuels. The system works almost completely automatically, from receiving to the feeding system of the rotary kiln. Cranes pick up the engineered secondary fuels in the storehouse and fill them into the discharge bunkers with their discharge equipment. From there, a chain belt conveyor transports the fuel continuously towards the pipe conveyor, which conveys it to the weigh feeders before the main burner.

Fill level measuring probes and other measuring technology monitor the automated processes.

The curved pipe conveyor at the core of the system requires little maintenance and its enclosed design and quiet operation protect against emissions and the wind-blown dispersal of the fuel. It is able to connect long distances without interruption and navigate tight curve radii that adapt to the individual conditions of the plant.

About BEUMER

The BEUMER Group is an international leader in the manufacture of intralogistics systems for conveying, loading, palletizing, packaging, sortation and distribution. Together with Crisplant a/s and Enexco Teknologies India Limited, the BEUMER Group employs 4,500 people worldwide, and achieves an annual turnover of about €900 million. With its subsidiaries and sales agencies, the BEUMER Group serves customers around the globe, across a wide range of industries.

If suppliers encounter problems in regards to the quality of their processing, BEUMER AFR systems can be upgraded and are suitable for high substitution rates.

Rulmeca helps Copenhagen fulfil its aim of becoming carbon neutral by 2025

STATISTICS

Efficiency	Replaced drive	Motorized pulley
Rated power	200kW	132kW
Noise emission	91.5dBA	88dBA

In 2017, after many years of co-operation with HOFOR (Capital Power Supply) Rulmeca won a very large order for a total of 32 high-performance motorized pulleys with a power of up to 132kW as well as 8,000 low noise transport rollers.

The transport components produced by Rulmeca are helping HOFOR to reduce its carbon emissions to a minimum in HOFOR's new biomass conveyor facility, which began transporting biomass in the power plant in 2018. At the same time, the specially designed conveyor rollers are helping to reduce the noise pollution from the conveyors to its nearest neighbours.

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Rulmeca's technical consultant Ole Bentsen has spoken about the project work with HOFOR, which lasted for two years.

"It has been an exciting and very challenging project for me," he says. He explained that, from the outset, HOFOR set out the requirements that had to be met in the design of the biomass transport facilities. These stated that it was vital to reduce carbon consumption, noise pollution and maintenance costs, as well as ensure that all components were ATEX-approved.

"By using Rulmeca high-performance motorized pulleys and noise-reducing transport rollers, we achieved high energy and carbon savings. We reduced the noise level significantly, so its centrally located neighbours closest to the power plant in Copenhagen, not will be affected. We made it possible to remove all dust from the conveyors and we reduced dramatically the maintenance costs, as Rulmeca's motorized pulleys only require an oil change for every 30,000 operating hours. At the same time, all drum motors and rollers are ATEX approved," Bentsen said.

Rulmeca's portfolio of noise reducing and ATEX-approved Zone 22 transport rollers delivered to HOFOR offer the following characteristics:

- pressed in damping ring in the roller bearing housing;
- the roller tube is turned;
- the roller is dynamically balanced;
- noise measurement of the rollers is documented in a noise test lab developed by Rulmeca Germany.

Servicing by Rulmeca

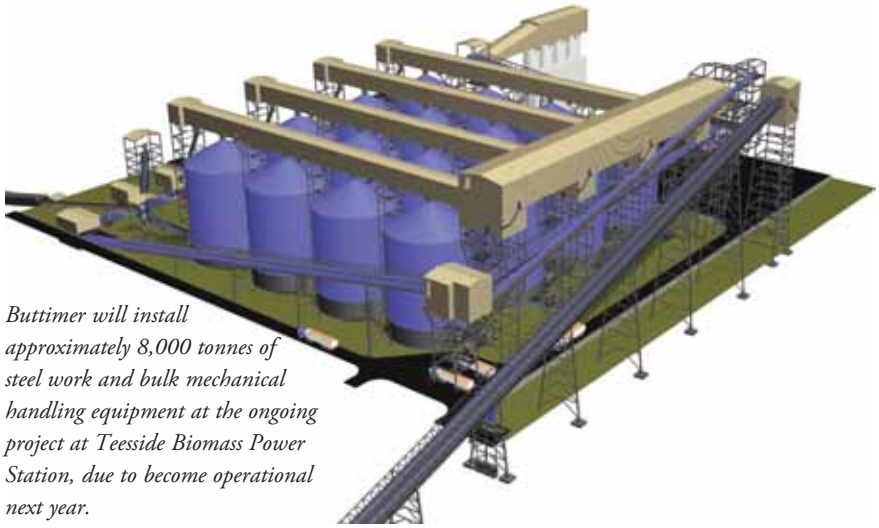
For the past five years, Rulmeca has offered full service and repair of all types of motorized pulleys, ranging from Ø80 to Ø800. Its team has more than 25 years of experience in maintaining and servicing motorized pulleys which are used in conveyors every day. Rulmeca supplies motorized pulleys to all industries.

Buttimer Engineering expands its involvement in biomass handling

Company background

Since the inception of Buttimer Engineering in 1978, at which time it exclusively served the Irish dairy industry, the company has substantially broadened its capabilities and now provides a high level services to many varied industries. Nowadays, Buttimer is a specialist in bulk material handling systems and high-quality steel fabrication, but its overall scope of capabilities reaches far beyond this narrow definition, operating in many sectors.

With this continued expansion, the list of industries that Buttimer has been directly involved with becomes more and more extensive, covering everything from Food & Beverage, to Pharmaceuticals. However, the latest trend that has emerged in recent years is an emphasis on renewable energy and sustainable fuel resources. It is for that reason that biomass has come to the fore, providing Buttimer with an opportunity to continue its recent growth in the renewable energy sector. In order to maintain this growth, Buttimer has had to develop its products and services considerably, and it has done this through patented safety features and systems.



Buttimer will install approximately 8,000 tonnes of steel work and bulk mechanical handling equipment at the ongoing project at Teesside Biomass Power Station, due to become operational next year.

DOCKSOLID hoppers key to safe biomass handling

Buttimer's DOCKSOLID hoppers have a wide range of anti-explosion, fire prevention and general safety features which help to alleviate some of the risks surrounding the handling of biomass. In terms of biomass handling, dust can be one of the greatest causes for concern and so it is something that Buttimer Engineering has always been eager to tackle. The hoppers incorporate a number of advanced dust-prevention and -suppression techniques, which help minimize some of the main health hazards and explosion risks as a result of the dust emitted during the loading process. These range from the relatively simple, such as a steel wind-block thimble around the grab opening, to the more complex, such as the reverse-jet dust extraction filter fan system. The air extraction and filtering system works by creating a negative pressure inside the hopper, subduing rising product dust, as well as utilizing the rubber non-return-valve ('flex-flap') system to contain all product within the hopper as the grab is opened. In contrast, a positive air pressure is maintained in the hopper's plant room to prevent the intrusion of dust or dirt into the hopper's motor, hydraulic or mechanical equipment, which in turn significantly reduces wear and tear. This is, naturally, especially useful as it negates the need for excessive maintenance and overall extends the longevity of the equipment. Of course, one of the final stages of the handling process is the discharge of the product, and it is here when a substantial amount of product can be lost. To combat this, the hoppers discharge the product — through pneumatic slide doors — via aspirated chutes which are retractable or operated and ensure that the product is not exposed to through-winds or falling from a height as it is loaded into the awaiting truck beneath the hopper. Although the features mentioned here do not incorporate all of Buttimer's highly advanced features, it gives an insight into how much emphasis is placed on safety and environmental awareness, especially when it comes to dealing with a product as volatile as biomass.

Sample projects

Given the fact that biomass handling has becoming an increasingly significant facet of Buttimer's business, the company has played key roles in many large-scale Biomass related projects, such as;

MGT Teesside

This ongoing project is based at the Teesside Biomass Power Station in Teesside Port, UK. It is due to become operational in 2020 and, when completed, will become the largest wood pellet-powered plant in the UK and one of the largest in the world. This will prove to be one of its most extensive projects to date, with Buttimer trusted to install approximately 8,000 tonnes of steel work and bulk mechanical handling equipment to support the bulk handling system in place. As part of this the company has been trusted with the installation of 20 conveyors with total length of over 2km for loading and unloading 16 bulk handling silos, installation of preassembled gallery sections at height 50m via tandem lifts.

Peel Ports, Liverpool

Buttimer Engineering was employed to carry out mechanical and structural engineering installation packages involving the fuel handling systems on the new biomass import facility at Gladstone Quay in Liverpool, UK. This is one of the largest biomass handling facilities in Europe with the capability to handle over three million tonnes annually, as well as being one of the key port locations in the UK to supply wood pellets to Drax Power Station, which provides roughly 6% of the UK's electricity supply. As part of this considerable project, Buttimer was entrusted with the installation of conveying system to ship-unloaders and silos, conveyor gantries, train loading and out-loading systems, erection of seven large transfer towers and much more.

Two ways dome storage provides ideal biomass storage

After 40 years of building bulk storage, Dome Technology has taken its ideal model for biomass and improved on it, *writes Rebecca Long Pyper for Dome Technology*. The DomeSilo™ still provides product protection and resists deflagration and now comes equipped with innovative explosion panels that prevent major structural damage should an emergency happen.

The DomeSilo

A DomeSilo is proven to be an economical and reliable solution for long-term biomass storage. Just like it sounds, a DomeSilo is tall and narrow with a domed top. That dome is important; its geometry allows for significantly greater storage capacity than available with silos of similar dimensions because it can support product stacked right up to the apex. The DomeSilo also rivals silos in cost efficiency.

A DomeSilo differs from steel tanks and silos in key ways, including upfront and long-term cost savings. A dome has a longer life cycle than a steel tank and requires little maintenance. Traditional bulk storage sometimes requires costly deep-foundation systems, but Dome Technology engineers utilize a variety of foundation systems that can reduce costs.

A dome can be built quickly — once the outer weatherproofing membrane is in place, the construction work is completed from the inside, so the project can proceed regardless of the weather. This allows for building to take place year-round. And integrating a variety of reclaim systems is always an option with a dome.

Insulative nature of the dome

One way to prevent fire is to select storage that inherently resists conflagration, and certain dome characteristics make fire less likely than in other facilities. A dome's concrete shell is non-combustible and has low thermal conductivity, performing better in large fires than wood or even steel counterparts.

The insulated nature of the shell — comprised of layers of polyurethane foam insulation and concrete — moderates externally generated temperature fluctuations, and the more constant the internal environment, the more stable pellets will be.

Each dome is covered in a waterproof PVC airform, an important feature since the process of moisture-content changes in pellets will produce heat, with either the drying effect or the hydrating effect causing self-heating. The dome's insulated nature also reduces heating and cooling of the walls and air inside, thus preventing condensation from forming and introducing moisture to the pile.

The dome is airtight, aiding in the containment of inert gases pumped inside to deter fires and to minimize available oxygen for supporting fires. The truss-free structure discourages dust build-up, and the double curvature has proven in real-world examples that a dome is structurally stable under extreme fire and heat conditions; with a two-hour or more fire rating, the structure itself can survive a disaster that other types of storage might not and will likely reward customers with insurance-premium savings.

Domes are engineered with systems to monitor temperature, humidity and off gasses. Spark detection recognizes sparks when product is loaded into the dome to anticipate and prevent fires. Dust collection also comes standard with a dome.

Recent innovation: round explosion panels

One recent dome innovation is round relief panels that channel pressure out of the structure in such a way that structural damage is prevented.

Square and rectangular explosion venting has long been the norm in storing product prone to deflagration, but Dome Technology's team has pioneered a round hybrid model that is being installed on biomass projects now. When an explosion occurs, the vent accepts the load and transfers it uniformly around the perimeter.

Case study: Albioma in Fort-de-France, Martinique

Though flat storage was an option for Albioma in Martinique, where the company built the island's first 100% biomass power plant, the large size as well as local conditions like cyclonic and seismic activity and poor soil would have required a very high investment cost.

A DomeSilo was selected for its smaller footprint, less-expensive foundation, lower overall cost and higher storage capacity, Albioma project director Claude Décamp said. But the fact that a DomeSilo could withstand natural disasters was of special importance.

Domes are especially suited for weather resistance. Their robust nature comes from monolithic construction and the shape of the dome, which distributes applied forces across the entire surface of the structure. In fact, domes are frequently built as safe shelters based on their tolerance for natural disaster.

A dome can be engineered to withstand winds exceeding 250mph (which includes EF5 tornadoes) and can be built to meet ICC-500 specifications. Domes are a choice option in areas prone to seismic activity because a seamless concrete shell can resist seismic loads.

"We built the first wood-pellet dome and have since built all of the wood-pellet domes around the world," said Dome Technology CEO Bradley Bateman. "As a pioneer in the dome-construction process, we innovate and provide optimal systems for our customers, proving to be the trusted experts for bulk storage."

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Handling of solid biomass from the perspective of dry bulk terminals

Many dry bulk terminals have experienced an increase in biomass handling because of the use in feed and food sector, the recent technical development in bioenergy, and several governmental energy policies (e.g. EU directives)[1], *writes Dr. Mi-Rong (Kimberly) Wu*. Normally the biomass for the application in the feed and food sector (e.g. corn, oats, soy meals, barley) is handled by grain terminals. However, because of the wide range of applications in the energy sector, the handling of solid biomass materials has been seen also in other dry bulk terminals. Camia *et al.* estimated that more than one billion tonnes per year of solid biomass has been used in the EU; primarily in the feed and food sector, followed by bioenergy sector and biomaterial (see Figure 1)[1]. The International Energy Agency (IEA) has also estimated that by 2040 the demand for bioenergy will exceed 1,850 Mtoe (million tonnes of oil equivalent) [2].

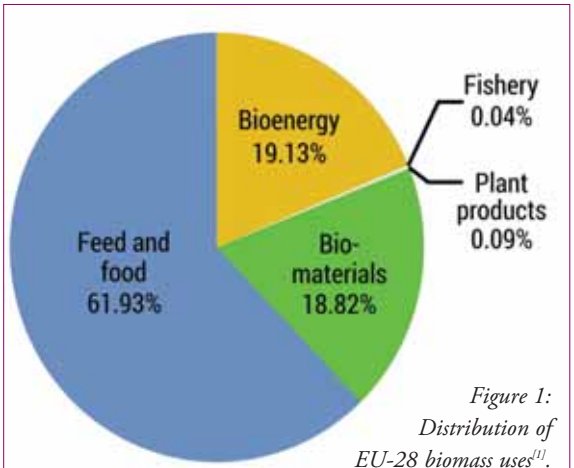


Figure 1: Distribution of EU-28 biomass uses[1].

Solid biomass comes in various forms (e.g. pellets, chips) and from various sectors (e.g. agriculture, forestry) and increasingly it is being traded in international markets. Bradley *et al.* [3] have indicated that shipping is the main method to transport solid biomass. In addition, other studies ([4] [5]) have concluded that the most preferable biomass supply chain is long distance transport via shipping. This implies that marine terminals in ports will be the important hubs within the logistics chain.

Various aspects should be taken into account to have a thorough picture of solid biomass operations: the significant material types for large-scale handling, the implication from the physical/flow properties for cargo handling at the terminal, and the effects caused by the stochastic parameters (e.g. vessel arrival patterns) to the storage capacity and storage time of solid biomass operations. These aspects are further discussed in the following sections.

Material type and physical properties of solid biomass

There are various kinds of solid biomass, but not every type is suitable for being transported over long distances and handled in dry bulk terminals. Important criteria such as potential availability, the application preference/possibility by major users (e.g. power plants) and logistical concerns are the reasons that wood pellets and wood chips are the main feedstocks for bioenergy application. Another solid biomass with good potential is torrefied pellets because its material properties (e.g. higher energy content, hydrophobic), provided that the market implementation in the future will be successful.

It is essential to understand the material properties of these selected solid biomass types, in order to know how to handle and store them properly. Selection and design of handling and storage equipment for solid biomass types strongly depends on their physical material properties/flow properties. Furthermore, the flow properties may also affect the operational process. For a better understanding regarding equipment it is important to look deeper to compare these solid biomass properties with other bulk materials that have been handled and studied frequently, such as coal and grain.

Table 1 shows that there is four times more volume of solid biomass required for the same energy output compared with coal. Solid biomass properties show a much wider range per characteristic, in comparison with soybean and coal. Furthermore, the following aspects are important when it comes to solid biomass fuels from the perspective of a dry terminal:

- Because of the hydrophilic nature of solid biomass fuels, they are sensitive to material degradation. It is recommended to handle and store solid biomass fuels with enclosed or covered equipment/option (e.g. warehouses, covered trough belt conveyors).
- Solid biomass has a strong tendency for self-heating because of bio-activities and potential high moisture content. Thus, certain common prevention measures performed for coal handling (e.g. compaction) increase the risk of self-heating.
- Equipment designed for coal handling is suitable for the operation of solid biomass fuels. However, the handling processes/methods need to be adjusted according to the material properties.
- Because of the low bulk density, more equipment (capacity) is required for the same tonnage handling performance. For solid biomass handling, the volumetric performance should be the main benchmark rather than tonnage performance.

TABLE 1: COMPARISON OF PHYSICAL PROPERTIES RELEVANT FOR EQUIPMENT DESIGN AND HANDLING SYSTEM SELECTION [6]

Material property	Solid biomass fuels	Coal	Grain
Bulk density (kg/m³)	220 – 650	640 – 920	700 – 870
Moisture content (%)	4 – 49*	15 – 65	5 – 20
Lower heating value (GJ/tonne)	8 – 21	30	N/A
Angle of repose (°)	34 – 47	27 – 38	25 – 27
Wall friction angle (°)	17 – 30	25 – 35	12 – 14
(Stainless steel)	40 – 53	55	29 – 31

** Fresh wood chips*

[1] A. Camia, N. Robert , R. Jonsson , R. Pilli , S. García-Condado, R. López-Lozano, M. van der Velde, T. Ronzon, P. Gurría , R. M'Barek, S. Tamosiunas, G. Fiore, R. Araujo, N. Hoepffner, L. Marelli and J. Giuntoli, "Biomass production, supply, uses and flows in the European Union: First results from an integrated assessment," Publications Office of the European Union, Luxembourg, 2018.

[2] International Energy Agency (IEA), "The World Energy Outlook 2018," OECD/IEA, 2018.

[3] D. Bradley, F. Diesenreiter, M. Wild and E. Tromborg, "World Biofuel Maritime Shipping Study for IEA Task 40," 2009.

[4] R. Suurs, Long distance bioenergy logistics An assessment of costs and energy consumption for various biomass energy transport chains, Copernicus Institute, Utrecht University. ISBN 90-73958-83-0, January 2002.

[5] C. N. Hamelinck, Outlook for advanced biofuels – International bioenergy transport costs and energy balance, Department of Science, Technology and Society, Utrecht University. ISBN 90-393-3691-1, 2004.

Impact from stochastic elements to storage capacity and storage time

It is challenging to simply calculate the storage capacity as a result from the following factors:

- the supply seasonality;
- the arrival patterns of the incoming and outgoing flows;
- the size composition of the vessels/inland transportation);
- the operational strategies and process at the dry bulk terminal; and
- the operational stoppages (e.g. rain, equipment breakdowns).

