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JUNE 2016 issue

featuring...

TRADE & COMMODITIES

Iron ore trade may see further growth 2
Interview with Vedanta Resources' CEO Tom Albanese 3
Americas coal trades 7

SHIPPING & TRANSPORT

Seatrade Clean Shipping Award goes to GAC EnvironHull 17
ISP introduces Challenger Worksafe Pro 300 lifejacket 17
EMS-Tech to supply Equinox Class self-unloaders to Algoma 19
Marine paints: orderbook backlog may keep industry afloat 23

PORTS, TERMINALS & LOGISTICS

Dry bulk sustains major Indian ports 33
'Green Port of the Future' boosts rewards for energy efficiency 35
Bulk cargo nexus: regional report on the Netherlands 39

ENGINEERING & EQUIPMENT

Efficient electric material handler for scrap recycling 67
FLSmidth to supply equipment to Russian port 70
Siwertell systems chosen for Indonesian chemical plant 73
Exciting times for CASE Construction Equipment 74
Van Beek's Liner Filler fills container liners very fast 76
BEUMER's conveying and loading systems 77
Lightening the bulk load: shiploading 81
Getting a handle on coal: update on the latest technologies 105
New barge-mounted E-Crane at Mulzer Crushed Stone 123
World's biggest woodchip transfer bunker 125
Bulk handling Stateside: US equipment in focus 127

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Iron ore trade may see further growth

A close balance between import demand increases and decreases around the world seems to be evolving. Additional volumes may be enough to outweigh reductions, resulting in a small rise in global seaborne dry bulk commodity trade in 2016 as a whole. Restraining influences in the minerals trades are very prominent, while in the agricultural products and minor bulk trades, signs of positive changes are limited.

During recent weeks there has been contrasting news about economic activity in some of the main countries affecting seaborne trade. Japan's GDP grew at an annualized rate of 1.7% in the first quarter of this year, after a contraction in the previous three months, a greatly improved performance. But, according to some indications, the eurozone is slackening after solidly gaining momentum in the early months of this year.

Iron ore

Many steel producing countries which import raw materials have experienced output weakness in recent months. World Steel Association figures show European Union January–April 2016 crude steel production falling sharply by 7% compared with the same period a year earlier, to 54.4mt (million tonnes). China, Japan and South Korea saw smaller 2% reductions, to 261.4mt, 34.3mt and 22.1mt respectively.

However, China's steel output volumes picked up in the past couple of months, and iron ore imports have been buoyant. According to official figures, total imports of iron ore in the first four months of 2016 reached 325.5mt, up by 6%. Although higher stocks at ports have accumulated, a continuing benefit seems to be resulting from further displacement of ore from domestic mines by foreign supplies.

Coal

Expectations for global seaborne coal trade have become much more cautious, and optimism has faded, since the downwards trend in China's imports became clearer. Negative influences have also become more prominent in another key country, India, now the world's largest coal importer.

Widely differing forecasts for India's imports in 2016 emphasize the uncertainty surrounding the outlook. A recent Australian Government report suggested that a 7% increase in India's steam and coking coal imports total is likely. By contrast, other independent forecasters are predicting reductions of between 1% and 5%, compared with last year's volume of around 220mt (historical figures also differ).

Grain

Provisional estimates of global trade in wheat plus corn and other coarse grains, in the new 2016/17 crop year starting July, point to a slight decline following a marginal rise in the year now ending. International Grains Council calculations show a 9mt or 3% reduction to 318mt during the year ahead.

Lower purchases by China, Iran and the EU are expected to be the main negative features among importing countries. But prospects will remain highly uncertain until summer domestic harvests, taking place in these and other northern hemisphere countries over the next few months, are completed. Any unexpected crop shortfalls could boost foreign buying. In China, another factor is current high stocks of corn which the government is attempting to reduce, with adverse implications for imports.

Minor bulks

Trade in forest products is a major component of the minor bulk commodity trade sector. Key elements are logs, sawnwoods, woodchips and pulp and a wide variety of other items. Signs indicate the possibility of limited growth in the overall volume this year, after a marginal increase last year which raised the total to around 340mt.

Bulk carrier fleet

Most of the growth in the entire world fleet of bulk carriers in 2016 will occur within the Handymax (40–64,999dwt) size group. Expansion in this category, as shown in table 2, is likely to be less rapid than seen last year, but still quite brisk. Somewhat lower newbuilding deliveries, coupled with higher scrapping, could reduce deadweight capacity growth to about 6%.

TABLE 1: KEY IRON ORE IMPORTERS (MILLION TONNES)

	2011	2012	2013	2014	2015	2016*
China	687.0	745.5	820.3	933.1	952.7	975.0
Japan	128.4	131.1	135.8	136.4	131.0	130.0
EU-28	113.0	107.0	112.0	116.0	113.0	110.0
South Korea	64.9	66.0	63.4	73.5	73.0	72.0
Taiwan	20.5	18.5	20.5	21.3	23.0	22.0
Total of above	**1,013.8**	**1,068.1**	**1,152.0**	**1,280.3**	**1,292.7**	**1,309.0**

source: China Customs, AGDIIS, Bulk Shipping Analysis **BSA forecast for 2016*

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

	2011	2012	2013	2014	2015	2016*
Newbuilding deliveries	22.4	20.9	14.7	11.4	16.0	15.0
Scrapping (sales)	2.2	4.7	3.5	3.1	3.1	5.0
Losses	0.1	0.1	0.2	0.0	0.0	0.0
Plus/minus adjustments	0.1	0.2	-0.1	-0.1	-0.1	0.0
Fleet at end of year	**131.3**	**147.6**	**158.5**	**166.7**	**179.5**	**189.5**
% change from previous year-end	+18.1	+12.2	+7.4	+5.2	+7.7	+5.6

source: Clarksons (historical data) & BSA 2016 forecasts **forecast*

by Richard Scott, Bulk Shipping Analysis, Tel: +44 (0)12 7722 5784; Fax: +44 (0)12 7722 5784; e-mail: bulkshipan@aol.com

India needs vision – and capital – to realize potential

Interview with Vedanta Resources' CEO Tom Albanese

A lot of zinc ore mining capacity has closed in the past six months and no new big zinc mines are coming on stream.

Kunal Bose

Concerns about Europe and the US going into recession and hard-landing of the Chinese economy refuse to go away. In an interview with *DCI* India correspondent Kunal Bose, CEO of Vedanta Resources Tom Albanese says if recession actually occurs, commodities will be the first to suffer. The commodities sector, according to Albanese, is seen as a canary in a coal mine. Left to him, he doesn't think a global recession will happen. Albanese was earlier CEO and a board member of Rio Tinto.

DCI: Industrial Commodities in general are down over the last few years. Aluminium and iron ore prices though have marginally improved in recent weeks. When do you think the real turnaround in commodities in general will happen?

TA: When seen in global perspective, there is a general negative sector sentiment around resources that is almost independent of supply and demand consideration. The reason for that is commodities sector is seen as a canary in a coal mine. There is a lingering concern that global growth is going negative, driven principally by the risk of hard-landing in China. You also have concerns of recession in Europe and the US. Risk perception has, however, lessened over the past six months. Chinese numbers are looking much better than they were six months back. If the world is to fall into a recession, commodities will be the first to suffer. Left to me, I don't think a global recession will happen. Even then the perception that commodities would lead such a downturn has caused people to be less exposed to the sector than they otherwise would. If you look at the statistics on institutional investors or long-only institutional ownership of commodities, including the mining sector, it's the lowest in 30 years.

The second factor causing negative sentiment is the US dollar

remaining the 'go-to' currency and it gets stronger against all other currencies. This cannot but have an offsetting effect against resources. Take our own zinc business, where the supply demand characteristics are pretty good. Even then zinc prices dropped from $2,000 to $1,500 a tonne in just six months, on no real fundamentals but on fear of the unknown. Now zinc has recovered over $200 and is beginning to reflect the fundamentals. As the blanket lifts off the sector, people are becoming less and less concerned of the unknown. Let's consider the supply-demand fundamentals of individual commodities. I do believe each has its unique fundamentals, not in the demand profile but in the supply profile. While the underlying zinc demand for auto galvanizing has slowed down, it isn't recessionary kind. Then a lot of zinc ore mining capacity has closed in the past six months and no new big zinc mines are coming on stream. So the supply tightness is more evident in zinc than in other commodities. All commodities are doing better than they were three months ago. But they are all worse than they were 12 months ago. The important thing is commodities rerating has begun.

DCI: But what about iron ore, the world's most heavily traded seaborne commodity?

TA: As for iron ore, we are pleasantly surprised to see this rebound in prices in the sea-borne market. It's principally driven by seasonal factors. Margins have improved for Chinese mills. Usually around this time of year, ore prices tend to be stronger. You have a combination of steel mills getting ready to build up stocks ahead of Chinese construction season start and then buying is triggered by cyclones in Australia and difficult weather condition in Brazil. In the first place drop in iron ore prices was overdone. Lots of producers were losing on cash flows. I think ore prices are looking for equilibrium. In the near term, some big producers have capacity expansions under progress. So we have to be ready to mine iron ore preferably at prices lower than today.

DCI: Industry's brave hearts Rio Tinto, BHP and Vale took the position that in no case they would regulate production to keep prices at higher levels which would help smaller producers to survive. They all have excellent economies of scale and even if ore prices fall to $25 a tonne, they will still be making money. Though margins will remain highly squeezed.

TA: What's happening in iron ore is no different from what is happening in other sectors. Smaller producers want bigger ones to reduce their production so that they can make money. You are right there have been quite a bit of expansion in iron ore mining capacity on the basis of continued growth in global Chinese steel production. Now it has slowed and that's having an effect on the current market environment. As for iron ore expansion, once it's complete the flywheel starts spinning. It just goes on and on. You can't stop it. It will be value-destructive to stop that flywheel.

DCI: Where will iron ore prices stabilize?

TA: In this low iron ore price market, small players will tend to leave the supply base, particularly in China. Then a lot less capital is spent in new mines. Fringe businesses in China and West Africa have been hit particularly hard. I am familiar with the West African supply side and miners there are devastated at

Tom Albanese, CEO, Vedanta Resources.

these prices. You have seen a supply side reaction in China. It has caused Chinese steelmakers to rely more on seaborne supply; possibly the upcoming restructuring in the Chinese steel sector will further that. Coastal mills relying on imported ore, armed with modern, less labour-intensive processes and strategically placed to export steel products will be spared the pains of restructuring unlike the old inland units. You will see overall Chinese steel growth slowing and therefore, the country's iron ore consumption. Chinese domestic miners will take the hit most. On percentage terms, mills there will be using a higher percentage of ore from seaborne market.

DCI: In 2009/10, India's iron ore exports amounted to nearly 118mt (million tonnes) on production of 219mt. But then because of ill-advised high export duty and mines closure on court orders, the country's overseas ore sales trailed off to 6.12mt in 2014/15. Your Vedanta is a major ore producer in India. Your comments.