Dynamic simulation tools are increasing used to make such an estimation for:

- the ability to cope with the above-mentioned stochastic elements;
- the capability for quantifying the measurable KPIs (see Figure 2 and Figure 3 for examples); and
- and the strength to systematically compare various strategies/options.

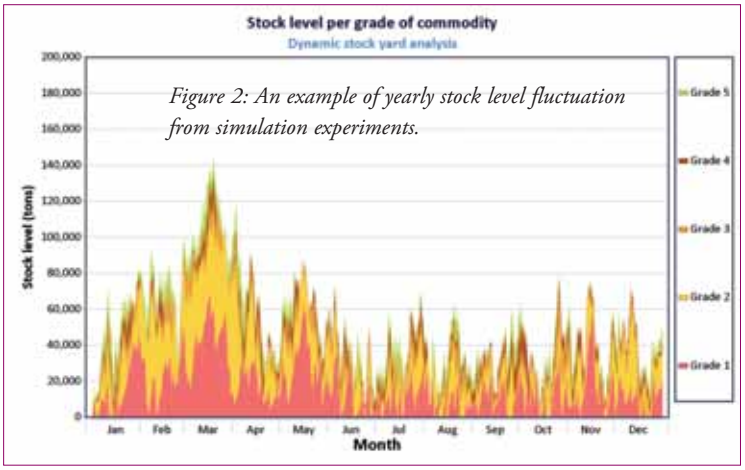


Figure 2: An example of yearly stock level fluctuation from simulation experiments.

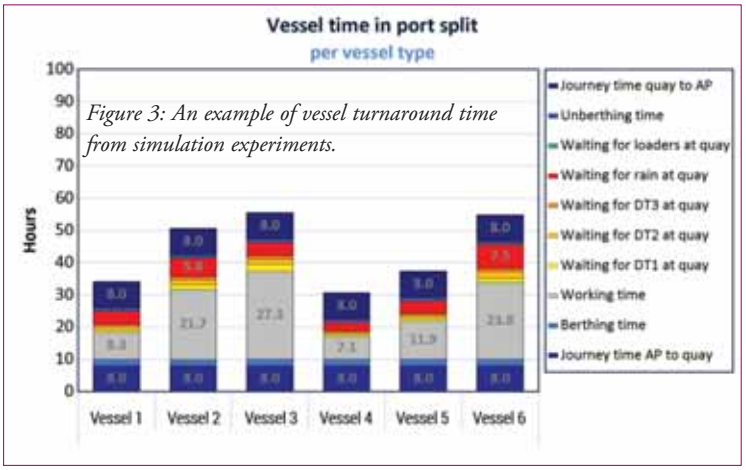


Figure 3: An example of vessel turnaround time from simulation experiments.

It is recommended to use such a simulation approach to design and assess the storage arrangement for the solid biomass handling.

Storage facilities for solid biomass require large areas as a result of their low bulk density and energy content (Table 1), to have the same energy output as coal, up to eight times more volume of solid biomass is required [7]. Furthermore, the need for an uninterrupted supply, power stations typically ask for storage capacities of about 100,000 tonnes which requires a covered storage around 200,000m³ (wood pellets). With the same stacking method, 1.3 times more land is needed (lower volumetric performances for biomass)[8].

Several enclosed/covered storage options can be used to store solid biomass, such as silos (assuring a first-in/first-out material flow); flat storage (wide sheds) or domes. The following recommendations apply to all storage options[8]:

- Measures against dry matter loss and material degradation, such as a good ventilation system and pre-drying before storage, should be applied.
- Measures against self-heating should be applied. Such measures can be having homogeneous storage piles (in terms of material particle size distribution), taking the geometry of storage piles into account, avoiding compacted storage piles, etc.
- The storage time of solid biomass should be controlled. Depending on the moisture content of the material, the recommended maximum storage time varies from three weeks (for fresh wood chips) to three months (wood pellets).
- Both storage capacity and storage time are sensitive to arrival and departure patterns. Good logistic control is required.

Conclusions and recommendations

Currently more and more dry bulk terminals are adding solid biomass into their cargo portfolio. It is expected that significant amount of wood pellets and wood chips will be handled by dry bulk terminals in the future, as well as "new type" of bioenergy feedstocks, such as torrefied pellets.

The material characteristics of solid biomass come with a wide variation range compared to commonly handled bulk materials such as coal or grain; it is necessary to have adjustments in terms of handling process and storage requirement. The low bulk density makes the volumetric requirement more influential than the tonnage demand mostly seen from other commonly handled bulk commodities. Several handling processes need to be adjusted (e.g. enclosed storage, self-heating prevention method) to cope with solid biomass material properties.

An analysis supported with simulation tools is recommended as this allows investigating the combined impact of stochastic events (e.g. material arrival and departure patterns, operational disruptions) and the material characteristics. This approach will result in a better terminal design in terms of berth capacity, equipment utilization, storage capacity and storage time.

About the author

Dr. Mi-Rong (Kimberly) Wu is the principal bulk specialist at TBA Group, a leading international provider of software and services for ports, terminals and warehouses with over 150 live installations worldwide. She has been involved with logistics, ports and terminals throughout her professional career since 2005. She has over 12 years' experience in the bulk sector focusing on subjects such as: bulk terminal design, bulk material handling and simulation modelling for bulk terminal design.

TBA's services have been proven to add value to existing terminals by increasing operational efficiency, supporting existing terminals to plan for future expansion and validating design for terminals. TBA's project portfolio covers terminals handling biomass, agri-bulk, coal, iron ore, sulphur, sugar and more.

[6] M. Wu, "Transitions to biomass handling - A simulation approach," in BULK TERMINALS 2017: ACHIEVING EFFICIENCY AND COMPLIANCE, London, 2017.

[7] M. R. Wu, A large-scale biomass bulk terminal, Delft: Delft University of Technology, 2012. ISBN 978-94-6186-076-7.

[8] M.-R. Wu, "Analysing terminal facilities for biomass operations," Port Technology International, pp. 51-54, Edition 60 November 2014.

2004.

‘multibulker® 2900’ from CRS ideal for handling biomass cargoes

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.

The company has now developed its 40ft high cube 2,900mm container (pictured). This will be 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.

Fairport conditions biomass ash

Fairport Engineering Ltd of Adlington, Lancashire, UK has been working on the Lynemouth power station conversion project since 2016. Fairport has been acting as the main contractor's SRM (storage resource manager), specialist materials handling engineer and designer, thus allowing this landmark project to benefit from the combined strengths of both organizations. This major multi-million pound project is totally focused on replacing the previous fuel (coal) handling and storage systems with a new regime that will be suitable for biomass (wood pellets). Whilst this conversion from one form of solid fuel to another requires major investment in the fuel handling systems, it also needed new ash handling facilities. Two types of ash will be produced once in operation: bottom ash direct from the boilers and fly ash from the filtration systems.

Fairport was commissioned directly by Lynemouth Power to provide a conditioning system for the finer fly ash. This consisted of drag link conveyors, silos, duplex discharge screw conditioners and screw conveyors to transport, store, condition and deliver the ash into skips for onward disposal. The new system is located in the same position as the existing facilities and utilizes the existing structure, suitably adapted and refurbished, but with only two new holding silos.

The drag link conveyors and screw conditioners and screw conveyors have been provided by Fairport Engineering's sister company Fairport Process Equipment Ltd. Recently completed after a six month construction period the conditioning facility is currently being commissioned.

Handling biomass safely with Liebherr-XPower wheel loaders and new assistance systems

For handling wood chips efficiently and safely, this Liebherr wheel loader L 580 XPower® is equipped with industrial lift arm and several new assistance systems.

Recently at the bauma 2019 exhibition, Liebherr presented a comprehensive range of intelligent assistance systems for selected wheel loaders from the corporate group. These include, for example, active rear person recognition, front area monitoring and the Skyview 360° camera system. These solutions increase safety, also in handling biomass, and reduce the burden on the machine operator, whose everyday work with the wheel loader brings with it a significant weight of responsibility.

For handling biomass such as wood chips Liebherr offers several useful solutions for its wheel loaders. For example Liebherr customers can choose between Z-bar linkage and industrial linkage for the XPower® L 550, L 556, L 566 and L 580 wheel loaders at no extra cost. Z-bar linkage is ideally suited to conventional wheel loader applications such as extraction. The optional industrial lift arm is best suited to uses with large attachments, for example high-dump buckets or large light material buckets for handling various types of biomass.

Active rear person recognition helps prevent accidents that result in personal injury

Liebherr's new assistance systems increase comfort and safety in daily operation in a range of ways. One of their advantages is that they enable machine operators to concentrate more on operating their Liebherr wheel loader by removing additional distractions. For example, the active rear person recognition automatically provides a warning on the machine display and sounds acoustic signals if there is danger in the wheel loader's rear area. A special feature of this system is that it uses sensors to automatically differentiate between people and objects with the aid of sensors.

If a person moves in the area behind the machine, the system alerts the machine operator. The active rear person recognition is activated at a greater distance than warning systems for inanimate objects such as walls or columns. The operator therefore receives a more precise warning if there is a risk of personal injury. The active rear person recognition thereby avoids an overload of warning signals, which in turn reduces the burden on the machine operator. The risk of serious accidents is reduced.

Enhanced safety with front area monitoring and Skyview 360°

When handling lighter goods such as wood chips or other biomass, Liebherr wheel loaders often work with large attachments, high-dump buckets for example. Because large buckets inevitably obstruct the driver's field of vision, Liebherr offers L 526 to L 586 XPower® wheel loaders with a roof camera for front area monitoring. The roof camera provides a view of the bucket in front of the machine from a significantly elevated perspective and transmits the image on a separate display in the operator's cab. Front area monitoring is therefore used for seeing people or objects hidden by the attachment, which increases safety when accelerating, driving forward and loading with large buckets.

The Skyview 360° camera system is another intelligent assistance system that enables the machine operator to recognize

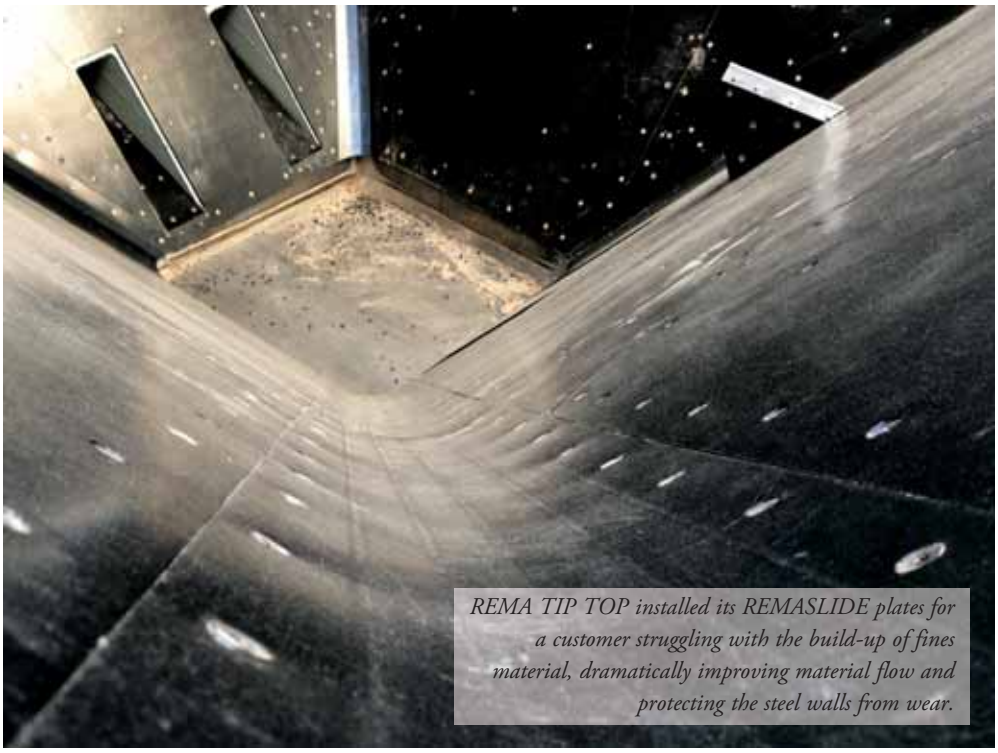
The roof camera for front area monitoring helps the machine operator to see people or objects that are hidden by large attachments such as buckets for handling wood chips.

potential hazards. As four additional cameras capture the machine's entire surroundings, it provides a 360° view of the wheel loader's immediate vicinity at all times. The system merges the individual images into a virtual bird's-eye view and shows this image on a separate display in the operator's cab. With this perspective, the operator can effortlessly see blind spots and danger zones, such as the wheel loader's articulation area, and avoid possible collisions.

The active rear person recognition helps prevent accidents that result in personal injury.

REMA TIP TOP INDUSTRY UK explains how it is meeting the particular challenges posed by biomass cargoes

Interview with Andrew West, Managing Director of REMA TIP TOP INDUSTRY UK Limited, on Biomass Handling and Storage



REMA TIP TOP installed its REMASLIDE plates for a customer struggling with the build-up of fines material, dramatically improving material flow and protecting the steel walls from wear.

Q: Mr. West, what can you tell us about REMA TIP TOP's involvement in the market for biomass handling and storage, especially in the UK?

A: *There are several projects we just finished or are currently working on, as biomass handling and storage is an important business field for us. To illustrate our field of work, I would like to give a recent example: the client was struggling with fines material building up inside the hopper on the walls and corners restricting the material flow and causing inaccurate load cell readings. As the walls were unlined steel walls, we installed 12mm-thick REMASLIDE-plates (UHMW-polyethylene) lining to improve the material flow and protect the steel walls from wear. Our solution also included radius gulley corners and a stainless steel top capping strip to avoid fines material ingress. As downtime is very expensive, we had a very limited timescale and realized the project in four installation days.*

Q: What are the specific challenges, that REMA TIP TOP is facing in this market?

A: *There are two main challenges for biomass lining materials: the ATEX-standard and anti-baking. The ATEX-standard is regulating the characteristics of the lining regarding the risk of sparks and explosives. Thus, all the products we supply must be ATEX-rated and proved. That is one of the challenges that we face. Furthermore, with biomass we often have to deal with moist material, which tends to stick to the lining and thus interrupt the material flow. This demands anti-baking protection to guarantee a steady flow and to prevent blockages in the production processes.*

Q: How did the demand for biomass handling and storage systems develop over the last few years and how will it continue?

A: *In the UK there has certainly been an increase in the demand for biomass handling systems in the last three to four years, as the use of coal and other conventional energy sources decreased. Right now, we see a shift towards new methods for renewable energy, such as gaining energy from waste, which also increases the demand for biomass handling.*

About REMA TIP TOP

REMA TIP TOP is a globally operating system provider of services and products in the field of conveying and treatment technology as well as tyre repair. The company has a global service network and offers a wide range of rubber products, linings and coatings for both the industrial and automotive sectors. Over almost a hundred years, the company has built up unique expertise in materials development and industrial services and is active in the belting, material processing, surface protection and automotive sectors. At the end of the 2017 financial year, REMA TIP TOP generated sales of over €1 billion. Worldwide, the company employs more than 6,900 employees and has more than 150 subsidiaries and associated companies — including well-known brands such as Dunlop Belting Products South Africa, Cobra/Depreux, and Asplit.

Prado Silos completes two biomass storage plants in Huelva (Spain)

Prado Silos has sold two twin plants to Ence Group in Spain. One of the plants is in Huelva, and the other is in Puertollano. Each plant has two silos of 8,700m³ each, for biomass storage. The Huelva plant is to supply a 40Mwe biomass power plant owned by Grupo Ence in Huelva. Prado Silos has developed these projects through Sener engineering company.

The roofs of these silos have been designed with a special angle of 40° in order to get optimum storage of the biomass. The silos also have a vehicle access door with dimensions of 3.5 x 3.5m. The discharge of the silos is carried out by a vibrating floor mounted in a hopper at 25° of inclination.

In terms of regulations and safety, each silo has been designed in compliance with the European Regulation 2014/34/EU "regarding equipment and protection systems for use in potentially explosive atmospheres". Each silo has a total venting area of 80m² formed by explosion relief panels, according to European Standard EN 14491.

"We are very pleased to achieve this important milestone, which contributes to settle Prado Silos as a leading supplier for high demanding storage facilities," says Javier Resano, commercial director at Prado Silos.

About Prado Silos

With more than 60 years of expertise Prado Silos is a grain and biomass storage company providing the design, supply and delivery of galvanized steel grain silos. Its portfolio includes flat bottom silos, hopper bottom silos and all required accessories in order to provide worldwide customized silos for the agricultural and biomass industry.

Prado Silos offers the latest technology within the storage industry. Its engineering and technical expertise, combined with its commitment to customer satisfaction, places it at the forefront of this growing market.

Flat bottom silos

These silos are erected on flat or conical concrete foundations. The volume of this type of silo ranges from 39m³ to 25,232m³.

This type of silo is used for both short-term and long-term storage of grain, oil seeds and other granulated free flowing materials including biomass.

Hopper bottom silos

These silos are designed for unloading processes through the action of gravity and they are erected on a supporting structure. The volume of this type of silo ranges from 80m³ to 2,200m³.

Hopper silos are used for seed storage (sunflower seeds, soya, maize, sorghum, rice, etc.). They can also provide temporary storage of wet grain as part of a grain drying plant and other buffer bin applications in silo plants.

The storage of other free flowing products like pellets for other industrial plants is also possible.

Hopper silos

All hoppers are designed for highly cyclical loading and unloading processes.

Standard hopper angles are supplied at 47° and 60°. Hopper silos have a smooth wall hopper transition with no steps or flanges to offer the cleanest product discharge from the silo.

Structure silos

Silos are supported on a rolled ring beam with welding. The entire support structure and the ring beam are hot-dip galvanized.

The supporting structure is made of hot rolled profiles.

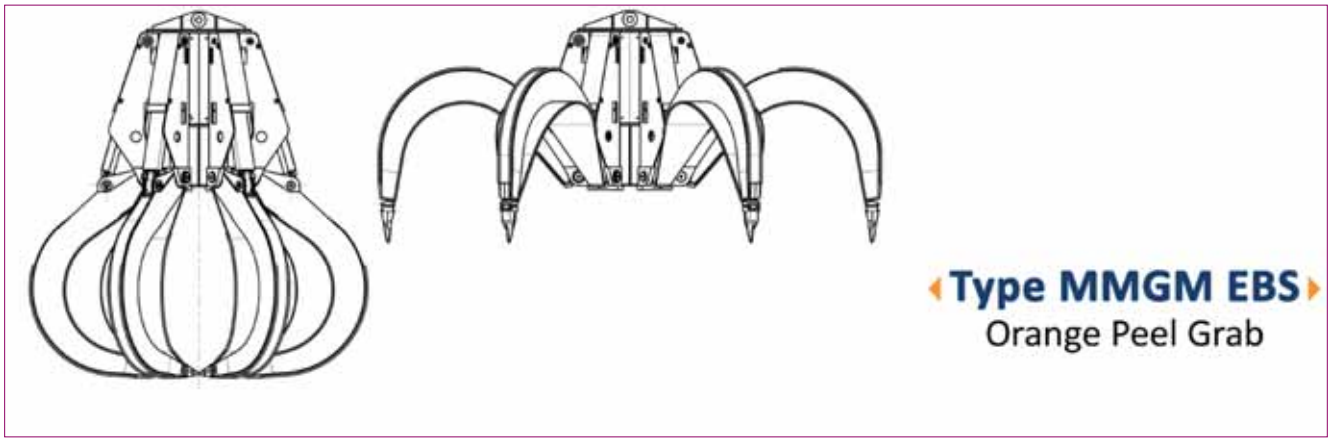
KRÖGER grabs for biomass: special design and sensors guarantee maintenance-free long-term operation

Construction and maintenance-free bearings guarantee a minimum of 3,000 hours of continuous operation.