TA: New Australian producers then picked up the slot India vacated. So it's not just that India lost the business but India permanently lost the market share. Look at some of the new players, Fortescue for example, their rise in production capacity almost nearly equalled the decline in India's export capacity. I'm aware of Indian steel industry campaign against ore exports of all kinds, lumps and fines irrespective of their iron (Fe) content. My view is that India is not short of iron ore. The industry is short on capital.

DCI: Capital should preferably come from outside, since India is short of that.

TA: Capital origin is not important. If there is an investment opportunity it will come from overseas or it will originate here. I have seen by way of a lot of experience that geological formations in Goa, Karnataka and Orissa are equivalent to those in Australia and West Africa. Geological formations are the










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same, prospective resources are the same and the constraints in India are basically man-made. The basic constraint is that lease sizes are quite small and so you are not able to look at the holistic geological formations, like in Australia. That is a legacy factor which is hard to work through. Geological formations in Australia are largely in remote areas with no population. But in India they are in communities settled locations. The mindset in India is for smaller domestic scale mines, very similar to what was found in Australia back in the 1960s. It wasn't till the 1970s the recognition came that Japanese capital, in conjunction with Australian capital, could develop very large resources. It went well beyond the then prevalent view of protecting Australian resource for Australian steel, to one where it became the single biggest industry in the country. In many ways, if you look at the geological endowment in India, I would say if it was difficult for Australia it is going to be difficult for India. The small leases, generally more populated areas and lack of infrastructure are going to make it all the more difficult for India. It took 40–50 years for the infrastructure to develop in Australia.

DCI: But infrastructure in Australia was developed by the big miners largely.

TA: Let's say by private capital. But it didn't happen overnight; it took many decades to evolve. Infrastructure will not be a constraint if private and public capital combines. You have to have a vision for India. I have a vision for what iron ore could do for India. But that's not realizable overnight. It is difficult to basically look at large scale operations and then to create the social licence due to the presence of communities in the area and also because of infrastructure deficit. Infrastructure could be developed through public private partnership (PPP) model. It should be one step at a time. But the Indian steel industry must not be fearful of losing its geological endowment. What they need to fear is that it doesn't continue to grow on Australian imports.

DCI: Believers in free trade will not care whether Indian steel mills are using local iron ore or ore of Australia origin as long as the prices and quality are right.

TA: I think I am a free trade person myself. I do want to say that the steel industry always had a special place with governments. If you look at all major wars of the past 300 years, they weren't won by countries with best armies; they were won by countries with the best steel industry. Ultimately when you think about policymaking you consider the government's responsibility to provide jobs, home and also defend borders. The steel industry always had a special place with policymakers. I respect that. If you think like that, India should have its own indigenous steel industry. I also believe that the iron ore resource endowment is so large it won't go away. If you look at what happened in Brazil, when people thought that their ore resource would only last 20–30 years; it is now being evaluated to be good for 100–200 years. I shall say 200 years from now geologists will still find more ore there and in many other places. I know in Pilbara (Australia) or Brazil or West Africa, the material that goes in waste dumps is abandoned iron ore formation with Fe level at 40%.

DCI: Do you think after what New Delhi has done with export duty in the 2016/17 budget, Goan iron ore exports will come back to its past level?

TA: We are not working in a $100 a tonne price environment for iron ore. Now we are at $40–50. From our perspective, we think that the government made the right decision to eliminate the duty for low grade iron ore exports. This was, however, not desired by the Indian steel sector. Moreover, Goan iron ore is not best configured in terms of its location. To get the mines in Goa back to where they were before closure will call for a lot of capital investment. So you are back to the point that the industry is short of capital not short of resources. We at Vedanta are ramping up our business, so also other operators. We should be able to make some money at current prices, but not a lot. The key is to get the flywheel going.

DCI: Whatever ore you produce in Goa has to be exported, since the domestic market is not there for that kind of ore. But for you to export you need China. But has China got the same kind of interest in Goan ore like it was before suspension of mining?

TA: Today we can sell every tonne of iron ore we produce. That is also our plan and most of the iron ore goes to the Chinese steel sector. We recognize that we have to now rebuild our market share even if our material is of lower grade, as opposed to other grades in the market. We do have some advantages in our iron ore. The Goan quality has low phosphorous than much of the newer Australian product. So we are marketing our product by encouraging Chinese steel mills to go for blending and thereby bring down phosphorous levels they may have through Australian ore. Vedanta mostly produces fines in Goa. But we also have some plus 58% Fe product which doesn't make sense for us to export owing to the 30% duty. We have our local market and we also have value-added business. We have been expanding that business in Goa. DCi

Americas coal trades

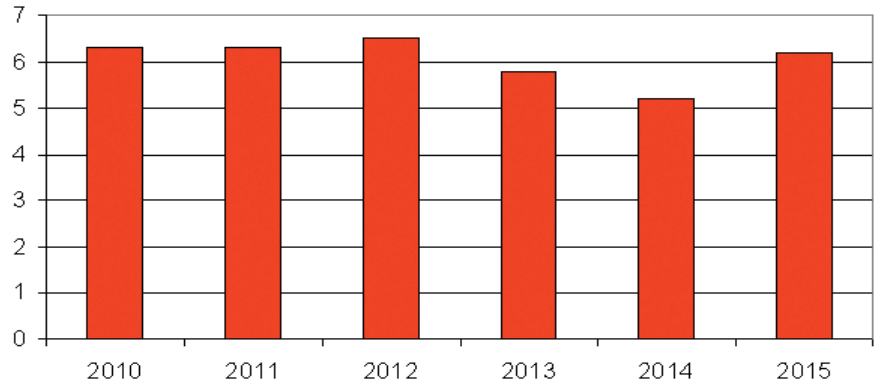
Dr Tim Jones, e-coal.com

Coal trade in the Americas has been under a lot of strain over the past year or so, and most operators on both the supply and demand sides have been experiencing great challenges. This is true from Canada to Argentina and Chile. Some operators have faired better than others, but on balance there was little to celebrate when 2015 came to an end. This year is proving challenging again, but most market players believe 2016 will not be as bad overall as last year. There is also optimism that improvements will be seen in 2017 albeit from a low baseline.

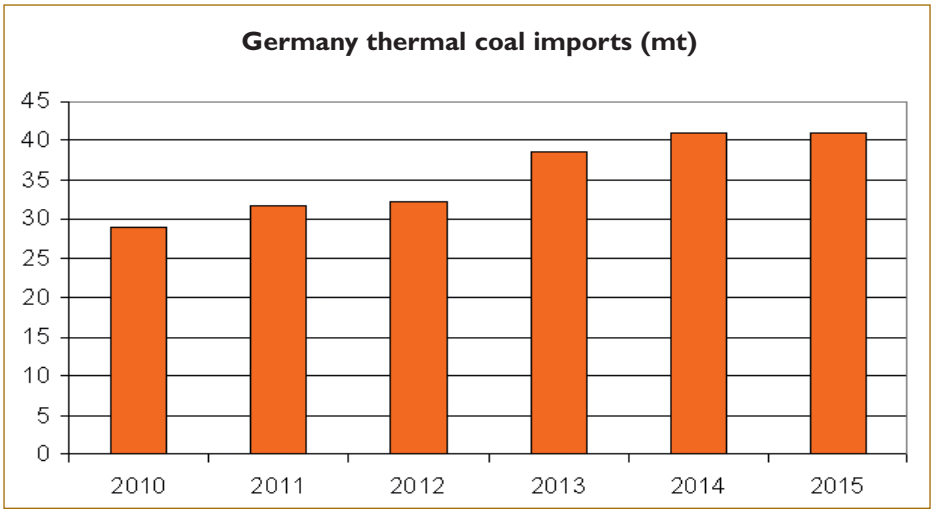
On the demand side in the Americas, in Argentina, coal demand at the AES Central Termica de San Nicolas was a little lower in 2015 compared to the previous year. The total recorded was 810kt compared to 840kt the year before. Colombian suppliers achieved over 60% of the market, with South African shippers making up the remainder. State-owned Yacimientos Carboníferos Rio Turbio is due to supply up to 1.2mtpa (million tonnes per annum) of domestic thermal coal to the 240MW Central Termoelectrica de Rio Turbio in Santa Cruz following commissioning this year. Coal demand in Argentina is expected to be steady during 2016 with around 820kt burned at CTSN and a total of about 1mtpa imported this year. The outlook for next year remains steady.

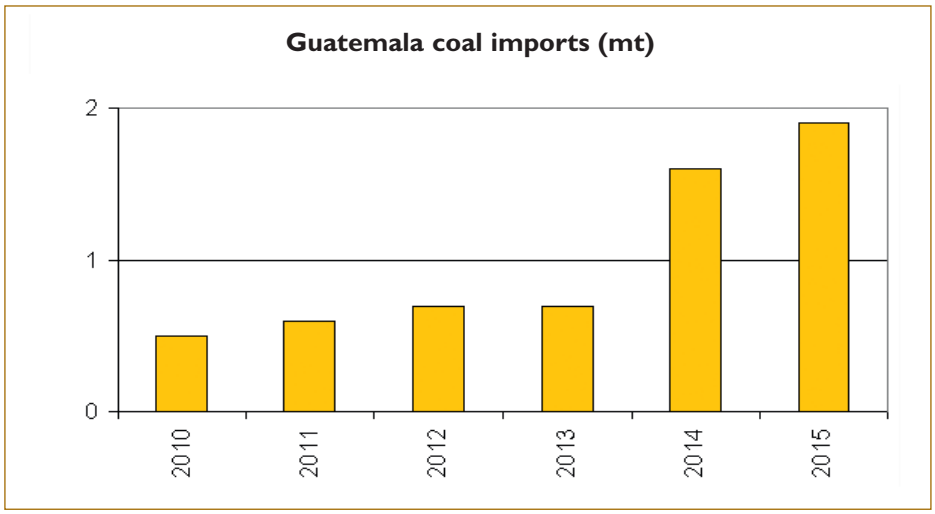
Brazil imported 21.5mt (million tonnes) of coal in 2015 which was an increase of 1.2mt compared to the previous year.