Biomass is becoming more and more important nowadays as a combustible in large incinerator plants, where it is mostly used in the form of pellets or chips. However, the handling of biomass material involves new challenges for the plant operators. This is why KRÖGER has developed special motor orange-peel grabs (type MMGM EBS) and motor clamshell grabs (type MZG EBS) that have prevailed increasingly in recent years in the handling of biomass.

The design of the grabs, which — by the way — are dimensioned exactly according to the customer's specifications, is completely new. They do not only have to be capable of coping with limited space requirements in the plant bunkers, but it must also be guaranteed that they collect as much of the lightweight material (such as wood chips) as possible.

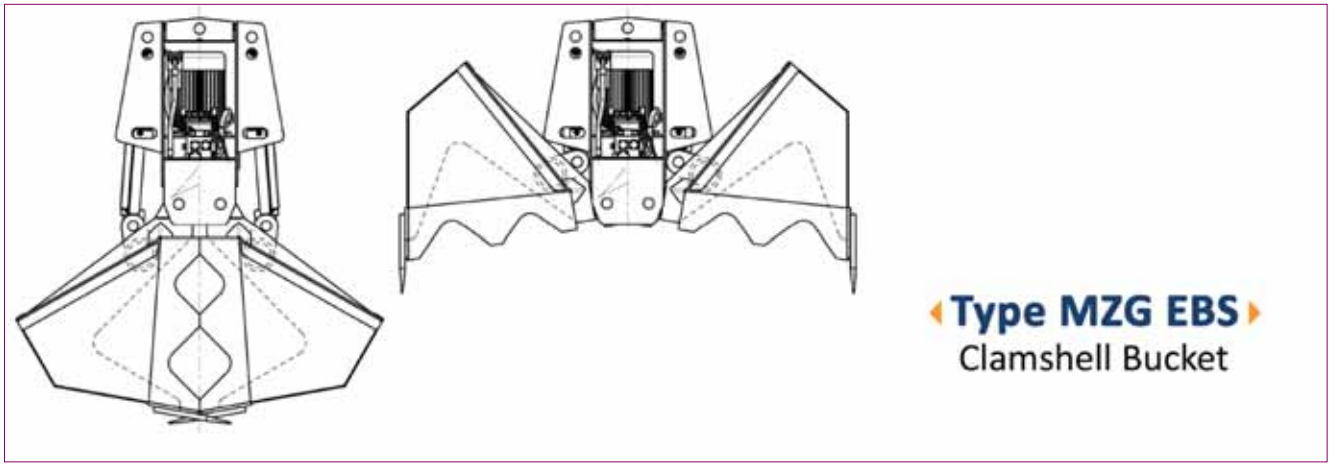
Moreover, it is important to ensure an optimum filling of the grabs to allow for a smooth operation of the incinerators. This



is achieved by a particular grab shape on the one hand and a special design of the teeth and lateral openings on the other hand. Since most incinerator plants operate fully automatically, the grabs are also operated for a long time without manual control and, therefore, ought to be maintenance-free. This is why KRÖGER uses special sensors, which not only detect the opening and closing of the grabs, but also react to pressure and changes in the oil temperature. In terms of bearing technology KROGER even guarantees 3,000 hours of trouble-free operation. These are the decisive features that allow for a fully automated operation of the plants in the first place.

About Kröger Greifertechnik GmbH

Kröger Greifertechnik GmbH & Co. KG is a manufacturer of grabs located in Sonsbeck/Lower Rhine Area in Germany. The company's core products include rope, motor-hydraulic and hydraulic grabs. The target markets are customers in the sectors of sand and gravel extraction, ports and general bulk handling as well as waste incinerator plants. End-users and distributors at home and abroad are among their customers.



Standard Industrie: improving efficiency, production and safety

Since 1978, Standard Industrie International has been a prominent group in the engineering and manufacturing of industrial equipment that is specialized in the handling, storage and transport of bulk materials. Its innovative solutions help improve production performance and efficiency, reduce maintenance costs and risks, and ensure a safer work environment. They are regularly used in the bioenergy sector. Here are some examples:

Industrial vacuum cleaning, to clean and recycle material spillages.

AIRCHOC®, TO AVOID PRODUCTION STOPPAGES DUE TO ACCUMULATIONS OF MATERIALS

Used in the boiler room, AIRCHOC® air blasters guarantee continuous heat production and allow operators to supply energy without the risk of breakage due to build-ups.

An Austrian engineering company which specializes in the design of boilers for the incineration of wood chips has asked Standard Industrie International to help it resolve a technical challenge: to guarantee the heat exchange in the economizer. The continuous burning of wood chips, creating a lot of ash, generates ash deposits on the economizer tubes. The accumulation phenomenon greatly reduces the efficiency of the economizer, requiring weekly cleaning and the stoppage of the boiler. The AIRCHOC® installed allows the boiler to be used at full efficiency while drastically reducing cleaning operations.

AIRCHOC® on a biomass boiler.

INDUSTRIAL VACUUM CLEANING, TO CLEAN AND RECYCLE MATERIAL SPILLAGES

Standard Industrie International offers a wide range of vacuum machines to resolve various problems. For example, at a pellet and wood manufacturer in Belgium, an industrial vacuum cleaner was recommended to remove sawdust in different areas, such as under conveyors, platforms, transfer zones or the elevator feet.

Without cleaning, in this type of plant, the accumulation of dust can increase the risk of explosion and fire in areas already regulated by the ATEX regulations. This mobile vacuum unit is an ideal solution to optimize safety, ensure a healthy environment and improve the working conditions of operators.

LIFTUBE®, TO PREVENT MATERIAL SPILLAGES AND DUST EMISSIONS

This patented solution by Standard Industrie International can be used in the wood industry, for the conveying of wood chips from the storage site to the treatment and production area. In conveyor improvement, the LIFTUBE® can be integrated to the existing frame. Its unique design and sealed hoods prevent the spillage of wood chips and ensure dust containment. This system allows the operator to significantly reduce the need for cleaning and, consequently, maintenance. DCi

The unique design of the LIFTUBE® means it can be integrated into the existing frame of a conveyor.

Pneumatic bulk handling

blown away by today's advanced technologies

NEUERO commissions M600 ship-unloader for Gunsan Port in Korea

NEUERO is a global specialist in pneumatic ship-unloading and mechanical shiploading. The company follows the 'made in Germany' tradition, and has over 100 years of experience in the production of reliable and tailor-made conveyor systems.

NEUERO offers a range of products, including ship-unloaders, shiploaders and mobile conveying systems.

The photo above shows a recently commissioned Multiport M600 at Gunsan Port in Korea. A green ten-year-old NEUERO ship-unloader is visible in the foreground of the photo, while the new M600 can be seen at the back.

The M600 is equipped with direct-drive blower with vibration and temperature sensors (this can be seen in the photograph on p92).

NEUERO's ship-unloaders

NEUERO designs pneumatic ship unloaders to meet the specific requirements of its customers. These unloaders can be used to unload many types of bulk goods, and are particularly popular with operators from the food sector, as well as those from the power plant and aluminium industries.

Each system is unique and is tailored to the customer's requirements and local conditions. NEUERO offers three main types of unloader:

Multiport

- stationary, mobile on rubber wheels or on rails;
- discharge capacity: up to 800tph (tonnes per hour) based on wheat with 0.75t/m³;
- power source via external power supply or diesel generators;
- unloading of ship sizes from Europe II to post-Panamax or Capesize;
- pneumatic conveying and loading onto on-site belt conveyors, trucks or rail cars;
- low energy consumption;
- simple operation with automatic mode;
- low dust and noise emissions;
- consideration of the ATEX regulations; and
- easy access with low maintenance.

The Multiport is suitable for discharge of many kinds of bulk materials especially from the food sector but also for products from the power plant and aluminium industries. These systems are usually

customized developments and adapt to the existing geometric conditions.

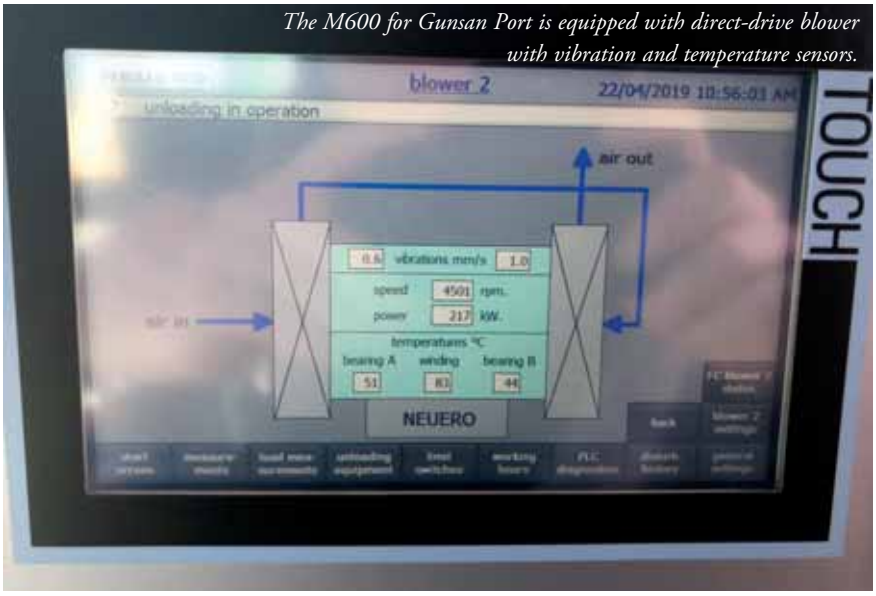
Unloading of all types of inland or ocean-going vessels and discharging directly onto conveyors, trucks or wagons. This happens almost dust free through the use of closed conveyor and aspiration systems.

Multiport ship unloaders have, depending on the geometry, bulk discharge capacities of up to 800tph based on wheat, with an energy consumption of 1.0kW per discharged tonne. They are powered either directly by low voltage or medium voltage with on-board transformers to get the corresponding voltages. If this is not possible, diesel generators can be used. Such type of machines are usually equipped with their own rubber-tyred chassis, which makes it possible to use the unloader at different locations in the port.

With the use of horizontal and vertical telescopic pipes a large surface can be reached within the ship's hatches. With a so-called auxiliary winch on the boom, a small front-end loader (e.g. Bobcat) or larger chain excavator with up to 15.0 tonnes in weight are lifted into the ship's hold for cleaning operation.

The Multiport ship unloader is equipped with the latest filter technology. The main filter with the special filter cleaning system has proven to be the best while simple and maintenance free. A purge air fan draws the air from the clean gas chamber of the filter, compresses the air and thus cleans the filter bags via an integrated nozzle system. Moisture condensation is prevented in the filter media and the use of a compressor is not necessary. Emission levels below 20mg/Nm³ are easily achieved.

Special explosion-protection concepts can be developed and in the event of an explosion special equipment can be supplied to prevent penetration of flames in both directions.



The M600 for Gunsan Port is equipped with direct-drive blower with vibration and temperature sensors.

Flexiport

- for unloading of non-free flowing bulk material like soy bean meal, corn gluten, fish meal, wood pellets, etc.;
- stationary, mobile on rubber wheels or on rails;
- special feeder for loosening the compacted bulk material;
- discharge capacity: up to 600tph based on wheat with 0.75t/m³;
- power source via external power supply or diesel generators;
- unloading of ship sizes from Europe II to Panamax;
- loading onto on-site belt conveyors, trucks or rail cars;
- low energy consumption;
- simple operation with automatic mode;
- low dust and noise emissions;
- consideration of the ATEX regulations; and
- easy access with low maintenance.

The Flexiport has a mechanical reclaim system which consists of an electrical rotating feeder, which loosens the material and feeds it to the suction nozzle.

The Flexiport's unloading operation is carried out with a pneumatic suction conveying system with a vertical and horizontal conveying pipe incorporated in a slewable and liftable boom.

This allows for the unloading of non-free flowing materials. The unloading suction line is equipped with a feeding system at the inlet, feeding the material to the suction nozzle. This mechanical reclaim system consists of a electrical rotating feeder, which loosens the material and feeds it to the suction nozzle.

The Flexiport can be used in particular for the discharge of bulk materials like soy meal, corn gluten, fish meal, feed pellets, wood pellets, etc.

Unloading of all kinds of inland or ocean-going vessels with discharge directly onto conveyors, trucks or rail cars. This happens almost dust-free through the use of closed conveying systems and aspiration systems.

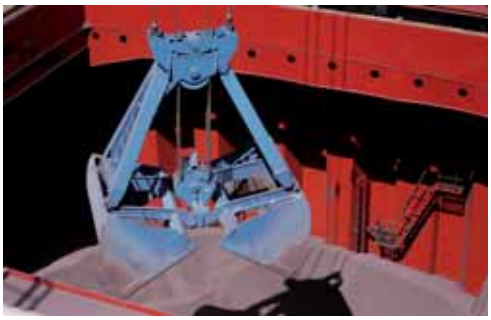
Flexiport unloaders have discharge capacities of up to 600tph based on wheat. By Kick-movements of the rigid vertical boom it can reach any place inside the hatch and even below ship covers.

Tower

- unloading capacities of up to 1,600tph, based on wheat;
- movable on rails;
- available with an optional loading boom;
- integrated auxiliary winch per boom;
- two separate suction lines (50% each); and
- integration of various conveyor elements, such as container scales, magnetic separators, etc.

WORLDWIDE NUMBER ONE

IN ROPE-OPERATED GRABS



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Good vibrations

vibration makes unloading more efficient

The orange VIBCO PF-3500 unit keeps material flowing and when the process is finished, it completely clears the left-over material out of the hopper.

The hoppers are covered, and a mist is sprayed into the area beneath the hopper outflow to minimize dust.

Unloading a ship, depending on the bulk material to be moved, will process faster and more effectively when a vibrator is used. Vibrators assist truck loading (shown in photos) by keeping the flow of material consistent through the hoppers and into the trucks, eliminating downtime in clogged hoppers. Even as the buckets overhead are unloading large quantities into the hoppers, there will be no heavy discharge into the trucks, no material hung up, and no sticking to the side walls. Getting the right size, force, and frequency as well as placement are critical for your success. See the box 'Selecting the right vibrator' on p95 for details on how to calculate the size/type of vibrator needed.

There is another added variable toward even material flow here, and that is the dampness caused by the dust control sprayers. In selecting a vibrator today, you must take these factors into consideration. There are many variables such as climate, material, humidity,

Selecting the right vibrator

STEP 1: Determine the needed vibrator force for your application

BINS, HOPPERS

To move the material in a bin or hopper, the friction between the material and the bin skin has to be broken. Once this is done the material cannot cling to the bin sides and it will flow out through the discharge. The vibrator force needed to accomplish this, for 80% of all applications, is very simply calculated as follows:

Calculate the weight of the material in the transition or sloping part of the bin. Normally this is the only place where the friction between the material and the bin sides has to be broken. *Do not calculate the total weight, only what is in the transition part.*

- For CONICAL BINS, calculate as follows: .261 x dia.2 x height x material density in lbs/cu. ft.
- For RECTANGULAR BINS, length x width x height x 1/3 x material density.

When the weight has been calculated, divide by ten. The figure you get is the force or impact needed on your vibrator _____ lbs. For example: the conical part of a 25-tonne bin contains 7,000 lbs. Divide 7,000 by ten, you need a vibrator with 700 lbs. of centrifugal force or impact.

NOTE: Additional considerations when sizing vibrator to bins.

- If bin side angle is below 30°, select next larger vibrator.
- If bin thickness is extra heavy, select next larger vibrator.
- On very sticky and hard-to-move materials, it is better to use two small vibrators instead of one large one (find the smaller one by figuring half the material weight.)

STEP 2: Find available vibrator models

Look for a manufacturer that has a vibrator product that meets your requirements. VIBCO's catalogue can be viewed at the company website.

STEP 3: Select electric, pneumatic or hydraulic operation

In general, electric vibrators are initially higher in cost than pneumatic vibrators; however, the operational cost is considerably less and the difference in price and installation cost is recaptured in a few months of operation. The electric units have the lowest noise readings, 60–70dB, no more sound than from an electric motor. The life expectancy is two to three times that of an air-operated unit. The life of an air-operated unit is, to a great extent, determined by the cleanness of the compressed air and the operating pressure. Maximum operating pressure is 80PSI, above 80PSI, the life of the pneumatic vibrator diminishes rapidly. The dBa reading on piston vibrators is 80–110, on ball vibrators, 80–115. The *only* pneumatic units with a dBa reading of 60–80 are the TURBINE VIBRATORS. The least air-consuming are the piston vibrators, then the turbine, ball and SVR high-frequency vibrators. As a general rule: for standard applications, limit your selection of vibrators to the SCR Electric Vibrator Line and the Turbine Pneumatic Vibrators. They will give you the latest in vibration technology and design with the lowest noise, the best life, the least maintenance, and the lowest energy consumption.

The hydraulic vibrators are fast gaining acceptance but still primarily used on OEM equipment for food and related products.