Mexico thermal coal imports (mt)



Imports from Colombia increased by 1.1mt to reach 6.2mt. Australian shippers delivered 5.9mt in 2015 which was an increase of 1.5mt compared to 2014, and Russia shipped 1.4mt which was an increase of 0.4mt compared to the previous year. US shippers saw a decrease in deliveries of 1mt to result in 6mt overall. Canadian exporters also saw a decrease in volumes of 0.8mt to record 1.4mt in 2015. Total thermal coal imports by Brazil in 2015 reached about 7mt last year which



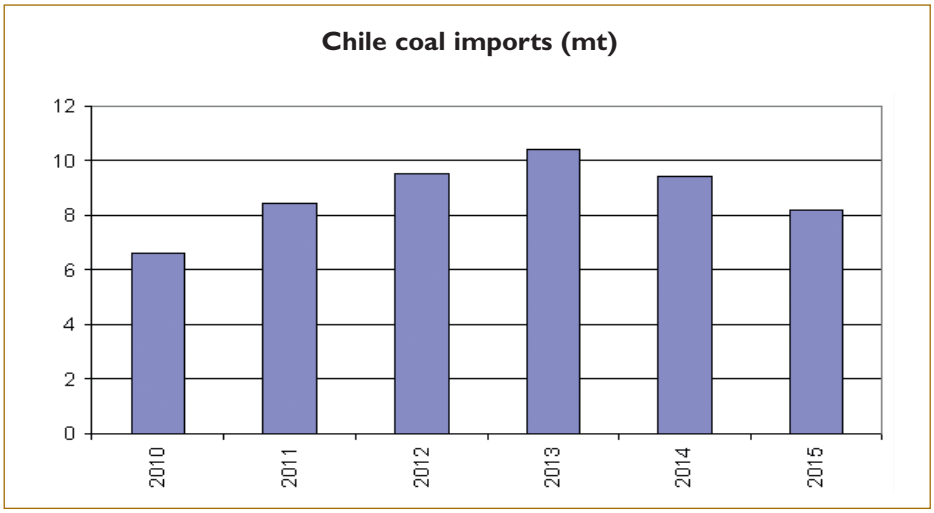


was an increase of around 1mt. A lack of hydro availability contributed to this increase.

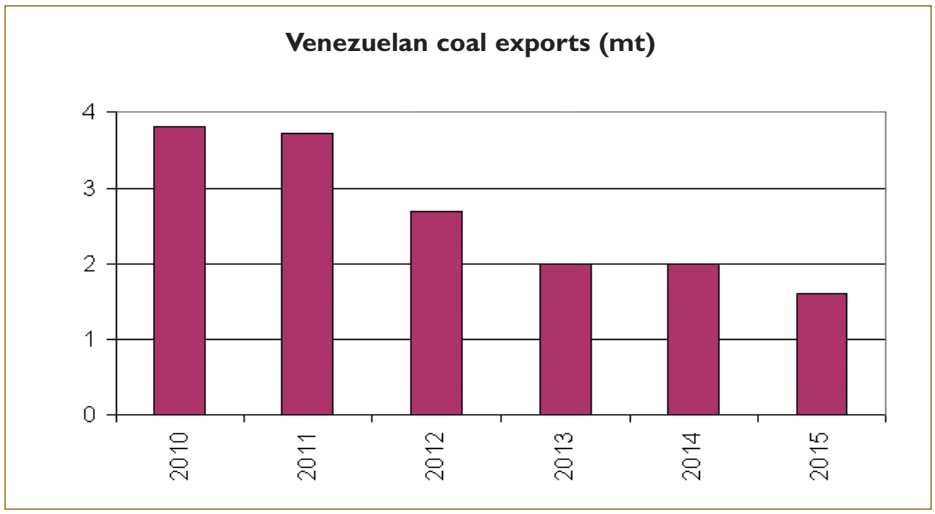
Eneva is expected to burn slightly more coal in 2016 compared to last year at 2.2mt. Alunorte is expected to increase demand to around 750kt in 2016 from 740kt last year. Other demand will come from Vale's Mineracao Onca and the Alumar aluminium smelter which will take a combined total of more than 750kt per year. Demand from Puma is likely to be about 375kt, while InterCement is burning more petcoke reducing coal import demand this year to

about 200kt. There has been no progress on the construction of the planned 600MW Amapa and 600MW Para coal-fired power stations yet. Thermal coal imports by Brazil in 2016 are forecast to be fairly steady.

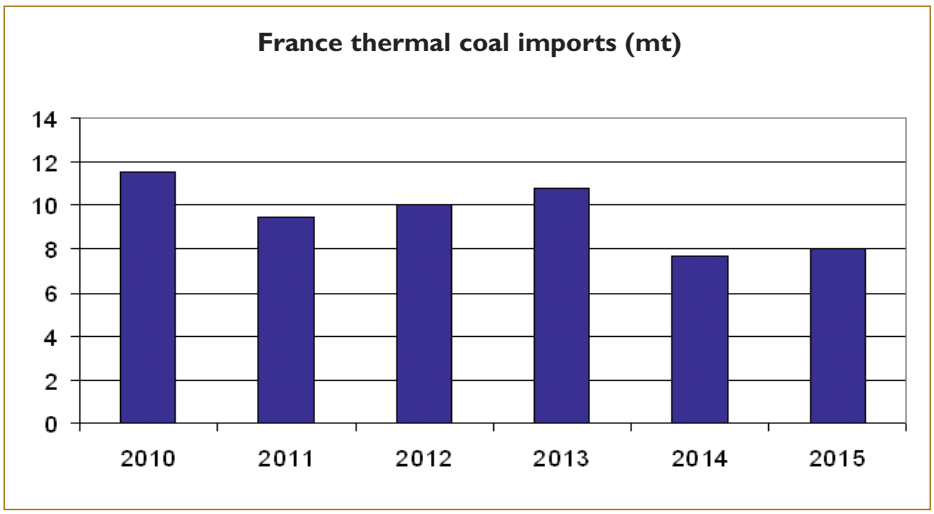
Chile imported less thermal coal last year, with Colombian shippers taking a large hit on trade and losing around a third of business compared to the previous year. Coal imports decreased by some 1.5mt in 2015 to around 8mt. The loss of power generation at Endesa's Bocamina power station earlier in the year contributed to this. Australian exporters, however, gained considerable extra market share with more than 1mt shipped to Chile in 2015. Chile's export trade was also more sluggish last year compared to the previous year, with most of the tonnage going to India from the Invierno mine. Output from that operation decreased due to market conditions as demand fell and prices continued to decline for the country's sub-bituminous product. Nevertheless, a few cargoes found their way to Europe, with the Netherlands and Spain recording some imports during the year. The country's own demand for electricity grew by about 2% in 2015 but this was lower than had been forecast due to the slowdown in some industrial sectors such as mining, and milder winter weather. As well as coal, other mining products such as copper and iron ore have seen depressed markets and this has impacted Chile's mining sector and further investment in the medium term. Some 40% of the country's electricity demand is from the mining sector, so this is an important factor in determining power demand. On the positive side for coal, there are two new coal-fired power stations, Cochrane and Guacolda V which should boost demand from 2016 onward. There could be an extra 1mt required in 2016, with a further 0.5mt next year if the new capacity comes into full operation.



In Central America, in the Dominican Republic, coal import demand has been around 1mtpa but this could increase if a major new project is commissioned. AES Dominicana takes about 0.75mtpa of Colombian coal for the Itabo power plant, while EGE Haina can use around 0.17mtpa. The cement sector has been importing about 0.15mtpa of Venezuelan coal for Cementos Nacionales and Cementos Cibao. Towards the end of next year, the new 680MW Santa Catalina coal-fired power station is expected to be commissioned and coal demand could reach 2.4mtpa.



In Guatemala, Jaguar Energy commissioned its new 300MW coal-fired power station last year, and thermal coal demand was boosted in the second half to result in the country importing 1.85mt by year end. This was an increase of 0.35mt compared to 2014, with Colombian shippers supplying almost all of the tonnage. Central Generadora Electrica (CGE) imported the bulk of the coal for its San José plant (0.4mt), Costa Sur and Santa Lucia plants (0.2mt), and about 0.25mt for supply to sugar producers and general industry consumers in the country. Cementos Progreso requires around 30ktpa while Duke Energy has been needing about 0.3mt at the



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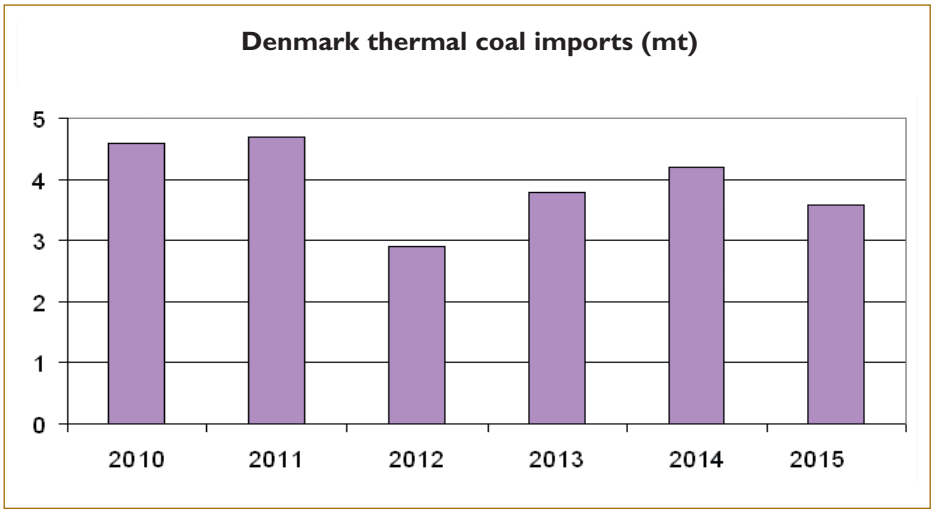
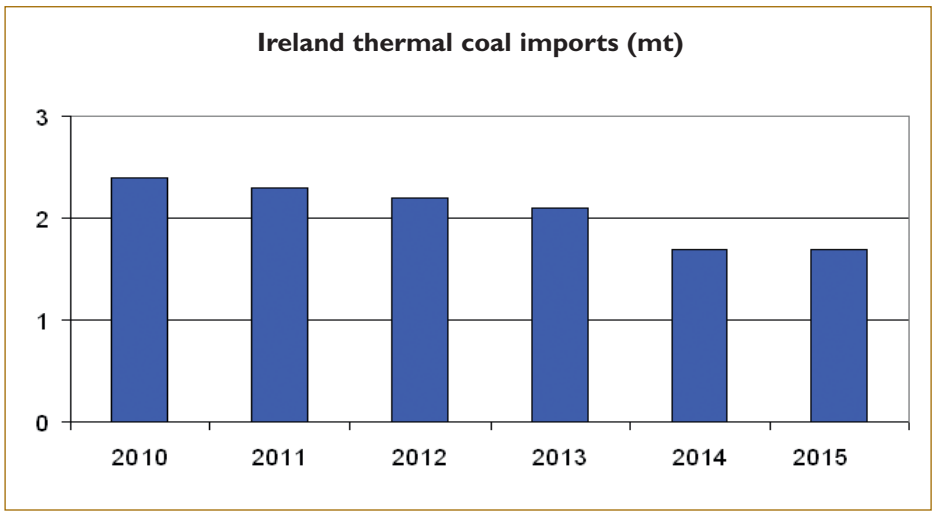
Las Palmas power station. Jaguar Energy is ramping up its electricity output this year, and is forecast to require just under 1mt of imported coal at full capacity. Competition from oil-fired generation amid low prices, however, could affect Guatemala's coal demand for the foreseeable future.