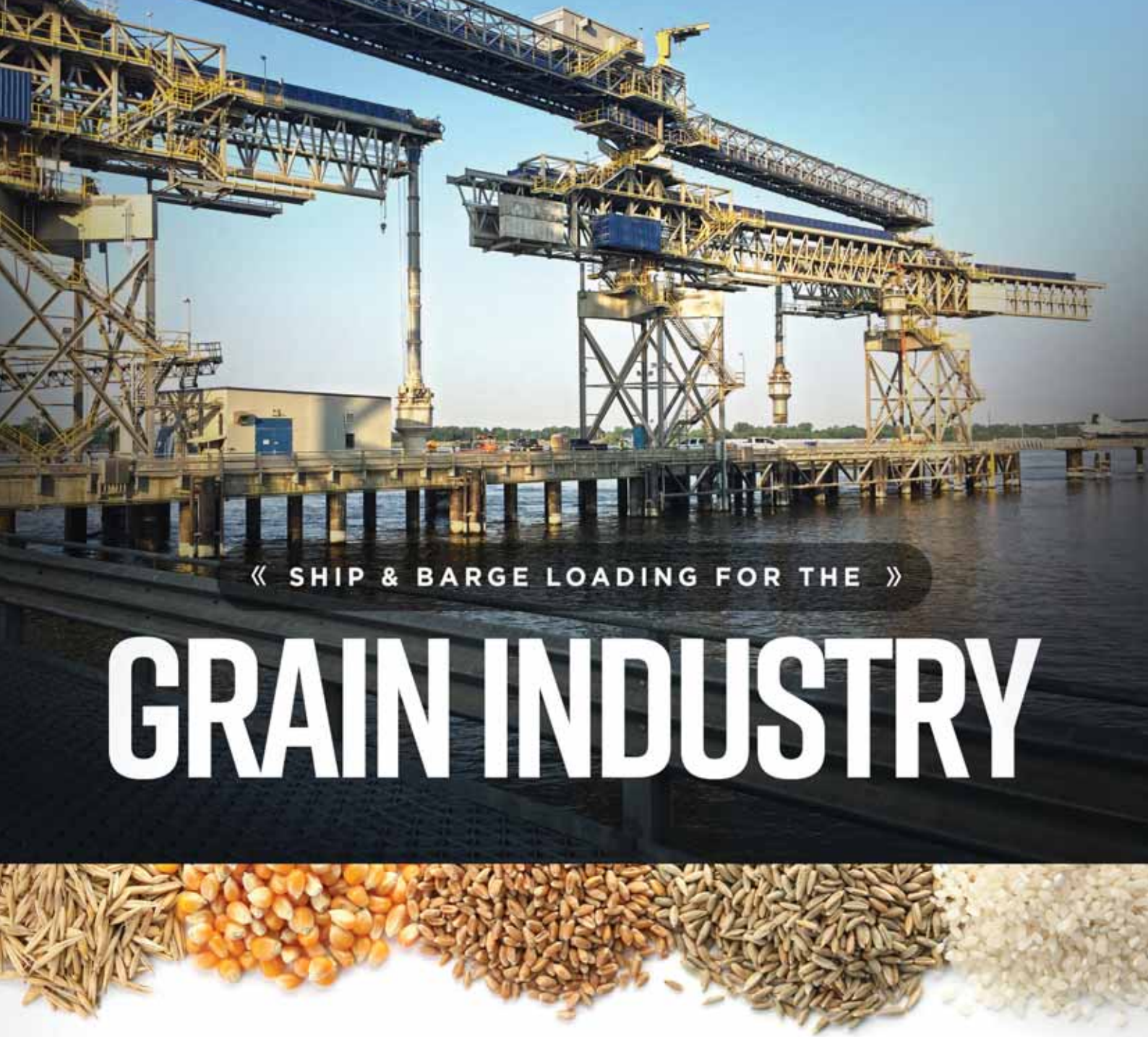
size of the hopper, flow rates, etc. In this application a high amplitude pneumatic vibrator was selected. With high amplitude you have your choice of electric versions on the market from 900rpm, 1,200rpm, 1,800rpm, and 3,600rpm. These all must be calculated into the type of material that is being loaded, and the variation of the material from day to day. Is the material coarse or fine and is the hopper designed with a high slope or a shallow slope?

A vibrator will keep material moving and will reduce costly shutdowns even when materials are damp and sticky.

Trucks line up under hoppers to be filled.

The filled truck moves out to make its delivery.

Depending on the power available at the location, there are vibrator models which conveniently operate on electricity, pneumatics, or hydraulics. Shown in these photos is a pneumatic unit with a muffler which reduces noise and keeps the unit free from contamination. DCi



« SHIP & BARGE LOADING FOR THE »

GRAIN INDUSTRY

"The most critical features of ship loading equipment are reliability and environmental safety. Nowadays, ports worldwide consider pollution prevention a primary objective – paying special mind to reducing dust emissions and preventing cargo overflow or spillage. To address these concerns, it is critical to incorporate sophisticated engineering controls and dust control measures capable of fulfilling the highest environmental standards."

– **Mark Schaberg P.E.**, Chief Engineer, Vortex

FAST & EFFICIENT LOADING.

When loading dry materials into bulk carriers, travel distance, product dispersion and loadout speed are of primary concern. The Vortex Ship Loading Spout is specifically designed for loading efficiency. Capable of load rates over 113,510 bushels | 141,260 ft^3 | 4,000 m^3 of grain per hour, which averages 1 ton per second, the Vortex Ship Loading Spout is among the world's fastest loading solutions. It is also designed to capture fugitive dusts and reintroduce them back into the load, to reduce product loss and waste. This improves profitability.

Learn more about Vortex Loading Solutions at

www.**vortexglobal**.com

VORTEX

Vortex Global

looking under the hood of this major solutions provider

Since 1977, Vortex has specialized in the bespoke design and manufacture of components used to transport and control flow of dry bulk solid materials. Vortex's technical focus is in the development of innovative technologies to improve solids process efficiency, ensure dust-free environments, and establish long-term reliability.

Worldwide, more than 20,000 companies rely on Vortex slide gates, diverter valves, iris diaphragms and loading solutions. With a global service network that spans more than 120 countries, Vortex delivers global solutions through localized relationships. Through an in-house team of 70 design engineers and application engineers, Vortex analyses the application parameters and works directly with customers to match the right solution to the application. Vortex offers collaborative problem-solving and technical support throughout — from project inception to completion.

With more than 300 years of combined experience in the solids and bulk processing industry, Vortex's application engineering knowledge is unprecedented. Vortex has delivered solutions to a wide range of industries handling thousands of dry bulk solid material types. If the material is dry, there is a high probability Vortex has handled it.

The heart of Vortex is made up of all the disciplines required to meet the expectations of its clients. Vortex strives for the highest standards at every stage of the manufacturing process — engineering, planning, welding, painting, assembly, quality, logistics, customer service, safety and so forth. Vortex believes that if it does not excel in all disciplines, then it fails to deliver the value its customers have come to expect. This is how Vortex has developed strong, trusting relationships with its customers for more than 40 years.

Vortex's client-focused quality management programme is registered to ISO 9001:2015 and covers every aspect of product quality and technical services, from initial inquiry to product performance. Vortex specialists are available for customers to contact at any time and can be quickly on-site. Vortex listens to end-user needs and welcomes their feedback, based on product performance in-the-field. This open line of communication has led to many design improvements and new product developments — and allows the company's client-focused design philosophy to take shape.

Vortex's mission is to provide value-added products that are specifically

Vortex wins export award

Vortex Global Ltd., a solids and bulk handling components company, has been recognized by Solids Handling and Processing Association (SHAPA) with the 2019 Solids Handling Industry Export Award.

The award was presented on 8 May, at the SHAPA AGM & Solids Handling Industry Awards Dinner. The event was hosted at the Royal Armouries Museum in Leeds, West Yorkshire, England. Other companies honoured on the evening include Lontra, who received the Solids Handling Industry Innovation Award, and Spirotech, who was named the Solids Handling Industry Company of the Year.

Entry to these awards was open to all UK-registered, SHAPA member and non-member companies and institutions operating in the solids handling and processing industry. In order to be considered for each award, companies must have demonstrated achievement, improved sales success, or deployment of industry best practices.

Joining Vortex Global on the 2019 Export Award shortlist were Russell Finex and Vent-Tech.

Vortex Global's award recognition is largely due to its demonstrated achievement in exportation activities. This includes a significant percentage increase in export sales, as well as successful entry into new global markets. Most notably, Vortex expanded markets into Finland and revised its sales strategy in the Middle East, contracting with new equipment representatives in Saudi Arabia, United Arab Emirates (UAE), Oman and Qatar, as well as nearby Egypt. Vortex revised its sales strategy in Asia as well, contracting with a new equipment representative in India. In Central America, Vortex relocated its Latin America office from Pachuca, Mexico to Queretaro, Mexico. The move enhances transportation accessibility, in order to travel to clients throughout the region.

"We are grateful and honoured to be recognized by SHAPA with this award," said Laurence Millington, managing director at Vortex Global Ltd. "This award embodies our employees' dedication to providing solutions that truly enhance our customers' dry bulk solids processes. The Vortex customer service and technical support network currently spans more than 120 international markets. Our goal is to continue exportation growth for the future, so that Vortex products and services are made available worldwide."

About SHAPA

SHAPA has been the UK's foremost specialist Association for the solids handling and processing industry since its formation in 1981. SHAPA remains on the cutting edge of industry knowledge, keeping abreast of the latest dry bulk material research, product developments, and changing legislation across a wide range of solids and bulk handling technologies. Through regular meetings, guest speakers, awards, exhibitions and export assistance, SHAPA provides assistance and support to serve as an invaluable aid in promoting ideas and opportunities for business.

designed for end-users in-the-field, while maintaining a technical focus on developing innovative technologies using the following core principles:

- **compensate for wear:** Vortex closely studies the characteristics of thousands of dry bulk solid materials and how they interact with various materials of construction. Vortex engineers assess the wear potential for each client's process and make application-specific modifications to ensure reliability, durability and longevity.
- **maintenance-friendly:** Vortex's priority is to keep customers up and running — because in the customer's world, there is no time for downtime. Vortex components are engineered with in-line service features that accelerate the system maintenance process, saving its customers' teams time and money.
- **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 designs products that will out-perform and outlast many market alternatives — so that end-users realize the full value of their investment.
- **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 reduces spare part inventories — which also means a cost reduction.
- **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 engineers, Vortex designs equipment for even the most demanding applications.

- **dust-free environments:** facilities have an ethical obligation to protect their employees and communities from the hazards of manufacturing. Vortex closely studies trends in air quality, environmental dust emissions, workplace safety protocols and other evolving regulations. Vortex components are designed with these concerns in mind.

Selecting the right piece of equipment is critical to the success of any dry bulk solids material handling system. Misapplied components and deficient designs add unexpected costs and create processing inefficiencies. The characteristics of dry bulk solid materials are endless, so there is no such thing as an all-encompassing solution that meets every application. This is why Vortex offers a wide range of valves and loading solutions for handling nearly any type of dry bulk solid, from fine powders to heavy ores.

Slide Gates – Quantum Series

- **Orifice Gate:** Dilute phase pneumatic or gravity flow;
- **Roller Gate:** Gravity flow;
- **Clear Action Gate:** Dilute phase pneumatic or gravity flow;
- **HDPV2 Gate:** Dense or dilute phase pneumatic, or gravity flow;
- **Maintenance Gate:** When maintenance of downstream equipment is required or if an upset condition occurs;
- **Handslide Gate:** Gravity flow;
- **Quick Clean Gate:** Gravity flow; and
- **Iris Valve:** Gravity flow.

Slide Gates – Titan Series

- **Aggregate Gate:** Gravity flow;
- **Titan Slide Gate:** Gravity flow;
- **Titan Pressure Valve:** Dense or dilute phase pneumatic, or gravity flow;
- **Rounded Blade Gate:** Gravity flow; and
- **Titan Maintenance Gate:** When maintenance of downstream equipment is required or if an upset condition occurs.

Diverter Valves – Quantum Series

- **Wye Line Diverter:** Dilute phase pneumatic or gravity flow;
- **Seal Tite Diverter:** Gravity flow;
- **Flex Tube Diverter:** Dilute phase pneumatic or gravity flow;
- **Gravity Vee Diverter:** Gravity flow;
- **Fill Pass Diverter:** Dilute phase pneumatic; and
- **Multi-Port Diverter:** For transferring dry bulk solid materials from any number of sources toward any number of destinations.

Diverter Valves – Titan Series

- **Aggregate Diverter:** Gravity flow;
- **Titan Lined Diverter:** Gravity flow; and
- **Pivoting Chute Diverter:** Gravity flow.

Loading Solutions

- **Loading Spout:** For loading a variety of dry bulk solid materials into trucks, railcars, barges or stockpiles;
- **Shiploading Spout:** For loading grains into bulk carriers;
- **Spout Positioning System:** For repositioning a Vortex Loading Spout above a truck or railcar;
- **In-Line Filtration System** or **Discharge Filtration System:** For dust management at the point of loading;
- **Aero-Slide Conveyor:** For air-gravity transfer of lightweight, fluidizable dry bulk solid powders;
- **Aero-Drum Valve:** For metering flow through an Aero-Slide Conveyor;
- **Aero-Slide Gate:** For material shut-off in an Aero-Slide Conveyor; and
- **Aero-Bin Bottom:** For fluidizing lightweight dry bulk solid powders as they exit a storage bin, to prevent bridging.

Industries Served

Vortex equipment is used in a wide range of industries, including aggregates, agriculture, aquaculture, cement, chemical, coal, coffee/tea, power & energy, food & beverage, industrial sand, milling, minerals & mining, pet food & animal feed, petrochemical, plastics, pharmaceuticals & nutraceuticals, rubber, textiles, tobacco, wood & pulp, among others. DCi

Conveyor transfer point design

material containment for safety and efficiency

As tonnes of material per hour are quickly dropped with great force through receiving chutes onto a receiving conveyor, fugitive cargo often piles up around the frame and dust migrates throughout the area, collecting on idlers, pulleys and floors and affecting air quality. Workers have to continuously clean up the material before it encapsulates the belt, potentially exposing them to a hazardous work area around a moving conveyor, where even incidental contact can result in serious injury in a split second. Considering that most conveyor injuries occur though routine maintenance or clean up, controlling fugitive material is becoming one of the primary elements in a well-organized effort to reduce hazards and prevent injuries.

"Conveyor operators need only take a broad look at the expense that fugitive material has on a system to realize the full cost that accompanies inefficient transfer point designs," said Jerad Heitzler, Product Specialist at Martin Engineering. "Problems such as improper belt support, badly sealed chutes, damaged idlers and uneven cargo distribution can all result in spillage and belt mistracking.

They also contribute to increased costs for lost material, premature equipment failure, maintenance and clean-up, as well as the potential for injury and compliance issues. These factors raise the cost of operation and reduce profit margins."

In a properly-engineered transfer point, each component, from the chute design to the cradles and dust seals, is employed to maximize its specific function and contain dust and fines, while at the same time offering workers easy access for maintenance.

Transfer points

Containment is the key to avoiding spillage and dust, and there are a number of components designed for this purpose. Although shaped transfer chutes and rock boxes direct the material flow to mitigate the

concussion of material on the belt, most high-volume operations need one or more impact cradles to absorb the force of the cargo stream. Heavy duty impact cradles can be equipped with rubber or urethane impact bars with a top layer of slick UHMW plastic to minimize belt friction. Able to withstand impact forces as high as 17,000 lbf (53.4 to 75.6kN) and drop heights of up to 50 feet (15.2m), support beams in the centre of the cradle are set slightly below the receiving belt's line of

travel. In this way, the belt avoids sustained friction when running empty and yet can absorb hard impacts during loading, while still retaining a tight belt seal.

Within the settling zone — located after the impact cradle in the conveyor chute box — slider cradles can then create a troughed belt to centre the cargo and reduce disruption quickly, aiding in dust settlement. Slider cradles, located down the length of the skirted area, have several functions. One is to create a trough angle that adequately centres the load. The trough angle also plays an important part in retaining a tight seal between the belt and the skirt. Lastly, utilizing track mount idlers in between each cradle, a smooth belt path is created through the settling area, one that can be easily maintained. A smooth belt path should have no gaps, minimizing disruption and promoting containment, allowing dust and fines to settle into the cargo stream prior to leaving the containment area.

Airflow

With a constant stream of material crashing on the impact point of the receiving belt, the transfer point can be extremely turbulent, and this turbulence must be contained. By slowing the airflow in the skirted area, suspended dust is allowed to settle onto the cargo path. To contain the mixture of air and disrupted material, a stable, correctly-supported belt is needed for the sealing components to function properly. Without a stable beltline, the belt will sag between idlers, and sealing components will not prevent air and fine material from escaping out of the resulting gaps, causing spillage and dust emissions.

Chute sealing

By closing gaps and keeping a tight seal on the belt, apron seals can also be attached to the chute walls to prevent fugitive dust and fines from escaping.

"A crucial requirement in any transfer point designed for reduced spillage and high efficiency is an effective skirting and wear liner sealing system at the edge of the belt," explained Heitzler. "Modern designs feature external skirting, which establish the tight belt seal needed to eliminate fugitive dust and fines."

The external design requires minimal tools and no confined space entry to inspect, adjust or replace wear liners or skirts, and in most cases can be performed by a single worker. The low profile of the skirting assembly needs only a few inches of clearance, allowing installation and maintenance in space-restricted areas. The design of these components drastically reduces scheduled downtime and the potential workplace hazards associated with replacement and adjustment.

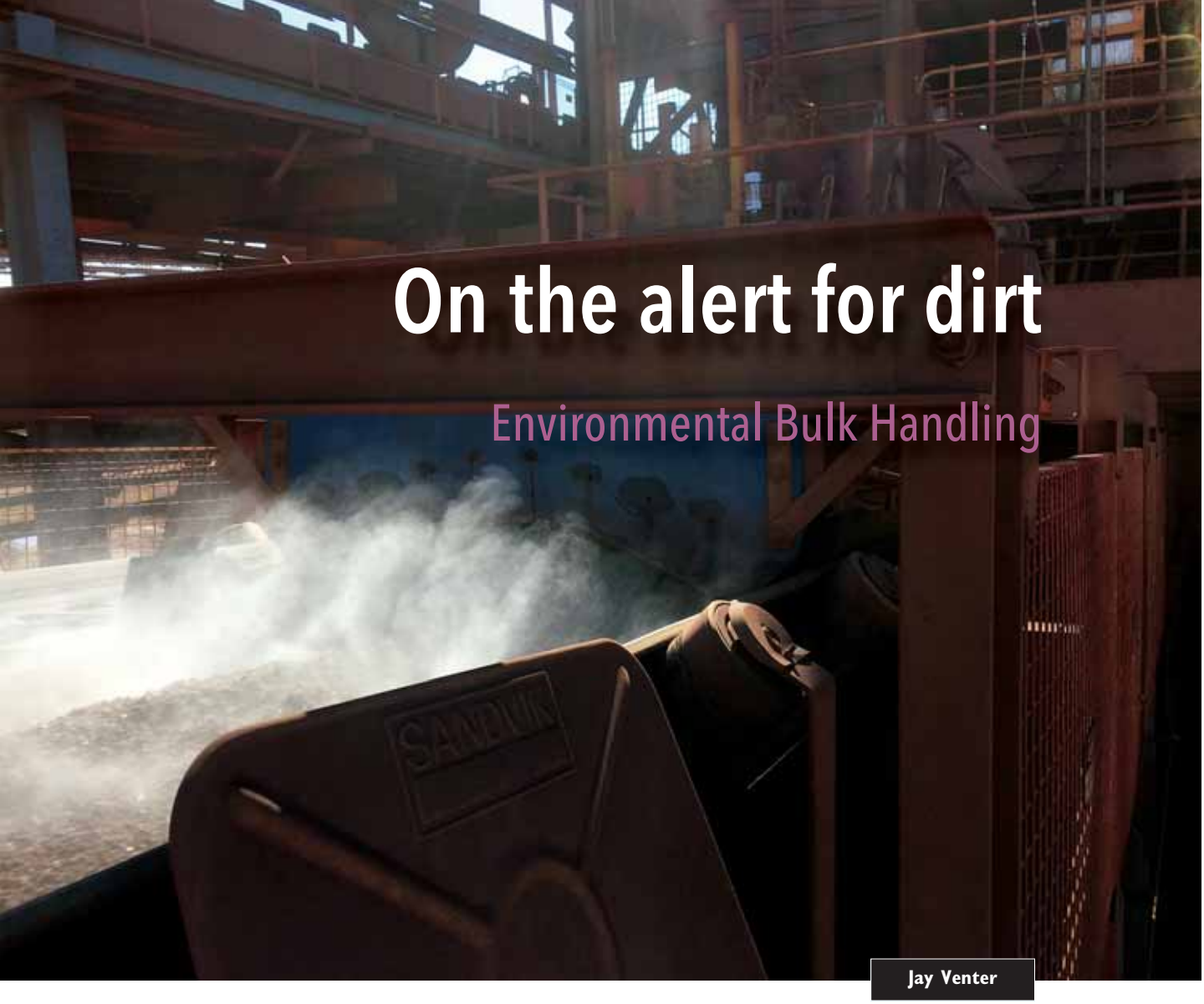
Dust filtration

In operations with limited space for a settling zone or especially dusty materials, dust bags and curtains may be essential components. Providing passive relief via positive air pressure created at belt conveyor loading zones, dust bags prevent the escape of airborne particulates by venting the air and collecting dust at the same time. Installed at the exit of the loading zone and mounted in the skirtboard cover, dust curtains can help create a plenum for dust suppression and dust collection. For additional dust control, an integrated air cleaner system can be installed at the point of emission, containing a suction blower, filtering elements and a filter cleaning system.