Honduras imported a small quantity of Colombian coal last year for the Envasa plant which takes about 20ktpa, plus about 23kt for Electrica del Sur's sugar mill at La Grecia. The mill can import 40kt of thermal coal but demand varies depending on gas availability and unused coal stocks being carried over each year.

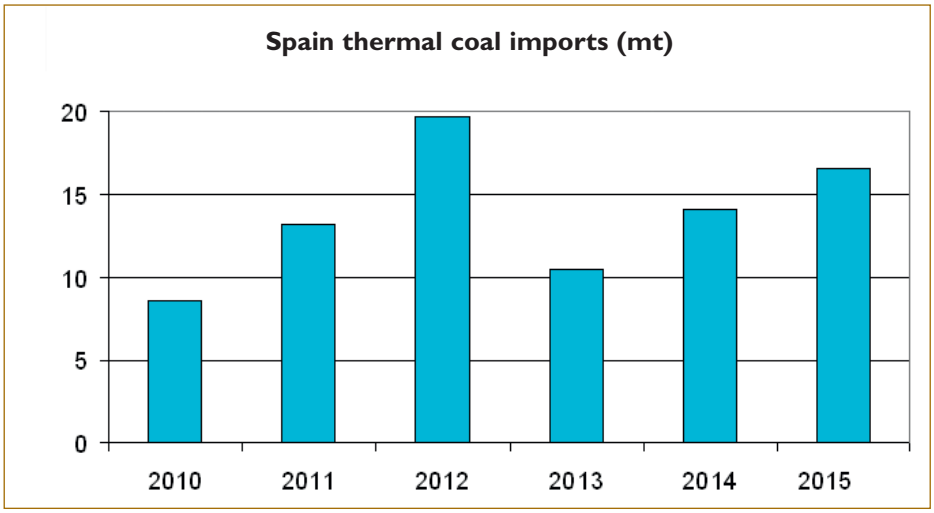


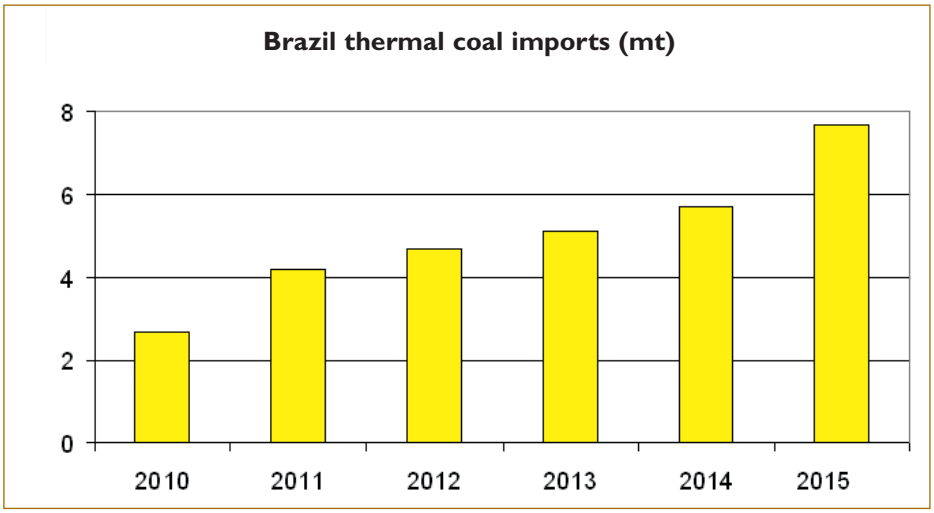
Cementos Panama imported 110kt of Colombian coal last year, with consumption expected to be level this year. The Bahia Las Minas power plant took 0.28mt of coal in 2015 and is also forecast to have level consumption in 2016. Colombian coal is supplied by Sator.



Mexico's Comision Federal de Electricidad imported about 6mt last year, which was about 0.8mt higher than the year before. This year, CFE is expected to require a similar amount of thermal coal. By the end of 2015, the national utility had coal stocks sufficient to see it through to June this year at the Petacalco power station. Steady demand this year is likely to increase after 2017 if the Pacifico II and Pacifico III power stations are commissioned. These have a combined capacity of 1,400MW. In the mix recently, there was lower hydro generation in 2015 due to lower rainfall, but nuclear generation grew by some 25%. Gas also competed with coal in 2015 as prices were lower.

Peru's thermal coal demand is based on the 135MW Enersur power station, and it amounted to 0.07mt in 2015. High coal stocks and competition from hydro, gas and oil at the other generating facilities in the country caused thermal coal demand to decrease last year from a more usual 0.3mt. This year the total is likely to increase to more than 0.3mt. No new coal-fired power stations are planned for Peru, but there are plans to build an interconnection with Chile with a possible capacity of 1,000MW. Demand for coal from the cement sector is facing competition from petcoke and Peru's domestic anthracite resource. Cement producers Unacem and Pacasmayo required about 0.2mt last year, but this is forecast to decrease to about 0.18mt in 2016. Peru's total coal imports reached about 0.3mt in 2015 which was a decrease of some 0.2mt compared

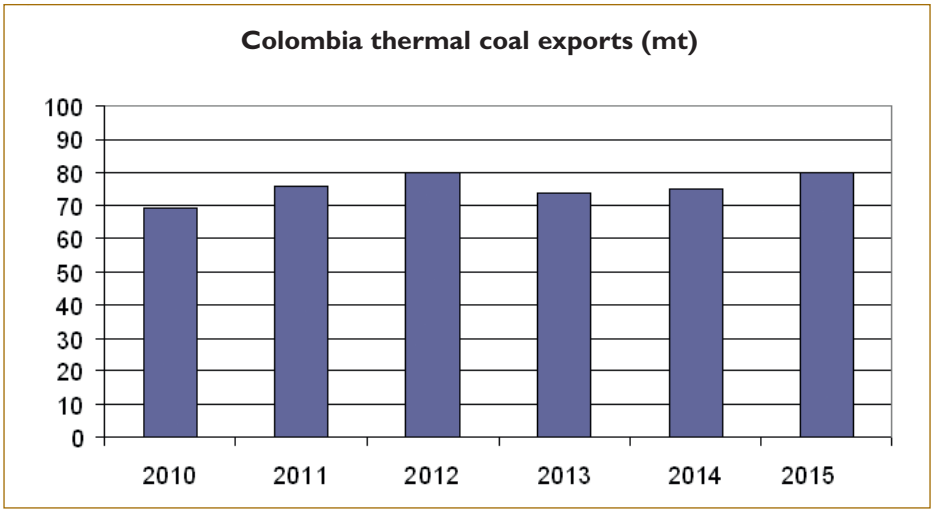


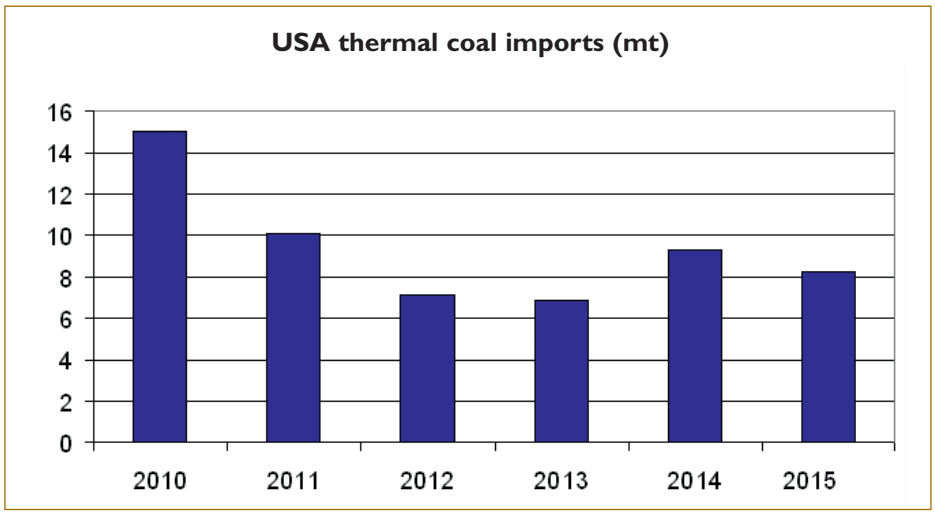


to 2014. Enersur is forecast to require more imports this year.

Demand for thermal coal imports in the United States was lower in 2015 compared to the previous year at under 10mt. Most of this was supplied by Colombia which was able to increase its trade by a few hundred thousand tonnes at the expense of shippers from Venezuela. Indonesian shipments to the USA were also lower last year compared to 2014. Thermal coal imports have been in competition with low gas prices in the US for power generation, seeing some of the lowest ratios in the fuel mix during 2015. The milder weather as winter approached, also led to lower deliveries being required by domestic suppliers at the end of the year. Stockpiled coal was used where possible as levels had been approaching maximum capacity on the pads in some cases, further reducing demand for imported thermal coal.

US consumers have been seeing excess supply despite reductions in output to try to address the imbalance in the market during 2015. This has not been positive for international trade and so the levels of thermal coal imports has been low. Forecasts have suggested that there will be little change this year, and with 2017 far enough away, some were predicting that as the earliest any change might begin to be seen. A rise in the price of natural gas is expected to be one main prerequisite for an upturn in the thermal coal market in the USA at this stage. With little movement so far this year, things continue to be depressed for producers in the country. The main coastal buyers of imported thermal coal keep an eye on bargains in the international market amid such conditions, and some tonnage still finds its way to the US ports at the time of writing. However, demand remains fundamentally low. Total thermal coal imports for 2016 are expected to be lower than they were last year, with the situation remaining unclear into 2017.