Conclusion

Managers concerned with the overall safety and cost of operation need to review potential hazards, the impact of rising labor costs for clean-up and maintenance, combined with the expense of potential fines or forced downtime, to determine specifically how they can affect the bottom line. Using the technologies described here, even poorly-performing conveyors often don't need to be replaced or rebuilt, but merely modified and reconfigured by knowledgeable and experienced technicians installing modern equipment.

"These improvements will help operations improve efficiency, reduce risk and contribute to regulatory compliance," Heitzler added.



On the alert for dirt

Environmental Bulk Handling

Jay Venter

Measuring the efficiency of dust suppression systems

One of the most difficult things in controlling pollution through dust suppression systems is to anticipate and measure the dust, and the efficiency of the suppression systems, *writes Gonzalo Campos Canessa, TRC CEO.*

There are many factors that affect the final performance of the dust control system. Dust control has a passive and an active component — one can't work with the other, and both have the same relevance. The passive dust control is the enclosure, which TRC normally helps its clients to design. However, TRC is not involved in either the manufacturing or the installation of it, so it necessarily becomes a variable that TRC cannot control, but which can affect the performance of its systems. The active component is the dust suppression system, which TRC provides. TRC has 35 years of experience designing, manufacturing, commissioning and maintaining dust suppression systems all over the world. Therefore, half of the overall dust control system is in TRC's hands.

To determine the efficiency of a dust suppression system that operates on a fog principle, by measuring the total amount of dust by means of high-volume samplers, TRC developed a procedure with one of its underground mining clients, which installed one of its dust suppression systems in all the ore transfer points from the conveyors into the chutes.

TRC extended the sampling through all three work shifts. Therefore, it was necessary to define a measuring point, in order to minimize any impact to the production activities; choosing to that effect the transfer point of conveyors 10E to 10F. The methodology used in this study can be summarized as follows:

1 **The amount of base dust (Cbg):** obtained by measuring the amount of ambient dust in the neighbourhood of the selected transfer point (transfer from conveyor 10E to 10F). Ventilation systems in normal operation, but with the production systems of the unitary grinder and the dust suppression system not working.

2 **The amount of total ambient dust (Cwi):** obtained by measuring the ambient dust in the same point as before. Ventilation and the production systems of the unitary grinder in normal operation, but with the dust suppression system not working.

3 **The remaining ambient dust (Cads):** measured at the same transfer point with ventilation, production and dust suppression systems, all operating normally.

The concentrations of the ambient dust in the air flow were measured by means of a high volume sampler, with automatic flow control, and calibrated on site to suction 1.13m^3/min. Fibreglass filters were used for the collection of dust, and their weight determined prior and after the tests, in a controlled environment laboratory.

To determine the efficiency, the following formula was used:

*Eff = 100 *(Cwi - Cads) / (Cwi - Cbg)*

An outstanding 99.22% Average Efficiency was obtained.

Solution to dust: Dustcruster® technology

Den Bakker Dustcrusting technology b.v., (dbd global) specializes in dust control and prevention. The company originally started in 1948 and is now active with Dustcruster® technology all over the world.

Dust is everywhere. It is not always visible, but often creates problems. Ever-more-stringent environmental legislation regarding dust control is putting pressure on many terminal operators.

Den Bakker Dustcrusting technology b.v. specializes in the control of dust, not only by cleaning areas that are already dusty, but also and most importantly working to ensure that dust does not become a problem in the first place. Being heavily involved in this matter as a contractor for some 30 years, the company has developed a range of solutions to help with dust control, including a range of specially designed water spraying vehicles each having particular capacities and performances to suit the needs of a specific site or condition. The constant desire to improve led to the development of a very effective method to control dust: the Dustcruster® technology.

Solution

dbd global has a solution for tackling dust problems commonly connected to storage of large stockpiles of coal, coke, petcoke, iron ore and similar products.

The product is called Dustcruster dry® and consists of a selected blend of several types of cellulose fibres pressed into pellets.

The advantage of using pellets instead of ready mixing product is that it can easily and cost effectively be transported and stored as dry bulk or in FIBCs (big bags) to the actual site where it is needed.

Once on site, Dustcruster dry® can then be dissolved into the sprayable product Dustcruster liquid® by adding water and using its special mixing installation.

Next step is to spray Dustcruster liquid® employing purpose made spraying trucks covering the coal/iron ore stockpiles hence creating a tough and long-lasting and clearly visible white crust even in tough atmospheric conditions.

Dustcruster Dry®

In order to reduce transport charges and to allow the use of the technology on a world scale, dbd global has created Dustcruster dry®.

Dustcruster dry®.

Dustcruster dry® is a mixture of different fibres which are crushed into pellets and are transported in FIBCs or containers.

Supply of FIBCs: approximately 800kg of Dustcruster dry® is supplied per FIBC (allowing the production of approximately 3,200 litres of Dustcruster liquid®)

The maximum effective solution is three litres of Dustcruster liquid® per m^2 for crusting petcoke, but for crusting less dusty materials only two litres per m^2 is recommended.

On location, the Dustcruster dry® pellets are dropped in a special mixing tank with clean water where they transform into a liquid suspension, Dustcruster liquid®, ready for use.

Here also, the special spraying trucks are required to successfully cover the coal/iron ore stockpiles creating a tough and long-lasting crust.

Dustcruster Liquid®

Dustcruster liquid® is an inexpensive and environmentally friendly (natural) product. After spraying onto coal and iron ore stacks, it forms a real 'white crust'. Rain hardly affects its effectiveness: even after heavy rainfall (more than 100mm in one night), there is still a tough and long-lasting crust of Dustcruster®

Picture after heavy rainfall (more than 100mm in one night).

Only after digging into stockpiles is it necessary to repair the crust by spraying on a new layer at the disrupted area.

Dustcruster liquid® is mixed in a special installation. It has proven to be a better solution than other chemical products because of its longer setting time. Dustcruster liquid® can be transported to most locations all over Europe where it is then transferred into large containers, equipped with mixers and sometimes even with heaters to allow work at near zero conditions. The company sells and rents the containers. For the spraying of Dustcruster liquid® the specific spraying trucks are required, mostly agri-tractor towed.

It is clearly visible

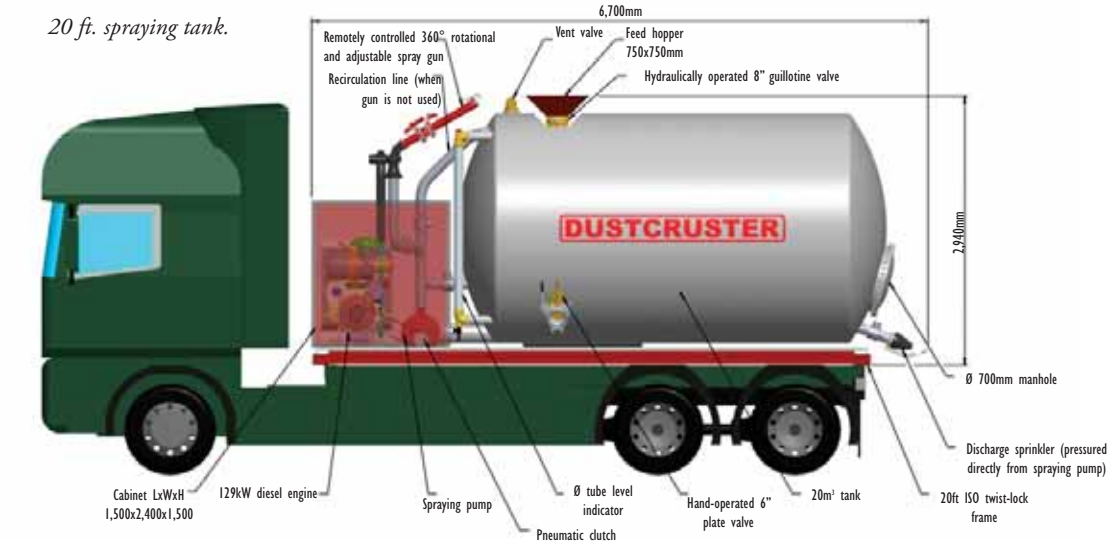
Also, once sprayed on the stacks, the Dustcruster® is clearly visible. It is white so you can see it from miles away.

This is certainly an advantage because, someone can see which stacks have been treated and whether the stacks are covered properly.

Dustcruster demonstration with the dbd global Dustcrusting Team

With a special self-supporting demo kit, consisting of: a tractor, purpose built 8,000-litre tank trailer and a load of

20 ft. spraying tank.



Dustcruster dry®, DBD's demo team is always ready to show prospective customers the many advantages of Dustcruster®. That way, customers can see what Dustcruster® can do for them, in their own working environment considering the local circumstances.

The correct water canon fitted to this trailer will be able to lay a tough and long lasting crust on every possible coal/iron ore stockpile. Also part of this demo kit is a smaller version of dbd global's mixing container which the company uses to mix Dustcruster dry®. The water needed for mixing is to be supplied by the customer to create the sprayable Dustcruster liquid®.

For demonstrations all over the world, dbd global has developed a purpose-built demo installation, designed to allow overseas transport at minimal freight rates. The installation fits in a 20ft container and the remaining space is filled with FIBCs of Dustcruster dry®. Once at destination, dbd global's experienced staff comes on-site to perform the demo.

Controlling dust with Wagoncruster®

dbd global has developed a solution for tackling dust problems on coal trains.

Spraying Dustcruster liquid® onto the surface of the coal trains using its Wagoncruster® spraying installation, creates a tough and long-lasting crust.

This crust safeguards the product from being lifted by the wind during transport. Developed and tested as far back as 2007 dbd global's Wagoncruster® installation has proved to work most efficiently and automatically keeps up with the wagon filling process.

Controlling dust with Foam dbd FO 312®

Den Bakker Dustcrusting has created a system where only a small amount of water is needed to create a large amount of foam. Dust control when handling/crushing wood and stone is particularly problematic, as using water can cause humidity problems. This larger foam surface is an excellent dust collector, and results in a better dust-free working environment.

This foam is created using special equipment that requires only 98 litres of water and a maximum of two litres of foaming agent to make a staggering 5,000 litres of foam. The foam is quite tough and long lasting. Depending on the actual activities performed the foam can last anything from three to 12 days.

Apart from the benefit of less humidity problems there is a huge saving on water.

New equipment: 20 ft. spraying tank

All components that make up the spraying tank are mounted on a 20ft ISO container frame with corner fittings. The system is complete and mainly consists of a hot dip galvanized steel tank having a capacity of approximately 19,500 litres, internal recirculation system, motor-pump compartment with 129kW diesel motor connected to a purpose-built special centrifugal pump to feed a hydraulically operated spraying monitor that is adapted to allow a proper use of Dustcruster liquid®.

A number of pneumatic valves completes the system to allow for spraying, mixing or for use of the sprinkler at the rear of the spraying tank.

A remote control is provided to allow the system to be monitored from the cabin of supporting truck.

Any supporting truck will do, even a second hand one, as long as the truck allows the mounting of a standard 20ft maritime container with twist locks.

No chemicals used

Although there is not a product that has the same equation, at the moment the products that are the most comparable with Dustcruster liquid® or Dustcruster dry® are the chemical products such as Polymers (Latex). dbd global has a lot of clients that used the polymer products before they discovered the many advantages of the Dustcruster® technology and started using only the Dustcruster® technology. The big differences and advantages in comparison with the polymer products are; visibility, Dustcruster® creates a clearly visible white crust; the long endurance of the product; the price that is more attractive and the fact that it is environmentally friendly — Dustcruster® is not chemical.

Principal features of Dustcruster®:

- It is a natural product, environmentally friendly.
- It is NOT a synthetic polymer or other nasty chemical, sometimes used for this purpose.
- It is not harmful to humans, fauna and flora.
- It is long lasting, with a clearly visible white colour.
- It will result in a considerably lower water consumption.
- It has no known negative effect on the bulk products it protects.
- It will ease possible tensions between environmental inspectors and with the population.

Wide experience

Den Bakker Dustcrusting technology b.v. has gained vast experience in the control of outdoor dust. It uses very advanced systems, stationary as well as mobile, which can operate under the most severe conditions. Frost and strong winds present no problems for the company's equipment.

Den Bakker Dustcrusting technology knows that each environmental problem needs its own approach and solution, and it enjoys the challenge of developing appropriate solutions for its customers, round the clock, seven days a week.

Dust-free loading in Port Elizabeth, South Africa

Delivery of 4 Revolver® spreaders helps Transnet Port Terminals commit to its sustainability agenda and reduce dust.

Summary

Following the introduction of containerized bulk handling at Port Elizabeth Container Terminal (PECT) in South Africa, Transnet Port Terminals (TPT) placed a repeat order with RAM spreaders for four units of the RAM Revolver® bulk handling spreader.

TPT handles large volumes of bulk exports annually at its Port Elizabeth Container Terminal and recently employed containerized bulk handling. The terminal invested in four units of RAM Revolver®, to help it service its base of customers better.

Flexible approach and clever use of capital

Containerized bulk handling (CBH) allows for easy handing of bulk materials with a simple spreader change on the cranes. The cost of the CBH system is a fraction of the cost of new bulk loaders.

Speaking at the handing over ceremony of the Revolvers, RAM Spreaders Cameron Hay commented "Since the first order of Revolvers in Port Elizabeth more than five years ago the CBH system has grown significantly. These new revolvers will allow TPT to ensure environmental compliance"

A route to market for miners

Mining companies are now able to find an new route to market using CBH for exporting bulk through standard container terminals, which until now has only been possible with heavy investment and an expensive infrastructure.

Clean and green

PECT is located near to the main town of Port Elizabeth and like all cities dust is a sensitive issue.

The CBH system, using a hatch misting system is the greenest loading system in the world with zero fugitive dust emissions. It achieves this through a two-pronged method:

1. The Revolver® adds very little energy to the bulk material as it tips at the very bottom of the hatch.
2. A hatch-based dust suppression system mounted on the hatch, which stops any small amount of dust from rising up.

Community — supporting local school

RAM Spreaders & Transnet Port Terminals are both socially aware companies which, as a result of the bulk handling project, are helping to support the local community by employing a number of local technical staff and provide training programmes to help further their skills in this new technology.

The local Green Apple Pre-school close to the Port Elizabeth Container Terminal is also benefiting from the new project, with RAM & TPT helping to subsidize teachers and provide funding to help the school add three new classrooms. This will allow more children in the area to receive a decent foundation education and in turn help the local area continue to prosper.

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DemcoTech Engineering: an environmental approach to material handling

Growing pressure, both from regulatory authorities and from civil society, in addition to their own sense of civic duty, is placing increasing pressure on industrial operations to ensure that they minimize the environmental impact of their activities, says materials handling and niche process plant specialist, DemcoTECH Engineering.

"As a result, we see a strong call for our technologies that assist in reducing and even eliminating contamination of the environment in which projects are located," adds DemcoTECH Engineering General Manager, Paul van de Vyver. "For example, our environmentally friendly pipe conveying technology has been in demand for applications ranging from coal, cement and sulphur to diamond concentrate while our extensive expertise in dust control systems assists us in ensuring that all equipment we install complies with safety and environmental regulations."

Pipe conveyor at Assmang's Cato Ridge Alloys plant in South Africa.

In a recently completed turnkey contract for a prestigious sulphur handling project in Malaysia, DemcoTECH's pipe conveyor technology was selected as an environmentally friendly method of conveying material on a completely open jetty, fully exposed to the elements.

"With a pipe conveyor, the tubular form of the belt encloses the material, eliminating contamination of the environment by the product being conveyed, as well as protecting the product from the elements," says van de Vyver.

"In addition the pipe conveyor's ability to negotiate horizontal and vertical curves makes it ideal for navigating difficult routes and eliminating transfer points with the associated spillage and dust generation."

The full contract awarded to DemcoTECH included the materials handling system from the delivery and stockpiling of the sulphur, through to reclaiming and loading the sulphur onto ships for export purposes. In addition to the stockpile being contained and isolated to prevent contamination of the surrounding area, the multi-curved 2.2km-long pipe conveyor provided a fully enclosed method of conveying material. The inclusion of a state-of-the-art telescopic chute on the shiploader also reduced the potential for spillages and dust generation.

In earlier international work, DemcoTECH's commitment to a clean environment is also evident in the projects it has carried out for a range of clients. In India, a unique feature of the pipe conveyor designed for a power plant was the ability to convey the material (coal) on the carry side and fly ash on the return slide. This resulted in zero emissions and the elimination of transfer houses, further reducing any potential for spillage. In Papua New Guinea, a 4.5km pipe conveyor was designed to transport gold ore through pristine jungle, providing an economical as well as an environmentally friendly solution.

In South Africa, DemcoTECH's pipe conveying technology was applied in the materials handling portion of the expansion to Grindrod's multi product terminal at the port of Richards Bay. The scope of the contract covered materials handling to convey various materials, but mainly rock phosphate and coal, from the three Richards Bay terminal sites: Navitrade, Kusasa and Valley. With this area being an environmentally sensitive area, pipe conveyors were employed, in addition to troughed belt conveyors.

Also in South Africa, DemcoTECH completed the expansion of a manganese export facility for local manganese miner Assmang at its Cato Ridge Alloys plant, in KwaZulu-Natal, working jointly with Kantey & Templer Engineers. Manganese operations generate high levels of dust and therefore dust suppression systems were installed at all transfer points and on the elevated tripper stacking manganese ore onto an open stockpile, providing a safe and environmentally friendly operation. The project consisted of three major components, namely refurbishment of the existing tipplers, refurbishment and upgrading of the existing conveyors and, lastly, the supply of a greenfields stockpile and automatic truck loading facility.