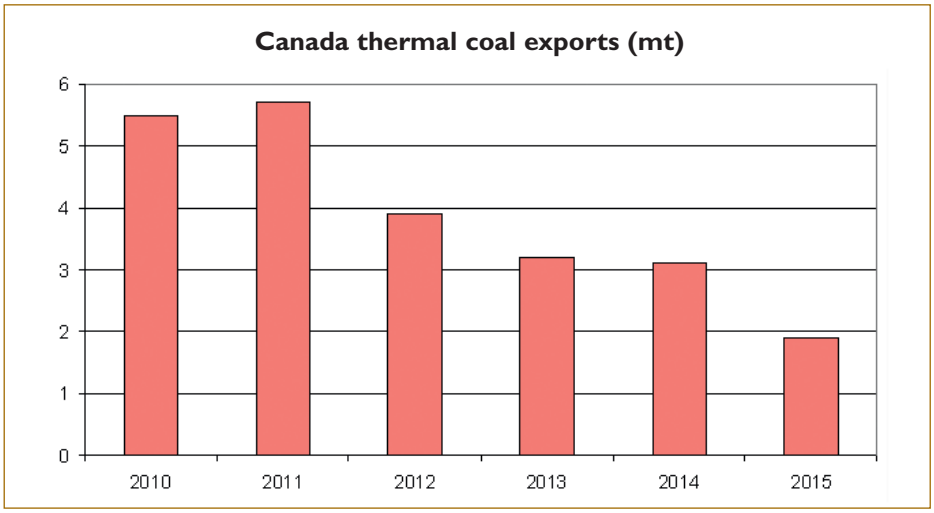




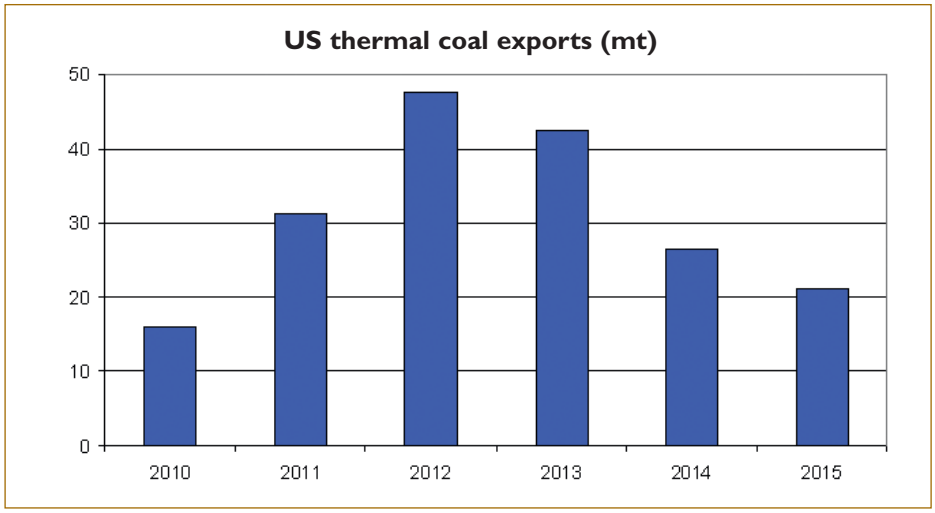
Canadian thermal coal imports were low in 2015 at around 2mt and are expected to decrease this year due to additional production at the Donkin mine which is expected to supply Nova Scotia's Lingan power station. Most of the imported thermal coal came from Colombia, with the USA making up the remaining 12% or so. The main consumers of coal include Nova Scotia Power which can burn almost 3mtpa as well as several hundred thousand tonnes of petcoke. Imports, mainly from Colombia have been shipped to Point Tupper and Sydney for consumption at the Trenton and Lingan power stations. New Brunswick Power imports

around 1mtpa of thermal coal at present, as well as around 200ktpa of petcoke.

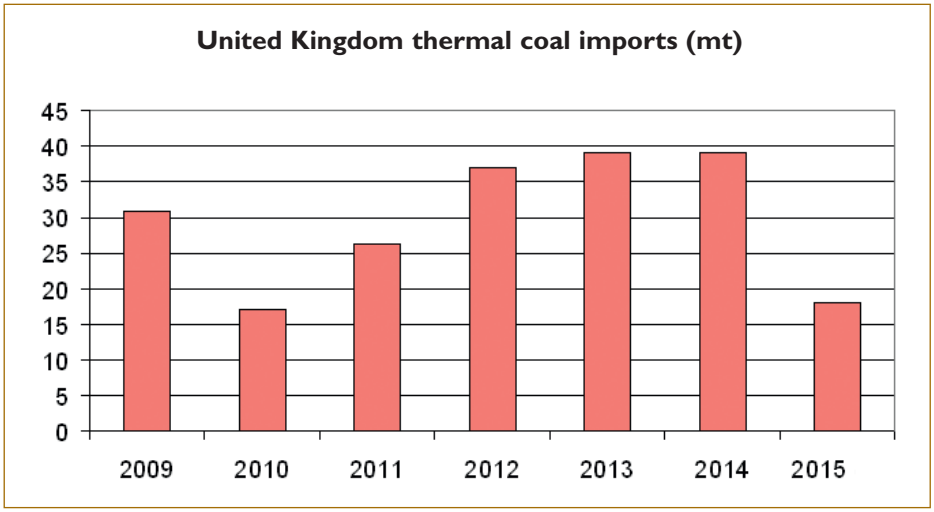
On the supply side, Canadian thermal coal exports were down by around a third last year compared to 2014 at a couple of million tonnes or so. The Asian markets were weaker during the year with Japan remaining the key buyer amid the fall in demand for imported Canadian coal there. Shipments to Taiwan decreased by over two thirds, and China showed little interest throughout the year. Despite the weaker export market, Ridley Terminals reported an increase in exports of 32% in 2015 compared to 2014 amounting to 1.97mt. This was 0.48mt higher than was reported in 2014. December was a busy month last year, with 0.31mt reported shipped. Some of that tonnage is believed to have been US product from the Powder River Basin. On other side of the country, Nova Scotia Power is expected to take thermal coal from the Donkin mine over the course of 2016, which is mainly a coking coal operation. It has a capacity of 3.6mtpa but is not expected to produce that much coal this year. Some exports are possible through Sydney, Nova Scotia, so this operation could impact the trade figures in the export and import markets in the coming years. Colombian and US traders are likely to be mainly affected. The state of the coal market is keeping development of the large resource at the Vista project in Alberta on hold. If conditions were favourable, the mine could produce well over 10mtpa and export through Ridley Terminals on the west coast into Pacific markets. Canada's export trade is expected to be fairly flat for this year and the foreseeable future after the decreases seen in 2015.



The US thermal coal export market was also depressed in 2015, with around 24mt shipped. This was half the level seen just three years earlier. The US is exhibiting its historic role as the swing supplier in the market, entering when prices are high but being less active when prices are low. Competition from Colombian exporters into the Atlantic markets both north and south also affected exports last year, and this is expected to continue this year. One sector that did see some positive results in 2015 was the demand from India for Illinois coal, recording more than 2mt shipped which was over twice that seen in the previous year. Indian demand for this product this year, however, is expected to be lower.

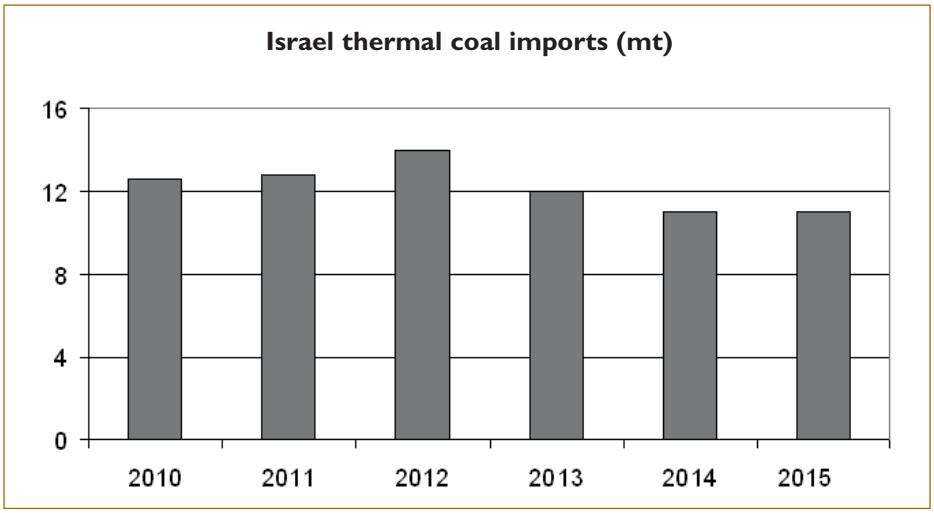


Production cuts in the USA are expected to continue this year and for the foreseeable future following the substantial decrease of some 100mt last year. With weak demand in the domestic markets as well as little opportunity for improved business in the export sector, the US coal miners are facing a prolonged difficult time. There appears to be little prospect of improved demand for US coal of all qualities at the time of writing. The start of this year saw declines in output while coal stocks were also plentiful during the winter months. Electricity generators had been seeing the highest stock levels for more than two years at that time. Weather patterns have not helped coal consumers to significantly reduce their stockpiles either. Competition from low gas prices has also hindered the thermal coal sector, and low oil prices have been persisting during the

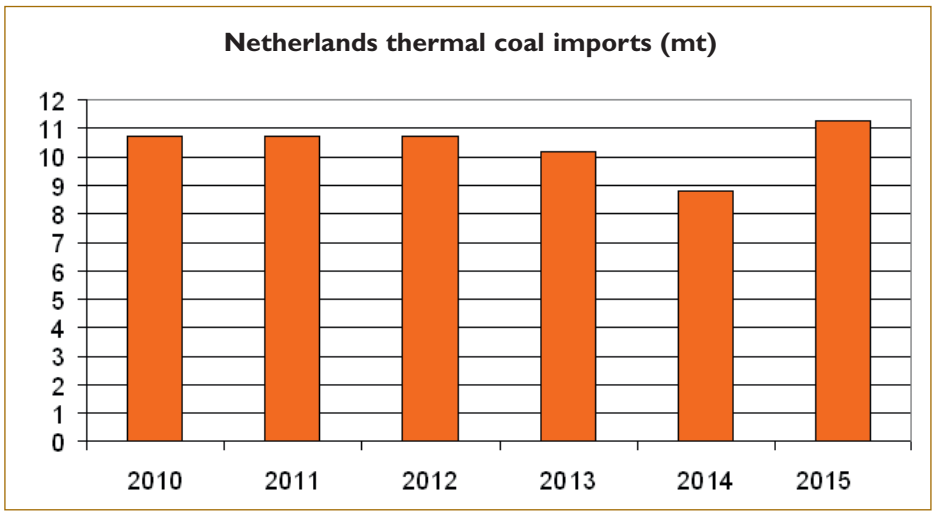


past months of 2016 as well. Low prices for coal in the US are expected to remain at present, and with a similar softness in the international markets the motivation to reduce coal output will continue, probably until 2017 or later.

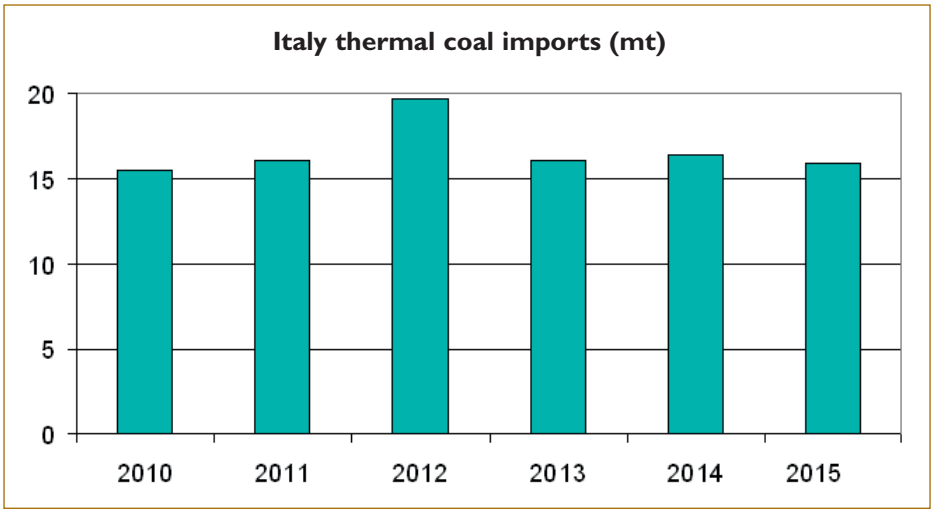
Given the subdued international thermal coal market the expectation has been for a further decrease in US coal exports this year. Some forecasts have suggested a decline of some 10mt by the end of 2016. Next year is expected to see some further decreases but perhaps to a lesser extent than the previous couple of years. The only market with reasonably firm demand is India, but shipments of Illinois Basin coal are not going to be large in this environment of low prices. India has also been looking to import higher quality material than has been the case in the past.



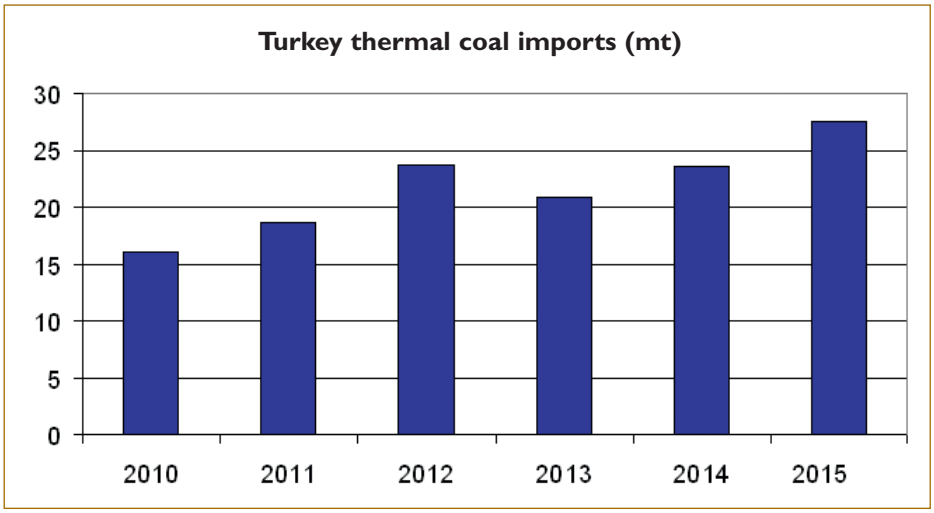
Colombian thermal coal exporters bucked the trend in 2015 and recorded an increase in shipments to 80.5mt. This was an increase of 5.5mt or 7.3% compared to the previous year, but it was still below the optimistic target of 84mt set earlier by the Colombian coal producers. Their main markets in Europe were weak in 2015 but economics allowed them to compete strongly with the likes of the USA, South Africa, and Russia throughout the year. They may have shipped even more, displacing competitors' tonnage, if there were not the restrictions on coal railing in Colombia. Night time transport from the mines to the ports on the Fenoco rail line had been restricted on environmental grounds. Drummond was able to return to full activity in 2015 after the port disruption in 2014. The company exported 27.9mt of thermal coal which was an increase of 6.1mt compared to the previous year. Cerrejon and Glencore had a weaker year in 2015 with 33mt and 16.4mt exported respectively.



The Colombian thermal coal exporters increased their shipments into Europe by about 4.6mt in 2015 taking the total to that region to 57.6mt. Buyers in Turkey and Portugal took advantage of lower prices, as well as those consumers in Italy. The Netherlands also recorded increased intake of Colombian thermal coal which was destined for various northwest European end users. The United Kingdom was not taking as much however, and the total Colombian tonnage imported in 2015 decreased by around 2.8mt overall as coal-fired power station closures largely to comply with European Union emissions regulations took a further toll on the United Kingdom



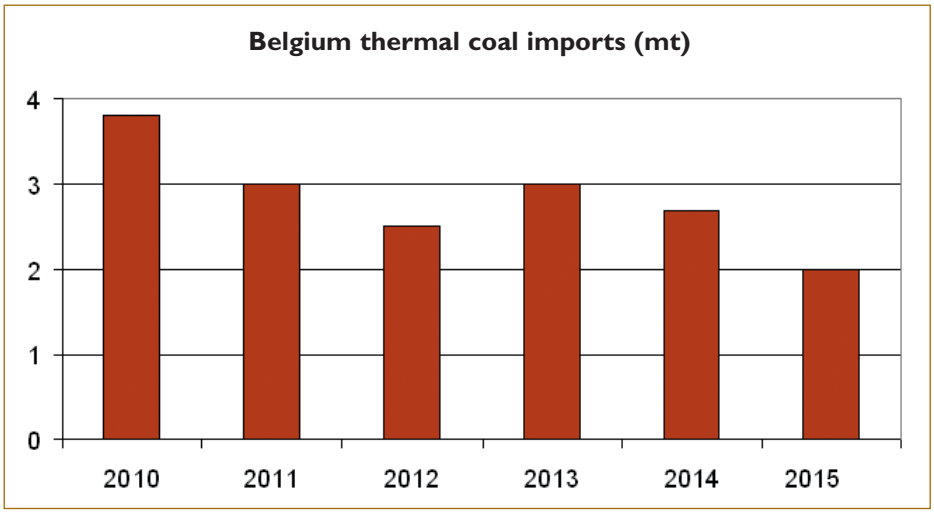
coal sector. Contract tonnage to consumers in the southern USA also proved firm during 2015, with some 6.3mt shipped there. This was actually an increase of 0.8mt compared to 2014. Growth in exports of thermal coal was also recorded to Brazil with an extra 0.6mt sent there last year. Guatemala also imported 0.5mt more Colombian thermal coal in 2015 which helped make up some of the 1.3mt decline in demand from Chile. Pacific thermal coal markets declined by some 0.9mt during 2015.

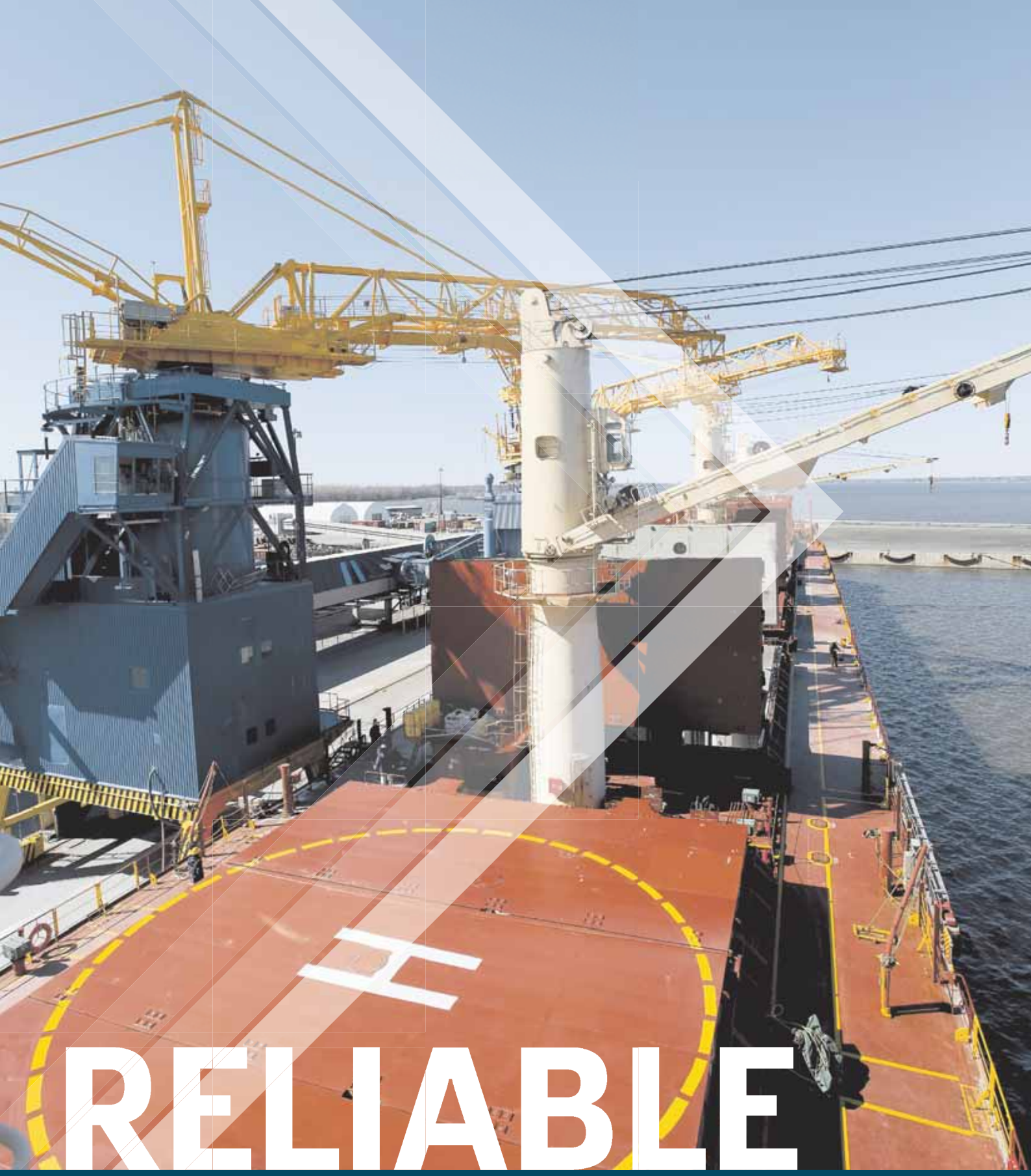


Border closure between Colombia and Venezuela in August 2015 due to suspected criminal activities affected coal shipments through the Venezuelan ports. Some 0.3mt is believed to have been involved by the end of the year. The Venezuelan coal industry saw further contraction in 2015, recording a decrease of 0.4mt in thermal coal exports to just 1.6mt compared to 2014. The main coal exporters, InterAmerican and Carbones de la Guajira shipped just 0.52mt and 0.82mt respectively. The increase in exports to the USA and Guatemala by Colombian shippers mentioned above was at the expense of the Venezuelans who saw a decrease of 0.12mt and 0.14mt to those countries respectively. Guatemala only imported 66kt of Venezuelan coal in 2015 while the USA took only 180kt. The European markets took 62kt less thermal coal from Venezuela last year, and the exporters sold 92kt less material to the Asian consumers compared to 2014. This year is expected to remain a difficult one for the Venezuelan coal sector, with little improvement likely for the foreseeable future.