Working again with Kantey & Templer, DemcoTECH completed two projects for leading cement producer, NPC. In the most recent contract, a new fly ash silo was constructed for NPC-Intercement's Simuma Plant in KwaZulu-Natal. Dust extraction systems were installed on the 1,000-tonne silo and at all transfer points on the conveyor feed system. DemcoTECH provided the detailed design and layout as well as being responsible for the structural, mechanical, electrical, control and instrumentation engineering of the silo.

In an earlier project to establish a new 40,000-tonne capacity, multi-discharge clinker silo for NPC-Cimpor, also in KwaZulu-Natal, DemcoTECH provided the materials handling for the project. Dust extraction using bag filters was applied on the material feed and extraction system.

"Recently we concluded a project for Idwala Carbonates, also located in the mountainous, environmentally sensitive Oribi Gorge area. Designing and erecting the feed and discharge materials handling system for the newly installed milling plant, we made use of multiple air slides combined with a dust filter extraction system, to ensure that dust emissions comply with regulatory health and safety

limits," adds van de Vyver.

About DemcoTECH

DemcoTECH has the in-house project management capabilities, technology and systems to successfully manage the comprehensive range of demands associated with the engineering design and execution of large local and international projects.

Its wide range of fit-for-purpose engineering services from conceptual design to construction and commissioning are offered from studies or single, fit for purpose conveyors to multi-disciplinary mining or port projects. These services are available in various contracting mechanisms ranging from engineering, procurement, construction and management contracts through to lump-sum turnkey contracts.

RightShip and South Pole deliver first reported entirely carbon offset iron ore shipment for Anglo American

Global mining company Anglo American has offset the carbon emissions for an ocean freight voyage from South Africa to Europe, using RightShip's verified carbon accounting tool and offset credits purchased from South Pole.

Anglo American transports large volumes of bulk commodity products and places protection of the environment and sustainability at the core of its activities. To put this into practice, the company has committed to sustainable mining plan, setting a goal for a 30% reduction in net GHG emissions by 2030.

RightShip's GHG Rating compares a ship's theoretical CO_2 emissions with other vessels of a similar size and type — both newbuilds and existing ships — and gives each ship a rating on an A-G scale, with 'A' indicating the most efficient vessels and 'G' the least.

The GHG Rating gives owners and operators vital information to make more sustainable choices in their vessel selection — which along with reducing emissions also makes good economic sense, as the less fuel a vessel burns the cheaper it is to run.

Anglo American has used RightShip's GHG Rating for many years to select charter party vessels. For this particular journey a ship operator bid for the iron ore cargo; and as part of the charter party agreement, offered to offset the emissions for the entire journey. The transit equates to 5,880 tCO2e — including the ballast leg and the laden voyage — from Saldanha Bay in South Africa to Europe and is understood to be the first entirely carbon-offset bulk journey.

Peter Lye, Head of Shipping from Anglo American said: "We've used RightShip's GHG Rating for many years as a core element of our safety and environmental sustainability practices. Anglo American has set ambitious goals for its overall sustainability agenda including carbon emissions and a verified tool like RightShip's GHG Rating is a key part of monitoring and meeting those targets.

"When the shipowner suggested boosting the GHG Rating with carbon offsetting, ensuring that the entire journey had a carbon neutral environmental outcome in line with our environmental policies, we were happy to agree."

Kris Fumberger, Sustainability Manager at RightShip adds: "As the calls from industry grow louder for dramatic action to reduce carbon emissions, more and more companies are seeing the need to account for the carbon emissions along their supply chains.

"RightShip's carbon accounting tool calculates the carbon emissions based on the specific characteristics of the journey in question – the route, vessel particulars, cargo information, the fuel refining and consumption, and the loaded and ballast legs. The results can then be used to set targets, inform sustainable decision-making and, as in this case, allow companies to offset the emissions from their shipping activities."

The carbon credits purchased to offset this journey will support South Pole's Gunung Salak Geothermal Energy project in Indonesia. The project has helped to upgrade the capacity of a geothermal plant, enabling it to generate more clean electricity from the same source of geothermal steam thanks to modified turbines and steam gas ejectors. As a result, the Gunung Salak project mitigates approximately 113,000 tonnes of carbon dioxide equivalent emissions and supplies over 213,000MWh of clean energy to the local grid each year.

Jay van Rijn, Senior Carbon & Energy Manager, South Pole said:"Climate change is real and affecting business every day. To address this, South Pole collaborates upstream with suppliers, downstream with customers and across sectors to deliver solutions to our shared sustainability, carbon and energy challenges. Taking steps like this, to carbon offset an entire bulk journey, is a key action in addressing the scale and urgency of climate change".

About RightShip

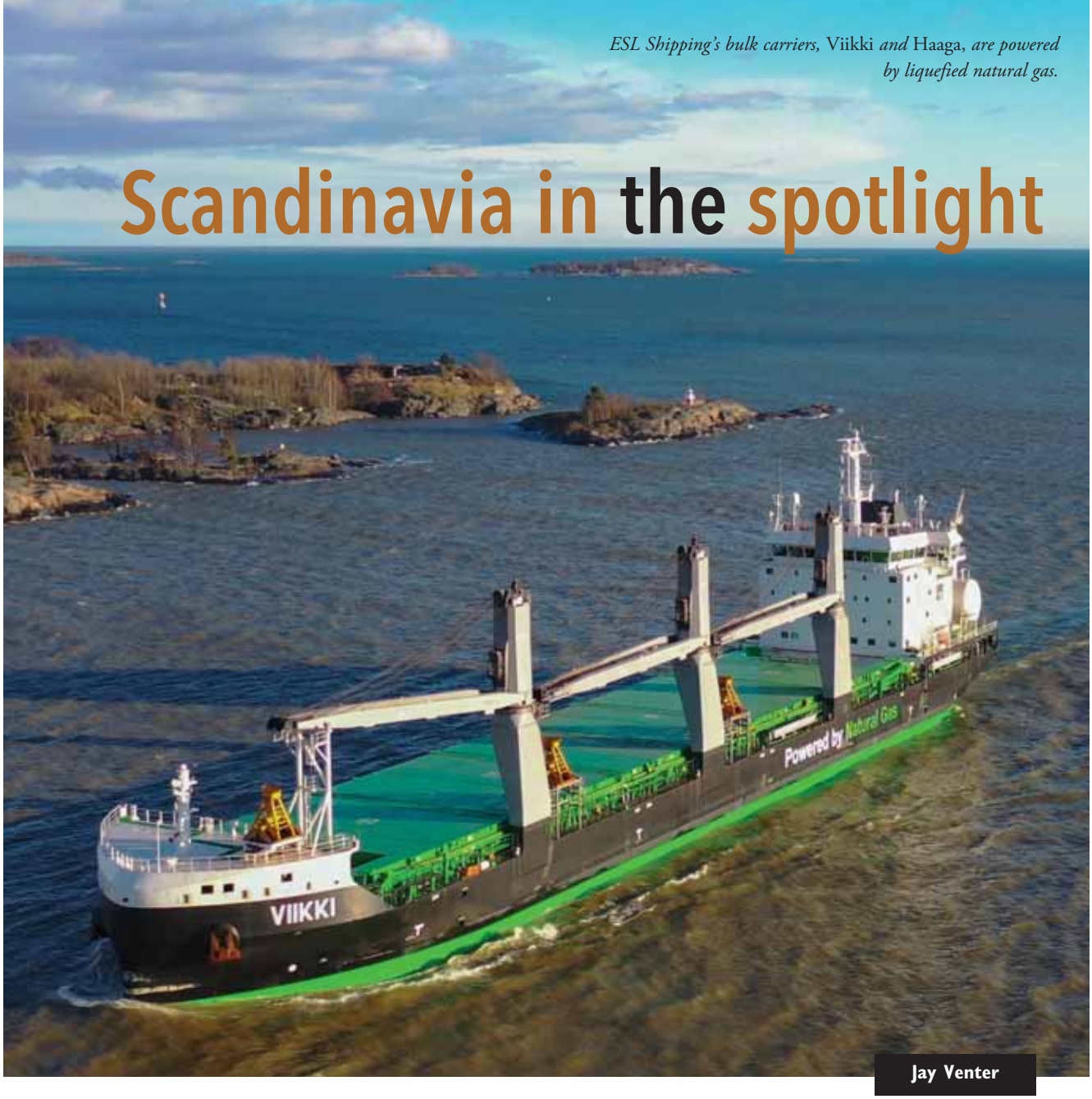
Established in 2001, RightShip is a maritime risk management and environmental assessment organization, with almost 300 customers and over 3,000 users of its predictive online vetting platform, RightShip Qi.

About Anglo American

Anglo American is a global mining company and its products are the essential ingredients in almost every aspect of modern life.

About South Pole

South Pole provides global sustainability financing solutions and services, with more than 300 experts over 18 offices worldwide. DCi



ESL Shipping's bulk carriers, Viikki *and* Haaga, *are powered by liquefied natural gas.*

Scandinavia in the spotlight

Jay Venter

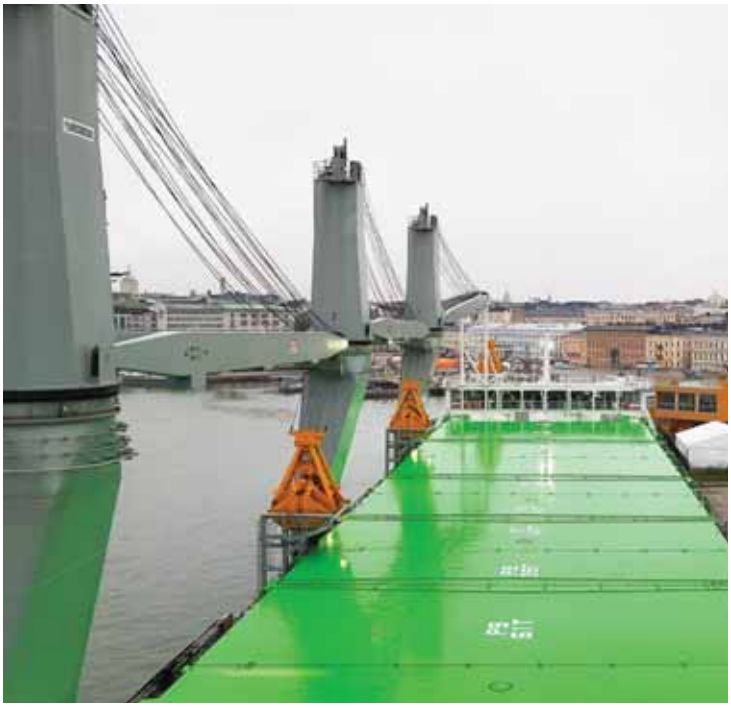
Five-star environmental rating for Viikki and Haaga

ESL Shipping's climate-smart newbuildings, *Viikki* and *Haaga,* have received a best five-star environmental rating from Clean Shipping Index (CSI). Clean Shipping Index is an independent system to verify comprehensively vessels' environmental performance. It's a non-profit organization and the methodology used is evaluated by the technical committee of experts and researchers.

The CSI evaluation of a vessel's environmental performance is comprehensive and takes into account emissions to air and sea. It evaluates direct exhaust gas emissions, chemicals used as well as water and waste management onboard.

"This independent verification proves our innovative new vessels offer our clients the greenest and most sustainable shipping solution currently available in the market," comments Managing Director Mikki Koskinen.

Powered by liquefied natural gas, *Viikki* and *Haaga* are the most environmentally friendly bulk carriers in the world. Use of LNG and efficient machinery result in low emissions to the air and ballast water treatment system and cargo hold wash water recovery system minimize emissions to the sea.

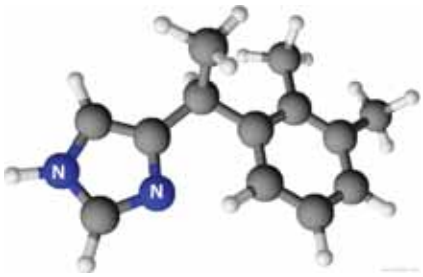


Swedish biotech company continues to drive antifouling innovation

I-Tech is a company name that has become well-known in the marine paints and coatings industry in recent years. Its active agent Selektope®, a substance which is added to antifouling coatings during the manufacturing process, repels barnacle larvae using a first-of-its-kind mode of action — it puts barnacle larvae looking to anchor themselves to a ship's hull into temporary swimming mode, rendering them unable to attach.

This desired effect is achieved by the science of selective receptor stimulation. That means that when the barnacle larvae approaching the hull surface are exposed to the Selektope® (chemical name medetomidine) leaching out of the antifouling coating, their octopamine receptor is switched on making them hyperactive and making their legs kick as fast as up to 100 kicks per minute. Although the effects of Selektope® are reversible, meaning that once out of the Selektope® exposure zone the barnacle larvae return to normal function, while a larva is exposed to Selektope® they have no option but to swim away and find another place to settle.

Selektope® patch, a year after application, demonstrating its effectiveness.



The Selektope® coating (chemical name medetomidine) affects the octopamine receptors in barnacles, giving them no option but to swim away and find another place to settle.

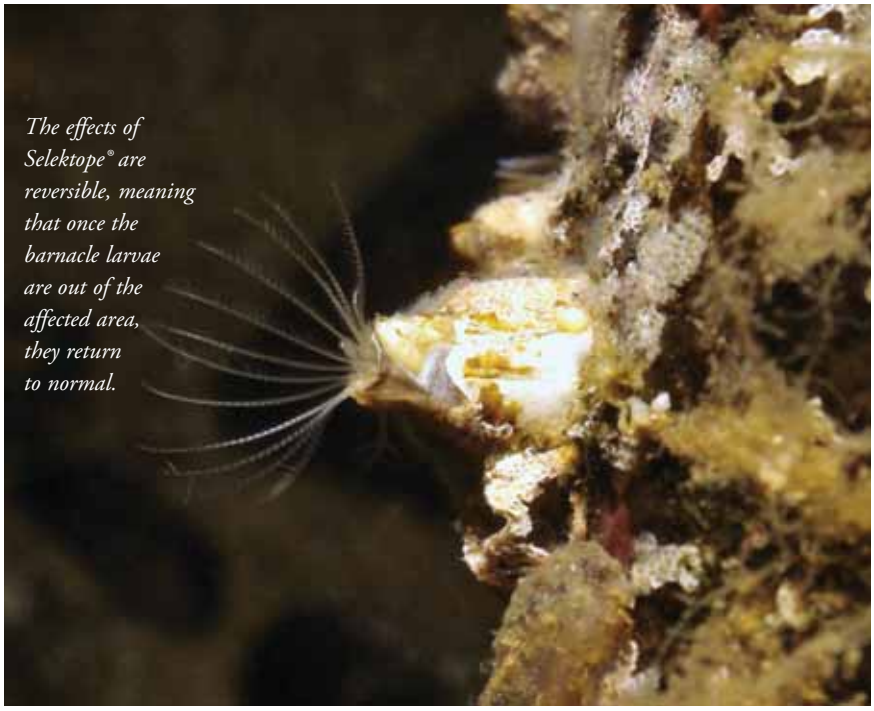
Founded in 2002 off the back of extensive academic research into the effect of medetomidine on the barnacle species Amphibalanus improvises, also known as the infamous Bay Barnacle, I-Tech has commercialized the use of medetomidine to prevent barnacle fouling in marine coatings.

Selektope® binds to pigment and other particles in the paint system and is therefore continuously released in the same way as other active substances and components that prevent biofouling on the hull. The amount of paint required to coat a ship's hull can vary from a couple of thousand litres to over twenty thousand litres depending on the ship size and type. With an efficacy that requires just 0.1% concentration per wet weight of paint, approximately two grammes of Selektope® is required per litre of paint.

This means that this technology offers the opportunity for coatings suppliers to use just a fraction of the active substance needed to achieve comparable performance to traditional copper-based biocides or other alternatives. In fact, Selektope® is powerful enough to replace copper in copper-free paints but is flexible

enough to boost copper-based formulations as well.

To-date, over 300 ships have been coated with antifouling paints that contain Selektope®, a great proportion of which are bulk carriers. Based on supply orders received, I-Tech anticipates that the number of ships using Selektope®-powered coatings will exponentially increase in 2019 and beyond. Selektope® sales in 2018 increased by more than 60% compared with the previous year and the company expects demand to continue to increase year-on-year. I-Tech CEO Philip Chaabane told *DCI*: "interest in Selektope has never been greater. Our product Selektope® has proven to be a vital part of the puzzle to create yet further credibility to the fuel saving capacity that antifouling paints can offer."



The effects of Selektope® are reversible, meaning that once the barnacle larvae are out of the affected area, they return to normal.

For owners and operators of dry bulk carrying ships, this Scandinavian innovation offers a solution to the growing problem of hull fouling, a problem for idling bulk carriers. A great number of bulkers lay idle in biofouling hotspots and have low activity rates. Average global sea temperatures are warming, intensifying biofouling risk within these hotspots, or 'red zones', located in warm waters worldwide. In these so-called red zones, antifouling products that can cope with intense biofouling pressures, particularly from hard fouling organisms, and continue to deliver antifouling performance for a ship at anchor for three to four weeks, are a must-have.

Of equal importance are antifouling solutions that are both well-suited to specific ship trading patterns, and varying activity levels. When looking at the future trading potential, ensuring that a ship is protected against hard fouling whether it be in constant active service, idle for long periods of time, or have the risk of fluctuating between the two is an imperative strategy for any bulk carrier owner.

This future-proofing approach to antifouling coating selection, without any certainty of future trade, is exerting great pressure on marine coatings suppliers. This in turn is prospering great innovation and new approaches to the development of fouling prevention technology that makes use of I-Tech's unique barnacle-repellent technology Selektope®.

Due to powerful effects demonstrated, Selektope® rapidly caught the attention of coatings suppliers in the early stages of its research and development over more than a decade ago. Fast forward to 2019 and the testing of Selektope®-containing paint formulations by coatings suppliers continues to accelerate at a rapid pace, with a multitude of commercial products being launched onto the market every year.

"As demand for Selektope® soars, the number of antifouling products that contain our unique bio-repellent ingredients is expanding. This ensures that ship owners and operators have a selection of products to choose from, and confirms the flexibility and compatibility of our product with a range of different antifouling ingredients," says Philip Chaabane, CEO I-Tech AB.

For Selektope®, the future is promising. This is a Scandinavian antifouling technology can enable superior static hard fouling prevention performance in addition to supporting the reduction of invasive species transfer and emissions by contributing to cleaner, more efficient hulls with a low investment barrier.

Conveying the cost benefits of IPCC

FLSmidth & Co. A/S, based in Copenhagen, Denmark, looks at what the real benefits of its recent acquisitions are to customers and to the market.

Primarily, complete pit-to-plant coverage means market-leading solutions throughout the mining process chain, as well as knowledge and optimized practices that can deliver new possibilities for customers to improve productivity and lower costs.

A central element in the recent expansion is customers can now access the deepest range of In-Pit Crushing and Conveying (IPCC) options in the mining industry through one provider. The range of market-leading excavators and IPCC solutions provide uniquely compact, flexible, and fully mobile/relocatable options, allowing customers to improve throughput and productivity and lower CAPEX, OPEX and other operating costs.

"We are now the only OEM on the market that can provide the full value chain. This brings value to customer processes and allows us to work closely with the customer throughout their operations to find the best possible solutions that are underpinned by a harmonized optimization from the pit through to the plant. Being active in the processing side as well as the mining side combines two very important aspects of the mining value chain. We can add to the productivity gains that our customers are looking for and close productivity gaps that we currently see on the market," explains Thomas Jabs, Global Head of Mining Projects.

There will be improved synergy and coherence between products in the process line, allowing the potential for additional productivity. It is also easier to optimize the entire pit-to-plant process as it can be delivered from one source, explains Alexander Lehner, Director Service Line Management Lifecycle Enhancement: "All aspects of the

equipment fleet are now available to customers through us. This gives them one single point of contact, which in turn helps to decrease interfaces and friction losses along the supply chain. Customers can decrease operational costs through special spare part programs and machine availability services, while increasing the equipment lifetime through dedicated life enhancement services covering everything from upgrades, retrofits and refurbishment of their material handling equipment."

A smooth integration

As well as making a seamless range of surface mining and minerals handling technologies and resources for high-capacity mining operations, newly acquired competences, resources and technologies will also benefit customers across the global market.

"The integration has been very easy as those employees that joined as part of the acquisition have been working for a company with a similar DNA as FLSmidth. They have similar traits; they are all out of the box thinkers and focused on collaboration, for instance, and characteristics like these mean they have fit very well together during the integration process," comments Jabs.

Considering conveyors as an economical alternative to trucks

The benefits that can be delivered through IPCC solutions, however, are clearly something that Jabs believes can immediately bring cost savings to customers: "Cutting truck fleets is one of the main reasons customers are looking at IPCC solutions. Conveyors are a very economical alternative to trucks and operators are increasingly seeing how this can be the most economical approach when transporting material from A to B.

"Previously operators looked at shovel-to-truck. Full stop. Now it is totally different — every greenfield project, every expansion project and even brownfield operations are investigating alternatives to shovel and truck. The most interest is coming from mining companies that have already introduced conveyors previously — they fully understand the savings that can be made. They are also not afraid of any changes in the maintenance regime compared to those operating trucks. There is growing interest from greenfield operators, who have not previously introduced any conveyors. We are working with them to show the potential cost benefit and productivity gains of a conveyor system; i.e., lower OPEX, more

Siwertell signs three-year service contract with Pagbilao Energy

On 10 March 2019, it was announced that Siwertell — part of Bruks Siwertell Group — has signed a three-year Siwertell Care service contract with Pagbilao Energy in the Philippines.

The agreement will see Siwertell undertake mechanical and electrical annual inspections and be on hand to offer maintenance support and training for Pagbilao Energy's Siwertell ST 790-D rail-mounted ship-unloader. The unloader has a rated capacity of 1,400tph (tonnes per hour) and has been in operation since last year.

"Our Siwertell agreements secure equipment's optimal performance and reliability," says Tony Aronsson Area Manager APAC, Siwertell Service Division. "These proactive contracts also build up an operator's own service skills, something that Pagbilao Energy is particularly keen to do."

Siwertell's commitment to customer service and support was recently recognized, winning an industry award at the end of 2018 for its dedication to service. "Our aim is to forge long-term partnerships and continuity of support with our customers," adds Aronsson. "As well as ensuring customers have a safe, efficient dry bulk handling system, we dedicate a specific person to each customer, offering customized care and extended service support." As part of Pagbilao Energy's Siwertell Care service package, it will have access to 24/7 telephone support, a spare parts management programme, and will also receive a discount on all spare parts.

About Bruks Siwertell

Bruks Siwertell designs, produces and delivers systems for loading, unloading, conveying, storing, and stacking and reclaiming dry bulk materials, alongside equipment for chipping, screening, milling and processing wood for the biofuel, board, saw mill, pulp and paper industries.

All equipment is designed to ensure environmentally-friendly and efficient cargo operations.

robust operations and less downtime."

Time to push the digital advancement

Even though the potential for financial savings and productivity enhancements can be obvious for some customers that are thinking of switching to conveyors, there can be other blockages in terms of making the commitment. The switch requires changes in the ways a mine operates and affects mine planning on the operator's side.

But for Jabs change is inevitable: "It is fairly obvious that what has worked thus far will not work in the future due to changing conditions in mining. Mines will need to examine alternatives and we, as an OEM, have the responsibility to produce these solutions for our customers or develop them together. And already we are coming up with new solutions as we see some current limitations. The mechanical side is advanced but innovations are possible and likely in this area but the big steps forward will come through digitalization, automation, intelligent systems (smart IPCC) and in the feedback of information to the control centre. We are prepared to push the digital advancement in mining and work with our customers so we present solutions that fit their unique requirements, risks and conditions — and ultimately increase their productivity."

Vice President, Minerals Engineering & Technology, Marnus Fick, echoes Jabs, commenting: "Access to the complete range of key technologies all through the process simply allows engineers to digitalize the full value chain and improve the utilization of new and existing technologies. When monitoring the complete process journey from pit to plant, we are able to strengthen process-joints, align our technologies and improve productivity in the process."

Optimizing the whole mining value chain - together

Much has been made of FLSmidth's full flow sheet acquisition from the equipment and solution perspective — but customers will also see an integrated approach when it comes to analysis and identification of areas that can be improved. Not only can FLSmidth look at how well one piece of equipment is performing but it can see how its performance is affecting other parts of the flowsheet downstream.

The example given by Jabs is in crusher selection and implementation. "Crusher selection is a key discipline in introducing IPCC. If you do not get it right you will run into a lot of problems. FLSmidth has a lot of experience in this area and works closely with our customers. But we also know that crusher selection is not the end of the story — we look closely at how crusher selection will influence the downstream processing of the material as it can vary if it is going to the mill or to secondary/tertiary crushing or to the waste dump or tailings.

"Since we also deliver downstream solutions, we are very familiar with the whole process, meaning we can deliver credible and integrated solutions to the customer that do not only focus on the IPCC element but also the downstream equipment. What we are striving for is to look at optimizing the customer's whole mining value chain — the whole comminution and processing chain — to the very end."

Inkoo Shipping investing in future growth

The port of Inkoo is a privately owned, public commercial port. The annual turnover of the port is well over two million tonnes, consisting entirely of tramp shipping. As the volume increases, Inkoo Shipping has decided to invest in handling equipment.

The newest investment is a material handling crane, a Mantsinen 140 M HybriLift.

Managing Director, Thomas Bergman, says, "With the new crane, we can reduce the handling time of our customers' goods."

The port specializes in the storage and handling of dry goods in bulk. The port's competitiveness is based on long experience, adequate storage facilities, and flexible handling of goods in bulk, together with the geographic location and good connections by sea and road.

"The volumes of crushed rock, metal scrap, pellets and other product has increased during the last year, which makes the new crane a welcome addition to the machine park," Bergman mentions.

A big project for the port, that has meant both machine investments and hiring more people, has been the participation in two international pipeline building projects. These projects have increased its volumes of handling crushed rock significantly. "The loading of crushed rock is done with Volvo wheel loaders, which were selected specially to keep up with these projects' demands", says Bergman.

Inkoo Shipping is also building storage warehouses. The latest warehouse was put into use in December and the next warehouse will be ready in June. "When the new warehouse is ready, we will have a storage capacity of 33,500m^2," adds Bergman. "There is also plenty of outdoor storage space on Inkoo Shipping's area and two weighbridges."

Inkoo Shipping expects the volumes of coal to decrease during the coming years which means that the biofuels, such as woodchips and pellets will increase. Also, the volume of other recycled products like metal scrap has increased. "With the investments of storage space and handling equipment Inkoo Shipping is ready for this change," assuress Bergman.

Inkoo Shipping's new Mantsinen 140 M HybriLift.

Cimbria to supply state-of-the-art drying technology

The grain terminal with the newly developed ECO-Logic dryer during installation.

For customers, gentle and uniform drying with optimum energy consumption are essential, in addition to a high level of automation and remote control, low dust emission and low noise levels. These requirements are augmented by demands for high reliability and availability, as the dryer has to operate without interruption during the harvest and drying season.

Cimbria has won the order of two big projects for Lantmännen in Sweden consisting of intake, pre-cleaning, drying and storage for new grain terminals.

Both plants will have new ECO-Logic continuous flow dryers, which represent the absolute state-of-the-art in terms of current technology. In addition to the drying process, both projects are designed for reception and storage of various grains.

The first project, Hargshamn in Uppsala, north of Stockholm, will be ready in February 2019 and dry-tests and testing of the dryer and the control system will continue immediately after installation is complete.

The second project is for installation in Hammenhög, close to Ystad in southern Sweden. In Hammenhög, in particular, the plant will carry out fine cleaning of malt grain outside the harvest season.

Mechanical installation will commence at the beginning of February 2019 and is scheduled to be finished at the end of June 2019, with performance tests and training of operational personnel due to be carried out during the 2019 harvest.

The newly developed continuous flow ECO-Logic dryers are equipped with the latest generation of automatic operation control and process control, as this is an essential part of the drying process. In addition, variable heat recovery of dry air and dust extraction are performed in integrated tangentially-acting dust separator Dust Guards.

CIMBRIA.COM

HIGH QUALITY EQUIPMENT FOR DRY BULK CONVEYING

CIMBRIA CONVEYING EQUIPMENT

Cimbria develops and manufactures an entire range of conveying equipment for handling a vast variety of bulk materials, ranging from agricultural products to industrial commodities and raw materials.

The Cimbria equipment are delivered worldwide as singular supplied equipment or as a part of a total solution where they link key machines to form smoothly running industrial plants.

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Flat storage steel construction.

The two dryers are not heated by fossil fuels such as oil and gas. The first dryer for the Hargshamn project is heated with direct electrical heating, whilst the second dryer for the Hammenhög plant is heated with water from a boiler plant fired with renewable fuel.

The electrical heating method, in particular, has many advantages, not least in terms of regulation, whilst at the same time ensuring a good and highly uniform distribution of heat throughout the drying process. These advantages are particularly significant in connection with the size of the facility, which corresponds to a capacity of more than 100 tonnes per hour.

The fans for aspiration and recirculation are equipped with frequency converters, so that the power consumption of the large fans is controlled according to exact requirements. The dryer is equipped with automatic control of the recirculation zone, which is controlled in increments depending on the product, as well as the temperature and humidity of the grain and dry air.

Construction and technical features: intelligent drying with optimum energy consumption

A continuous flow dryer consists in principle of three sections: the heating section, the dryer column and the exhaust section. In the heating section the ambient air is heated and mixed with the recirculated air and is led into the drying column via hot air ducts. In the drying column, the heat of the drying air evaporates the moisture in the grain, while at the exhaust section the drying air is expelled through the exhaust fan and the dust separation devices.

Gentle and uniform drying

The main objective in the heating section is to obtain a completely uniform temperature at the dryer column inlet. For the ECO-Logic™ dryer a hot air mixer was designed by utilizing Computational Fluid Dynamics (CFD) analysis and this air mixer ensures a ±5°C tolerance of the drying air to guarantee even, accurate and gentle drying of the grain.

The discharge device of the dryer column ensures an even discharge of the grain across the entire outlet area of the dryer. The discharge principle is based on Cimbria's well-known volumetric discharge system, which provides a very accurate indication of capacity, since each discharge has a certain fixed volume. High grain quality is maintained, thus assuring germination ability and grain quality.

The ECO-Logic™ has been designed to redirect the hottest grain so that it changes place with the colder and wetter grain at the colder part of the dryer in order to ensure even drying of the grain.

Energy-efficient solution

A prerequisite for achieving high dryer efficiency is to ensure that the exhaust air humidity level is as high as possible and the volume flow of the exhaust air is as low as possible. With the very even temperature distribution and accurate control of the dryer, the drying temperature can be increased and kept at a high level without damaging the grain, thus ensuring high humidity in the exhaust air and hence high efficiency. To reduce the volume flow of exhaust air and to utilize the fact that the exhaust air at the lowest drying sections is not fully saturated and is relatively warm, the number of recirculation sections has been optimized and is controlled by a sliding valve.

In general, the new dryer is approximately 20% more efficient than a traditional dryer such as the A-dryer and 10% more efficient than a dryer like the ECO-Master.

Low dust and noise

The ECO-Logic™ is provided with fans of the centrifugal fan type with limited noise emission. For control of dust emission, a dust guard is designed to capture the dust particles, thus ensuring that the ECO-Logic™ dryer complies with environmental regulations.

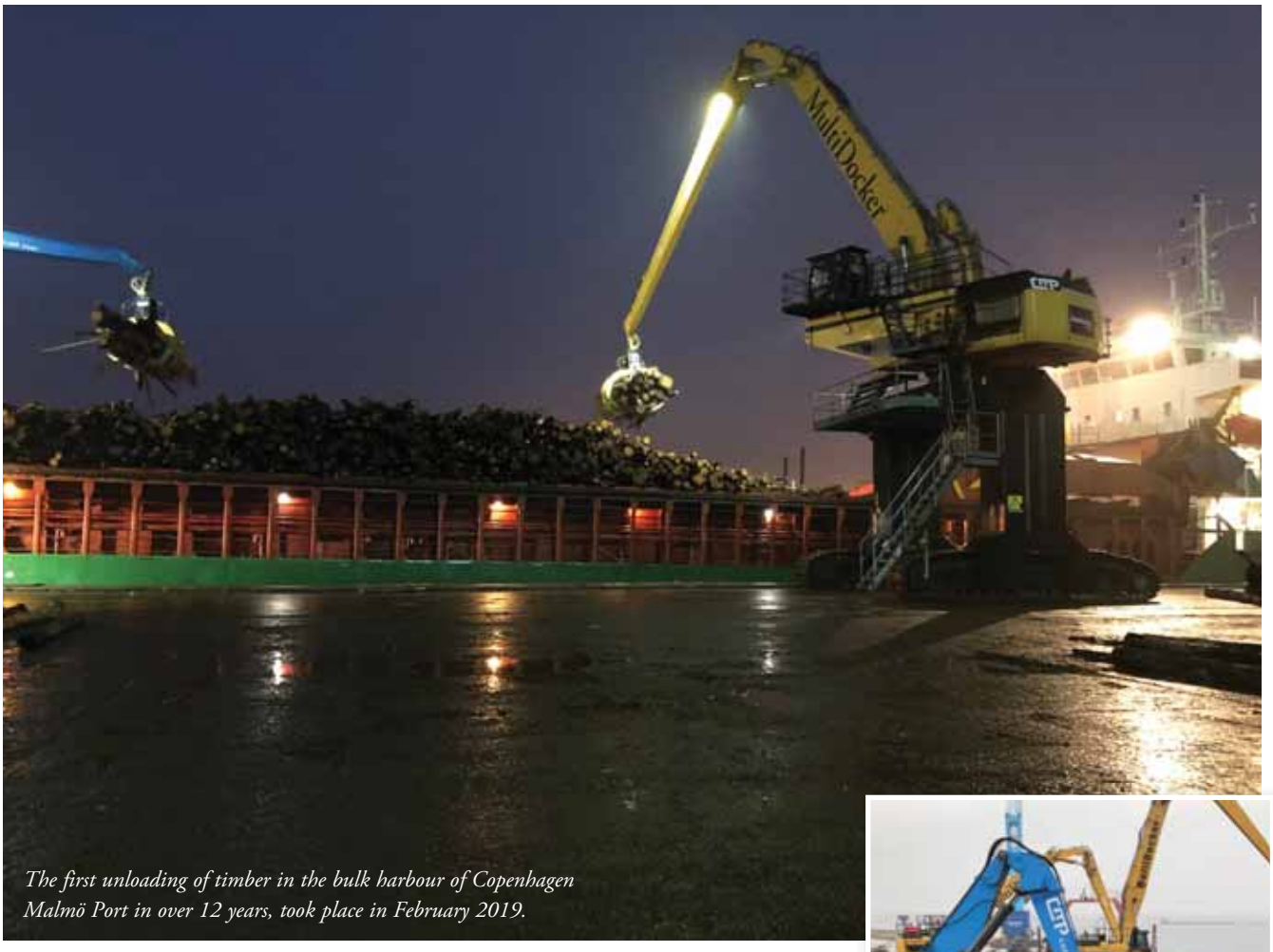
About Cimbria

Cimbria was established in 1947 and is today an international organization with 900 employees in 30 companies throughout the world. Since 2016, Cimbria has been a part of the AGCO corporation. Cimbria offers storage, equipment and processing plants for the grain and seed industry and transport and conveying equipment for bulk handling. The company has an experienced, highly qualified workforce, its own development and construction department and modern production facilities, which enable it to construct and manufacture all of the solutions in accordance with the individual requirements of each client.

Rauanheimo expands to Koverhar

Oy M. Rauanheimo Ab has signed a letter of intent with Port of Hanko Ltd to start a long-term cooperation. The common goal is to develop the port of Koverhar and its operations in the long term for both transit and domestic traffic and for various product segments. The goal is to start large-scale bulk handling in the autumn of 2019 and ship it through Koverhar. The aim is to handle approximately 1.5 million tonnes of bulk products during the first 12 months. Rauanheimo will invest in cargo handling equipment at Koverhar and the Port of Hanko will invest in basic infrastructure at the port.

Timber unloading in Swede Harbour



The first unloading of timber in the bulk harbour of Copenhagen Malmö Port in over 12 years, took place in February 2019.

In February 2019, Copenhagen Malmö Port, CMP, handled a timber load in Swede Harbour; it was the first unloading of timber in the bulk harbour in over 12 years.

"The unloading process was efficient and considerably quicker than what we had initially planned for, which was of course positive both for the customer and us. We hope to handle wood fuel/timber more regularly from here on," says Gustav Brising, manager of the dry bulk terminal at CMP in Malmö.

After unloading, the timber was sent to E.ON's heating plant, neighbour to the bulk harbour, where it is used as fuel in district heating production. Unlike natural gas, timber/woodchip is a renewable fuel source and thereby a better alternative for the environment. DCi

CakeBoxx Technologies launches 'CoilBoxx' container for steel and aluminium coil shippers

CakeBoxx Technologies has announced the introduction of time-saving two-piece intermodal container designed specifically for global transport of steel and aluminium coils.

CakeBoxx Technologies, the container innovation company that builds the two-piece intermodal shipping containers, has announced a new container in its product line designed specifically for the transportation of steel and aluminium coil cargoes. The 20ft 'CoilBoxx™' container takes advantage of the same 'deck and lid' form factor as other CakeBoxx models. A specially designed floor in the CoilBoxx deck houses adjustable cradles onto which coiled cargoes can be easily loaded, secured, transported and stored. This simple but extremely practical design allows coils to be loaded once at their point of origin and remain in the same container while being shipped globally to destination without having to be handled or transloaded.