The coal industries in the Americas are coping as best they can in this ongoing depressed environment during 2016. There may be some improvement next year, but with market fundamentals being the way they are, until there is a significant change in the supply demand balance, low price environments will continue to damage producers. With signs of an improvement in some markets in recent weeks, there has been some optimism from some coal investors. They are, however, looking at things from a depressing position which they have had to endure for a number of years now. Coal trade in the Americas during 2016 is looking to be varied, and some will be luckier than others.

Dr Tim Jones is Director of e-coal.com Consultancy and Editor of the weekly publication Coal Market Intelligence *which covers 11 spot markets worldwide, gives key information on the latest deals and tenders, company news, people and jobs, industrial relations, and ports, shipping, and freight rates.*





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Seatrade Clean Shipping Award goes to GAC EnvironHull

Accolade recognizes benefits of brush and diver-free underwater hull cleaning technology

GAC EnvironHull's innovative HullWiper hull cleaning technology has won the Clean Shipping title in this year's Seatrade Awards presented this week in London. It is the fourth major industry award the diver-free remote-controlled system has won since it was launched at the end of 2013.

The Clean Shipping Award is presented to new or improved technology which makes a significant contribution to reducing the negative environmental impact of shipping. By presenting to title to GAC EnvironHull, the panel of judges recognize its ability to deliver a foul-free hull quickly, conveniently, economically and without risk to human life or the delicate marine environment.

Since its launch in Dubai two and a half years ago, HullWiper has been approved for use at ports in the Middle East, Europe and Asia, and more than 400 hull cleaning operations have been conducted using the Remotely Operated Vehicle (ROV) to date.

Not only does HullWiper effectively clean vessels' hulls of fouling with water jets rather than brushes or other abrasives, it also collects debris from the operation for ecological disposal on land, thus reducing the risk of cross-pollination of waters with alien species.

The Clean Shipping Award was presented to Simon Doran, Managing Director of GAC EnvironHull. He says: "Even in a depressed market place where oil prices have taken the pressure off of vessel efficiency and operating costs to some degree, there will always be room for greater safety and the protection of the environment. This award win is a valued endorsement from the industry that the HullWiper revolutionary hull cleaning system meets the stringent and vital marine environmental protection standards."

Simon Doran, Managing Director of GAC EnvironHull Limited (centre left) with the Seatrade Clean Shipping Award, presented by Kitack Lim, IMO Secretary-General (centre-right).

HullWiper is now in use at the ports of Jebel Ali, Sharjah and Fujairah in the United Arab Emirates, Sohar in Oman, Singapore, Spain and in Scandinavia.

About GAC Group

GAC is a global provider of integrated shipping, logistics and marine services. Emphasizing world-class performance, a long-term approach, innovation, ethics and a strong human touch, GAC delivers a flexible and value-adding portfolio to help customers achieve their strategic goals.

Established since 1956, GAC employs over 9,000 people in more than 300 offices worldwide.

ISP introduces Challenger Worksafe Pro 300 lifejacket

Tough wipe-clean lifejacket for the bespoke commercial market

ISP (International Safety Products), whose global portfolio of marine safety products and services cover commercial, leisure and military markets, has added a new lifejacket to its workplace range, the Challenger Worksafe Pro 300.

Available as a single chamber 275N, the Challenger Worksafe Pro, which supports 330 Newtons, is designed especially for the tough demands of industrial and commercial maritime environments. An ergonomically designed slim fit for easy donning and a comfortable fit, the Worksafe Pro is constructed of a highly durable but flexible PVC with orange wipe-clean cover. A neoprene anti-abrasion neck further adds to its comfort.

Features include a fitting for AIS Recovery System integration, storm flap and integral zipped pocket and radio attachment strap, with a single removable crotch strap for additional security. A zipped closure means it is easy to re-pack, should it be activated. The UML Pro Sensor Automatic operating head sits behind a window for speedy safety checks.

The Challenger Worksafe Pro is a bespoke product, and can be customized for commercial and other organizations. A 150N model is also available.

New Challenger Worksafe Pro 300 from ISP.

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EMS-Tech to supply three 'Equinox Class' self-unloaders to Algoma Central Corporation

The EMS-Tech sales team has announced the signing of an additional three *EQUINOX*-class self-unloaders for Algoma Central Corporation — contract signing took place in Rijeka, Croatia on Friday, 11 March 2016. The Laker classed self-unloaders will be constructed in Rijeka, Croatia at 3 MAJ Shipyard, part of the Uljanik Group, along with the Algoma 650s contracted late last year.

The first of the three 740s will be delivered in Quarter (1) 2018. The *EQUINOX* class represents the next generation of Great Lakes - St. Lawrence Waterway bulk carrier vessels. The *EQUINOX*-class vessels have been specially designed to optimize fuel efficiency and operating performance, minimizing their environmental impact.

The new vessels from EMS-Tech will join Algoma's existing EQUINOX*-class bulkers.*

EMS-Tech is thrilled to have its self-unloading technology integrated into these new generation self-unloading bulk carriers, and looks forward to working with the Uljanik Group to successfully deliver these new vessels to Algoma Central Corporation.

MacGregor self-unloading systems for Algoma's Great Lakes fleet modernization

MacGregor, part of Cargotec, has received an order for gravity self-unloading systems for two 29,800dwt bulk carriers (lakers) from the Yangzijiang shipyard, in China. The vessels will be delivered late 2017 / early 2018 to Canadian Great Lakes operator, Algoma. The order was booked into the first quarter 2016 order intake.

"MacGregor enjoys a good, long-term relationship with the Yangzijiang shipyard and we are happy to see our position in the self-unloading market strengthened through this order," says Mikael Hägglund, Sales Manager, Selfunloaders.

The contract will see MacGregor deliver a highly-automated, efficient self-unloading system to each of the new vessels. The system is designed for a maximum unloading rate of 5,450tph (tonnes per hour) for stone or iron ore and 4,360tph for coal. MacGregor is responsible for the design of the complete self-unloading system, which includes a discharge boom, full flow cargo gates, conveyor belts, cross conveyors, and a C-loop.

"MacGregor thoroughly discussed Algoma's technical requirements during the pre-contract phase and was able to offer the most efficient solution that best suited the operator's needs," notes Mr Hägglund. "Meeting the tight delivery schedule and the co-ordinated teamwork with the shipyard was also an important factor in securing the order."

The new bulkers will join Algoma's fleet of 13 domestic self-unloading vessels operating on the Great Lakes and the St Lawrence Seaway, all of which have to comply with extremely strict environmental protection legislation.

"MacGregor's gravity self-unloading technology is well-recognized by the industry for being able to provide improved levels of cargo handling efficiency, which in turn delivers a commercially competitive advantage to shipowners," Mr Hägglund adds.

MacGregor shapes the offshore and marine industries by offering world-leading engineering solutions and services with a strong portfolio of MacGregor, Hatlapa, Porsgrunn, Pusnes and Triplex brands. Shipbuilders, owners and operators are able to optimize the lifetime profitability, safety, reliability and environmental sustainability of their operations by working in close cooperation with MacGregor.

MacGregor solutions and services for handling marine cargoes, vessel operations, offshore loads, crude/LNG transfer and offshore mooring are all designed to perform with the sea.

Self-unloader runs aground in Lake Superior

A self-unloading freighter carrying a load of iron ore pellets ran aground in eastern Lake Superior on Friday afternoon, 27 May 2016.

The *Roger Blough* was en route from the Twin Ports (of Duluth, Minnesota and Superior, Wisconsin) to Conneaut, Ohio when it grounded near Gros Cap Reef in Whitefish Bay, ten miles east of Sault Ste Marie in Michigan.

The 858-foot vessel, owned by Canadian National Railway's Duluth-based Great Lakes Fleet, was experiencing minor flooding in some ballast tanks but there was no pollution.

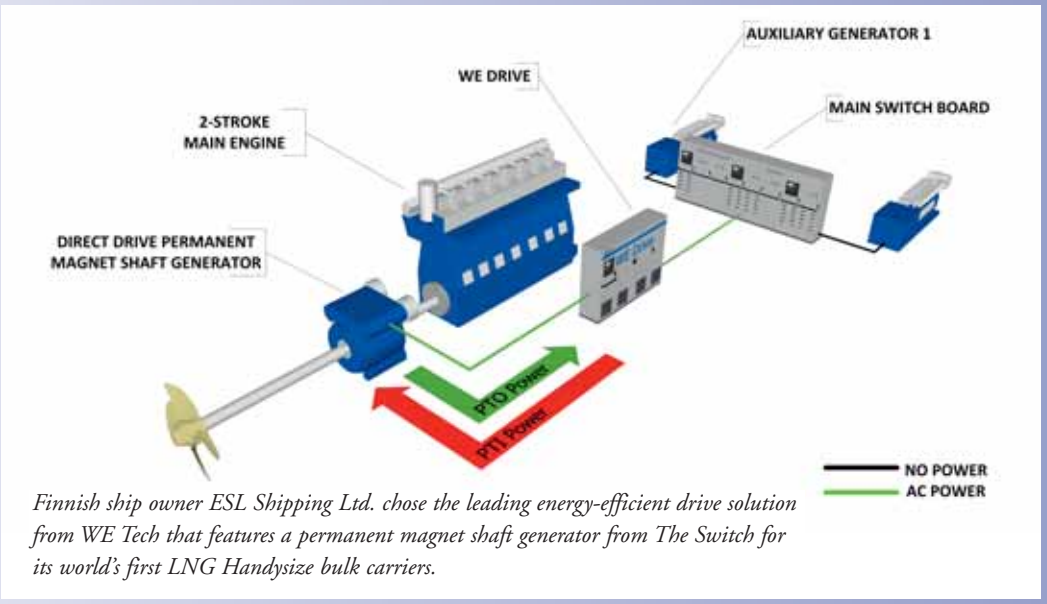
No injuries were reported but as of Friday night the 24 crew members were still aboard.

US Coast Guard (USCG) response vessels were ion the scene and some USCG inspectors had gone aboard the Roger Blough to assess the situation.

The grounded vessel is not impeding the movement of other ships.

The cause of the incident is under investigation.

Direct-drive permanent magnet shaft generator solution for world's first LNG-fuelled Handysize bulker



Finnish ship owner ESL Shipping Ltd. chose the leading energy-efficient drive solution from WE Tech that features a permanent magnet shaft generator from The Switch for its world's first LNG Handysize bulk carriers.