The CoilBoxx™ can hold up to three coils, and has fulled adjustable racks that fit into the floor.

The 'lid' can be lifted using standard handling equipment.

The announcement marks the first new product for CakeBoxx Technologies in 2019. It continues a trend of game-changing, practical innovations from the company, which in recent years has included the launch of the BreakBulkBoxx™ product line of 45ft and 53ft containers that allow shippers to containerize many cargoes previously only transportable by breakbulk or ro-ro vessels. Similarly, the CoilBoxx provides a new way for both domestic and international steel and aluminium coil shippers to take advantage of the safety, low cost and route efficiency offered by container shipping.

Designed and manufactured to ISO specifications and CSC certified, the CoilBoxx provides a time and cost saving containerized shipping alternative to traditional flatbed trailer, flat rack and breakbulk vessel transport. It is also extremely effective at protecting coils from exposure to adverse environmental conditions and typically unavoidable handling mishaps. The versatile CoilBoxx is suitable for transporting and storing all types of coiled or cylindrical cargoes. As with all CakeBoxx containers, the CoilBoxx deck is fully accessible from 360° for ease and speed of both side and top loading. The CoilBoxx cradles are adjustable to accommodate up to three coils with outer diameters of as large as 1,700mm and as small as 300mm with a maximum width of 2,232mm. These can be easily secured without the need for blocking and bracing or any further packaging using the embedded tie-down system.

CakeBoxx Technologies Director of Commercial Operations Scott Lyman commented, "The CoilBoxx will be an eye-opener for coil shippers. As more and more high-value coils are being produced and shipped globally it makes great sense to take advantage of the benefits of expedited container service. They can easily load their coils into our two-piece 20ft container and lock into cheaper, faster and safer intermodal options, from short haul truck lanes to rail and water transit anywhere in the world — increased product protection and fewer damage claims."

CakeBoxx Technologies is planning to host a series of demonstrations with the CoilBoxx container in the United States and Europe through 2019. Companies interested in attending a demonstration should contact CakeBoxx Technologies for more information.

It is quick and easy to load the coils, with access from the top and all sides.

Package deal

Bagging equipment & FIBCs

Dinnissen's new Combi Filling Station makes it possible to fill a wide range of packages in a single filling station.

Jay Venter

Combi Filling Station for client-specific packaging

Dinnissen Process Technology introduces Combi Filling Station for filling client-specific packaging quickly, efficiently, and dust-free

Dinnissen Process Technology specializes in systems for filling big bags, drums, tote bins and octabins with powders, particles, and granulates for the food, feed, pharma, and chemicals sectors.

As its clients increasingly wish to package their products in their own specific packaging, Dinnissen has developed a completely new Combi Filling Station with a filler head that can be easily and quickly exchanged for another. With a single investment, a company can now fill a wide range of packages with a variety of products.

Filling a variety of packages by making only a single investment

Client focus starts with meeting the specific requirements and wishes of each client.

Dinnissen's new Combi Filling Station accomplishes this by enabling clients, via only a single investment, to fill a wide range of packaging options including big bags, drums, tote bins and octabins. The brand-new filling station is therefore flexible and saves space as well as costs. Dinnissen developed an innovative filling head with an inflatable filling seal that can easily be replaced in order to make it possible to fill a wide range of packages in a single filling station. The innovative head forms a dust-tight seal between each package and the filling station. Once the appropriate filling head has been installed, a pallet with one or more packaging units is placed on the special scissor lift revolving table. The scissor lift then automatically moves upwards and positions the packaging unit precisely in line with the filling head. If a pallet with several drums has been placed on the revolving table, the table with its specially developed suction disc positions the drums, one for one, to connect to the filling head. If the user wishes to switch to a different type of packaging unit, the special vibrating mechanism in the fall pipe first comes into action. It vibrates the fall pipe and the replaceable filling head to thoroughly clean them and prevent any emission of fine particles, after which the filling head can quickly and easily be removed and a new one installed.

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Combi Filling Station can be customized for various target markets

The new Combi Filling Station is available in various options to serve the needs of different markets and end-users.

For example, Dinnissen's new filling station is available in an extra robust version that can withstand the most intensive use under very extreme conditions. It is also suitable for dust-tight operation when filling chemicals and toxic products etc. that are subject to the European REACH guidelines. The installation can be integrated into existing production processes or used as a stand-alone filling station. It can also be fitted with Dinnissen's Easy-to-Clean Feeder Valve with a very broad capacity range for the very precise dosing of products to the filling station or packaging unit. The new filling station can be equipped with a single or triple gas-tight seal system for Big Bags.

A weighing system for filling the packaging units very precisely is also an option. Finally, the filling station is available in a version for high care zones in sectors such as the foodstuffs industry.

Discharger pierces single-use bulk bags, cuts cycle times

A new BULK-OUT® Bulk Bag Discharger from Flexicon features a bag piercing receiving hopper and side-mounted flow promotion devices to feed downstream processes at ultra-high rates.

The BFC Series discharger features a cantilevered I-beam with electric hoist and trolley for loading a bulk bag without the use of a forklift, and lowering it onto the hopper's four-bladed knife. For applications that are suitable for single-use bags, piercing the bag bottom from seam to seam reduces labour and cycle times by up to 95%, compared with connecting reusable bags to conventional unloaders, according to the company.

Pneumatically-actuated FLOW-FLEXER® bag activators press and release opposite sides of the bag at timed intervals, promoting rapid and complete evacuation of free- and non-free-flowing materials.

The periphery of the bag bottom self-seals against a wide-diameter gasket at the rim of the hopper, eliminating the cost and additional headroom required for bag spout interfaces of conventional unloaders.

An optional dust plenum consisting of a hollow hopper rim vented to a plant dust collection system provides a secondary dust containment measure.

Compared with reusable bags, many of which are discarded after one use, single-use bags are typically less costly to purchase, and contain less material to be discarded or recycled.

The hopper transition charges an optional flexible screw conveyor that transfers free- and non-free-flowing bulk materials from large pellets to sub-micron powders, including products that pack, cake, seize, smear, fluidize or break apart, with no separation of blends.

Also offered are transitions for other mechanical or pneumatic conveying systems, or universal flanged outlets for connection to downstream processes.

Flexicon also manufacture tubular cable conveyors, pneumatic conveying systems, bulk bag conditioners, bulk bag fillers, bag dump stations, drum/box/container tippers, weigh batching and blending systems, and automated plant-wide systems to industrial or sanitary standards.

Bag piercing hopper of BULK-OUT discharger slices bag bottom from seam to seam, reducing labour and discharging cycle times by up to 95% per bag.

Rapidpack, global innovator in bulk cargo handling technology

Mobile Bagging Machines with grabs and trucking at DMP.

Rapidpack™ designs, engineers and manufactures state-of-the-art bulk cargo handling machinery for ports, trading houses and shipping companies around the world. A team of experienced engineers with years of practical knowledge in operating bagging equipment in complex and diverse environments ensure Rapidpack machineries are sophisticated yet easy to use.

With over 30 years of practical experience working in diverse conditions, Rapidpack equipment has been proven to perform under the most challenging operational conditions on a consistent basis.

The company's equipment is supported by a hands-on management team, a highly experienced engineering team and a 24/7 technical support team.

As a forerunner in bulk cargo handling, Rapidpack is a benchmark for equipment such as the award-winning Mobile Bagging Machine, mechanical and hydraulic grabs, hoppers, in-feed conveyors, ship loaders/unloaders, and RapidPower Generators for inland/warehouse use.

The most cost-effective and efficient Rapidpack Mobile Bagging System

The Rapidpack brand stands by its promise of high-standard, innovative and modern state-of-the-art machinery. The award-winning Rapidpack Mobile Bagging Machine is proof that the company delivers on this promise.

The Rapidpack MC7000 is a versatile high-speed double line mobile bagging machine that can package bulk cargo ranging from 15kg to 100kg bags accurately. The Rapidpack MC7000 is fortified with high grade Stainless Steel and offers bagging speeds of up to 140tph (tonnes per hour) with and accuracy of 0.2%.

The Rapidpack IBC MC1500 is the only containerized packaging machine in the world that can bag cargo including fertilizers, sugar, grains and pulses in bags ranging from 500kg to 1,500kg Supersacs.

DMP Rapidpack Mobile Bagging Machine and in-feed conveyor system.

Reliable and heavy-duty mechanical & hydraulic grabs

RapidGrab offers a variety of mechanical & hydraulic grabs that range from 3m³ up to 70m³ Jubo Grabs.

Whether it's single rope grabs or clamshell grabs customers require, Rapidpack has a solution for their bulk cargo requirements.

Rapidpack multipurpose bulk discharge hoppers

Rapidpack designs its hoppers to be extremely tough to withstand the extreme elements of bulk cargo handling operations. Made from high-grade steel with an emphasis on ergonomic design, Rapidpack Hoppers ensure reliable and efficient bulk cargo handling every single time.

Highly adaptable, the Rapidpack Hoppers can be used hand-in-hand with Rapidpack's RapidGrabs and in-feed conveyors that discharge directly to the Rapidpack Mobile Bagging Machine for fast & automated bagging.

Modern shiploaders & unloaders

Rapidpack ship loaders/unloaders can handle a range of dry bulk cargo at speeds of 2,000 tonnes per hour.

Simple and easy to use and set-up, the Rapidpack shiploaders are highly efficient and a foolproof way to load/unload bulk cargos like wheat, grains/pulses, fertilizers, sugar, soybeans, ores, coal, sorghum, etc.

Powerful RapidPower Generator Sets

Rapidpack's range of generator sets are guaranteed to provide much needed power even at the most remote locations.

The RapidPower Generator Sets ensure a constant supply of power for the toughest and most challenging bulk handling operations at any part of the globe. Rapidpack's generator sets are weather-proofed and are reinforced to ensure marine-grade reliability and sound-proofing for a more secure, reliable, and perfect performance.

Rapidpack Showcase:

A Few of its operations worldwide

Rapidpack's bulk cargo handling equipment - The lifeline to modernize the Port of Djibouti

One project Rapidpack is proud of was the inauguration of the Doraleh Multipurpose Terminal (DMP) in Djibouti. The port was able to improve loading and discharging speeds by over 48% thanks to the high efficiency and throughput of the Rapidpack equipment that it adapted at the new port.

Rapidpack port operations, Mobile Bagging Machines and grabs at DMP.

RapidPack grab at Doraleh Multipurpose Terminal

Rapidpack inland transportation trucking at DMP

The $590 million DMP project, started in 2015, was jointly financed by the Government of Djibouti and China Merchant Holdings with a vision to connect Asia, Africa, and Europe as part of the 'One Belt, One Road' initiative.

Today over 4.2 million tonnes of cargo is handled per annum through Rapidpack's equipment at the port. Rapidpack's innovative 70,000 metric tonne temporary bunker storage system for fertilizers, grains and other bulk cargo material has further enhanced the Port's Value addition and ensured that Doraleh Multipurpose Terminal is an important hub in the region. This is why Rapidpack's presence in DMP is a game-changer.

Rapidpack operates an impressive fleet of machineries — the largest in Africa — and modern facilities for all bulk cargo material handling requirements:

- six high-speed containerized Mobile Bagging Machines;
- six multipurpose bulk hoppers;
- six in-feed conveyors for warehouse operations; and
- 12 truck loading conveying systems.

Bulk cargo storage & bunker facilities

Rapidpack takes pride in being the primary bulk cargo expert in the region and is an essential part of the operations at Djibouti's DorDjibouti's Daleh Multipurpose Terminal (DMP) Multipurpose Terminal (DMP).

USA, All the Way | Rapidpack in the Wild Wild West

Another truly remarkable and unique project that showcased Rapidpack's arsenal and power was with its great friends in the great state of Texas in the USA.

For 24 hours a day, seven days a week, Rapidpack operates modern, sophisticated machineries including multiple bagging machines, conveyors and storage solutions for handling wheat, sugar, grains/pulses, and other bulk cargo materials at the Port of Brownsville.

The Port of Brownsville is strategic because it is the only deep-water seaport that is directly on the US/Mexico border and is a major point for intermodal transport and industrial development. With 40,000 acres, the Port of Brownsville has the largest land-owning public port authority in the USA, this makes Rapidpack's equipment a perfect synergy to further enhance the inland warehouse and alongside operations for the region.

Rapidpack's trusted equipment, combined with its modern engineering and easy to use design, exemplifies its promise of excellence for every project, night or day.

Rapidapck warehouse management with mobile bagging machine, USA.

RAPIDPACK 1TON Jumbo Bagging machine with hopper and in-feed conveyor warehousing.

Weather-proof, clean and profitable

Customer benefits from the ADAMS® technology from HAVER & BOECKER in focus

The ADAMS® technology stands for the filling of powdery products into water-tight Form-Fill-Seal packages. Developed for the building materials market, it has also made a name for itself in the minerals, chemicals and food industries. And now it is conquering the cement business. To date HAVER & BOECKER has sold more than 500 ADAMS® filling spouts. At POWTECH, the packaging specialist from Oelde, Germany, demonstrated the special advantages of the ADAMS® technology for powdery products at seven stations.

Clean filling

Loose, bulk materials are weighed cleanly and precisely, and filled into a watertight packaging. The work surroundings remain dust-free and employees stay protected. Production time losses due to cleaning and maintenance are reduced as are cleaning, operating and maintenance costs. The complete packing line is ideally utilized and the entire process runs reliably and stably.

Tear-resistant bags

PE packages are tear-resistant and durable, and they have a positive impact on the company and product image among employees and customers. Less damage during transport and storage leads to fewer complaints. Resources are optimally used and CO_2 emissions are reduced. Secure transport and clean handling prevent possible product loss along the entire supply and storage chain and thus protect the environment against contamination by hazardous contents. The entire production quantity gets sold and this secures sales turnover.

Weather-proof storage

The filled bags are watertight and weatherproof and thus can be stored outside at the point of sale, right next to complementary products. They guarantee product protection along the entire supply and storage chain, even under extreme climatic conditions. Moreover they ensure long shelf life and consistently high product quality — an advantage especially with hygroscopic materials. By using the ADAMS® technology, constant production utilization throughout the year and improved planning of the entire production are possible.

Attractive appearance

PE bags can be printed with effective advertising content, thus offering a clean and attractive appearance directly at the point of sale. This generates a positive company and product image among employees and customers. As a result, sales personnel have stronger arguments against the competition and thus have a good basis for possible price increases and greater market share.

Compact bags

With an ADAMS® system, fluctuations in bulk density during the filling process can be evened out. Efficient product compaction during packing ensures particularly compact bags that have a low volume and a perfect and secure-looking pallet appearance. Due to optimal bag volume, less film is required, which in turn leads to significant packaging material savings. Loading volume and transport costs are then optimized.

PE as recyclable material

The PE bags can be emptied free of trickling residue, easily disposed of and recycled or used as substitute fuel. This reduces CO_2 emissions and the use of primary energy, thus making a meaningful contribution to sustainability. The easily disposable and recyclable packaging provides good sales arguments and sets itself apart from competitive products.

Hygiene concept

Hygiene experts consider PE bags as being the most hygienic packaging material for highly sensitive foodstuffs, e.g. milk powder and baby food, because their smooth surface prevents bacteria and microorganisms from taking root. This is the basis of the hygiene concept of BEHN + BATES, the experts when it comes to

food packaging at HAVER & BOECKER. The ROTO-PACKER ADAMS CARE-LINE EDITION unifies proven components under completely new hygiene aspects to produce a new entirety. It stands for optimum hygienic product filling in PE bags with maximum protection for the filled products.

Bulk bag filler boosts pale ale malt packing output with reduced labour

Thomas Fawcett & Sons Ltd, situated in Castleford, West Yorkshire, The United Kingdom, required a more efficient system to pack pale ale malt into 350kg (772 lb) to 1,000kg (2,205 lb) bulk bags, sold across the UK and internationally.

Most of the company's malt was previously supplied in 25 tonne (27.5 ton) bulk lorry loads and 25kg (55 lb) sacks. When the company first supplied malt in bulk bags, members of the malting staff transferred batches of malt from pre-weighed 50kg (110 lb) sacks into bulk bags by wheeling the sacks on a sack truck on the upper floor and tipping them into a bulk bag held on a fork lift truck on the floor below. This was a three person job: one filling sacks, one tipping sacks, and one operating the forklift truck.

With the bag inlet secured to the downspouting, the automated weigh-filling cycle is initiated.

Bulk bag filling no longer labour intensive

Installation of a Flexicon TWIN-CENTREPOST™ Bulk Bag Filler and flexible screw conveyor in the packing room area has created a more flexible packing operation and saved operators from double handling of the malt. Brian Hickman, Thomas Fawcett & Sons, Malting Manager, says "By installing the bulk bag filler, we save between six to eight hours of operator time each week."

Flexible screw conveyor transports malt to bulk bag filler

A bulk storage silo was fitted with a charging adapter for connection to a Flexicon horizontally-oriented flexible screw conveyor 7.5m (25 ft) long and 168mm (6.6 in.) in diameter. From the conveyor's discharge housing, malt flows through downspouting to the bulk bag filler inlet.

How bulk bags are now filled

The bulk bag filler is equipped with an adjustable fill head that can be raised or lowered to suit all popular bag heights, and secured in place with two quick-release pins. An oversized filling spout accommodates open-top bulk bags. Mounted on load cells, the unit can weigh-fill 350 to 1,000kg (772 to 2,205 lb) of malt into bulk bags. To fill a bag, the operator positions a 1,200 x 1,000mm (47 x 39 in.) pallet on the filler deck and attaches the bag loops to each of four retractable bag hooks on the fill head.

The operator secures the bag inlet to the downspouting. The system's PLC runs the flexible screw conveyor at a high feed rate, reducing the feed rate to trickle before stopping the conveyor when the accurate target weight has been loaded into the bag. The bag and pallet are removed by pallet jack.

"Individual customer orders are typically 24 one-tonne bulk bags of malt," says Brian Hickman.

Upgrade saves time, increases production

"The system works well and we are pleased with the reliable operation it provides to our malting facility," says Brian Hickman, adding, "The Bulk Bag Filler and flexible screw conveyor operate separately from our 25kg (55 lb) sack filling system, providing another advantage as we can now do both operations simultaneously, saving time and increasing production. We fill the bulk malt outload silo in the evening when the 25kg (55 lb) sack line is not running, and then we can pack simultaneously during the day."

About Thomas Fawcett & Sons Ltd

Thomas Fawcett & Sons Ltd is a seventh generation family business that has been manufacturing quality malts for over 200 years on its original site in Castleford, West Yorkshire. The company supports and assists brewers of all traditions and sizes and its customers range from multi-national brewers to the latest start-up micro-breweries.

Bag spout is connected before malt is transferred from a silo through a horizontal flexible screw conveyor and downspouting into the bulk bag filler inlet.

Operator attaches bag loops to the four retractable bag hooks on the fill head.

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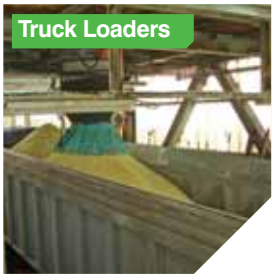

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