WE Tech Solutions (WE Tech), a leading energy efficiency solutions provider in the marine industry, has received an order to deliver its direct-drive permanent magnet shaft generator solution to two new 25,600dwt dual-fuelled Handysize bulk carriers, with an option for two more. The Switch, a technology specialist of megawatt-class permanent magnet (PM) machines for advanced marine drive trains, will deliver the PM shaft generators to be used in the solutions provided by WE Tech. The vessels are owned by the Finnish ship owner ESL Shipping Ltd., and built at Qingshan Shipyard of Sinotrans & CSC SBICO in China. ESL Shipping Ltd. is the leading carrier of dry bulk cargoes in the Baltic Sea region. The ship owner chose PM shaft generator technology to support its sustainability strategy and start a new era in green shipping within pollution-sensitive seaways.

These new, ice-class 1A ships will be the first LNG dual-fuelled Handysize bulk carriers in the world, representing the latest in technology and innovation. The aim of these new-build vessels is to raise the bar when it comes to energy efficiency and sustainability. Thanks to the focus on environmental benefits and cost savings that the advanced technology can provide, the vessels will also be more profitable for their owners. "With the active front-end low harmonic drive technology (WE Drive™) and the permanent magnet shaft generator technology in our solution, the energy efficiency of the machinery reaches unmatched levels in the marine industry," says Martin Andtfolk, sales manager of WE Tech.

Using the Power Take Out (PTO) mode, WE Drive™ enables propulsion machinery to operate in combinator/variable speed while the direct-drive permanent magnet shaft generator produces electrical power up to 700kW for the vessel's electrical network. Significant savings can be achieved by drastically decreasing the operating hours of the auxiliary generators, as well as reducing the need for maintenance. Using the Power Take In (PTI) mode, WE Drive™ converts auxiliary generator power to propulsion power by employing the direct-drive permanent magnet shaft generator as an electrical motor. The solution is utilized to boost the propulsion system with 1,250kW mechanical power when operating in demanding conditions.

According to Mika Koli, business development manager from The Switch: "The market has now recognized that a PM shaft generator is the most energy-efficient way to generate power in a vessel." The choice of The Switch PMM 1000 shaft generator, the most common type delivered to date, is very suitable for this type of bulk carrier vessel. It is installed directly on the propeller line and allows extremely high energy efficiency, especially in part loads.

The delivery from WE Tech is scheduled for March 2017. The vessels will begin operation in the Baltic Sea in early 2018. "Our vision is 30% less fuel consumed in the global shipping industry by 2030," says Mårten Storbacka, managing director of WE Tech. "This is a perfect example of implementing advanced drive train solutions for green shipping. ESL's goal of operating extremely energy-efficient LNG-fuelled bulk carrier vessels is further supported by the choice of The Switch PM shaft generator."

About WE Tech Solutions (WE Tech)

WE Tech is a leading energy efficiency solution provider with a global presence in the marine industry. The company specializes in supplying solutions based on variable frequency drives and permanent magnet machine technologies. Its portfolio of solutions provides many benefits for new builds and existing ship upgrades worldwide, including increasing energy efficiency, reducing fuel consumptions and lowering environmentally harmful emissions. The company is headquartered in Vaasa, Finland.

About The Switch

The Switch, a Yaskawa company, is a pioneer in advanced drive train technology. The company has an installed base of over 11GW of megawatt-class permanent magnet machine and converter packages. The main focus areas are wind, marine and special industrial solutions. The company's innovative drive trains make an impact on profitable power generation and energy use, with the ultimate goal of lowering the cost of energy and operations. Starting in 2006, The Switch reported net sales of €37.1 million in 2014. The company employs approximately 175 persons. The Switch is headquartered in Helsinki, Finland.

Norsafe shows comprehensive range at Posidonia

Norsafe, a globally renowned supplier of lifeboats showed a comprehensive range of its renowned safety craft at Posidonia which took place earlier this month.

Exhibiting in partnership with its Greek agent, Intra Mare, the Norway-based manufacturer together with its Greek subsidiary Norsafe Watercraft Hellas showed a mix of rescue boats, conventional lifeboats and smaller free-fall models.

Due to market requests, Norsafe has undertaken extensive work to improve release gear for lifeboats which has resulted in the newly updated TOR MKII on-load release hook.

The new design overcomes premature release issues and the highly visible yellow padlock, which can be seen on both sides of the hook, clearly indicates that the hook is set and release cables are correctly located.

Even when the cables are disconnected, the hook is able to stay closed in the most extreme load conditions and has been tested to 7.5 x SWL with no damage to the hook.

Another new design is the GES 21, a totally enclosed lifeboat taking up to 26 people.

This model was designed following requests from customers for a compact high specification quality life craft and is suitable for all ships that use free-fall lifeboats including LNG, chemical and dry bulk vessels.

The GES 21 can be launched from a hydraulic ramp which ensures the boat enters the water at a safe distance from the mothership.

All Norsafe's vessels are manufactured in accordance with the latest SOLAS requirements backed up with a 24/7 service network providing maintenance from over 300 ports worldwide.

The company has the widest range of rescue boats, davits, conventional and freefall lifeboats in the market today and has complete design flexibility making it possible for boats to be built to meet specific clients' needs.

Norsafe Group has its headquarters in Arendal, Norway and the company has a worldwide involvement that includes production, sales, delivery and service of lifesaving equipment for ships and to the offshore industry.

Norsafe has its own production and sales/service companies in Norway, China, Greece, Mexico, Singapore, South Korea, Australia, USA, UK, Japan, Brazil and the Netherlands. In addition, Norsafe Group has a network of 45 authorized service partners spread across all continents.

Norsafe Academy offers courses and training, STCW/OLF & OPITO, and is currently expanding its network. Norsafe is continually growing, and new daughter companies and service stations are being planned/developed.

ABS unites industry leaders in landmark standardization JIP

ABS, a leading provider of classification services to the global offshore industry, convened industry partners at the Offshore Technology Conference on 4 May to sign a memorandum of understanding establishing a unified joint industry project (JIP) for standardization. The goal of the JIP, which includes participants from Korean shipyards, operators, drilling contractors, engineering companies and classification societies, is to develop offshore design standards that will improve safety and increase efficiency for offshore projects.

While smaller JIPs have formed to address standardization issues, the number of companies participating in this partnership is an industry 'first', bringing together leaders from a broad range of companies with the common goal of improving consistency and reducing construction inefficiencies.

ABS COO Tony Nassif praised participants for their willingness to join this milestone JIP, stepping out of their comfort zone to enter into this unique collaborative effort. "The MOU we are signing today is a confirmation that we are in agreement that standardization has the potential to bring significant value to the industry and that we want to be part of the solution" he said. "I congratulate you on your foresight and am excited about the prospect of working with you to map the way forward for standardization in the offshore industry."

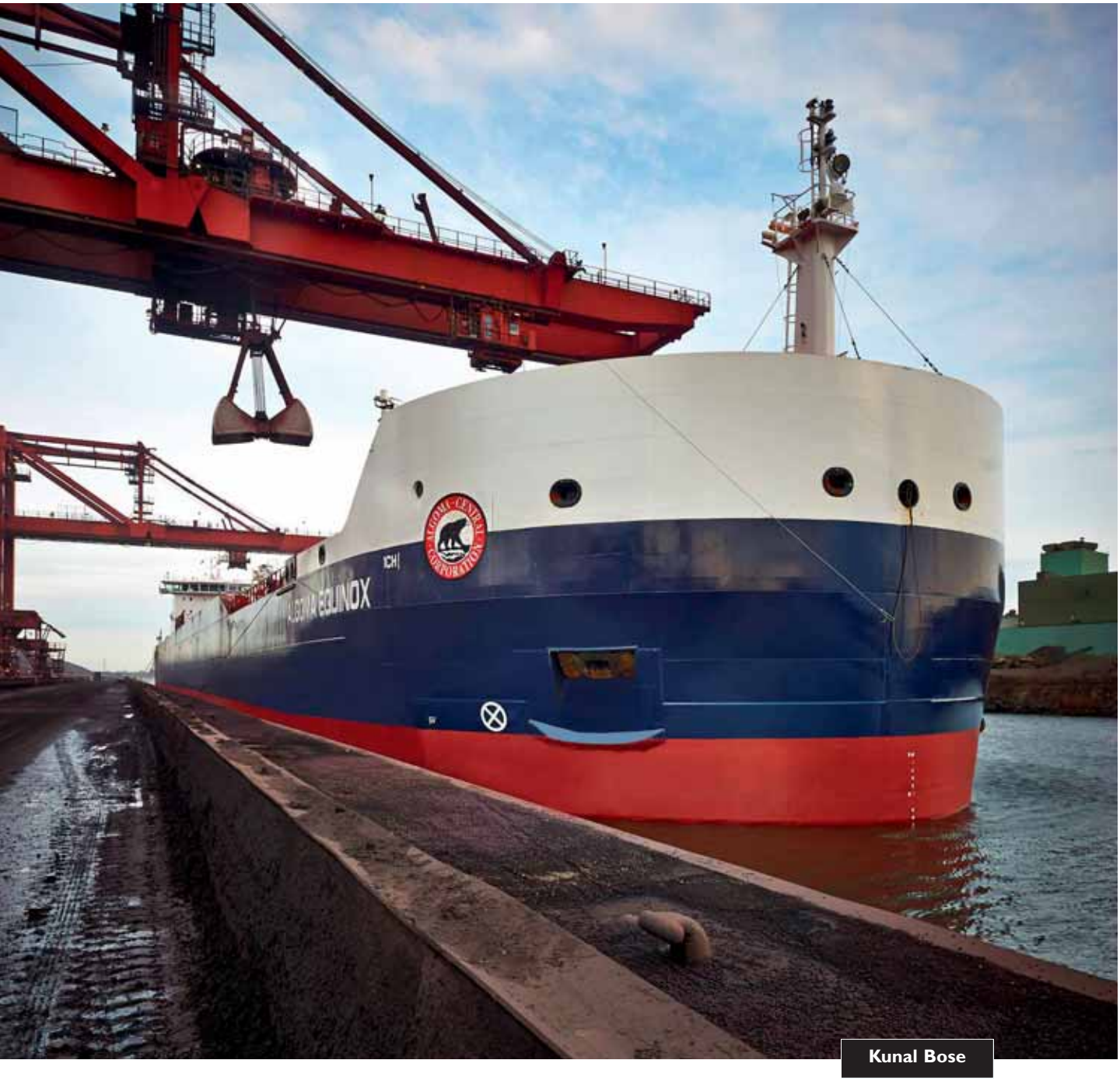
Robert Patterson, Executive Vice President, Engineering, Shell Projects & Technology, sees the formation of this JIP as an important move toward closer collaboration that will move the initiative forward at a more rapid rate. "This is the critical first step, and it will take some real 'stickiness' from all of us to go from signing to delivery," he said. "I want to congratulate you for having the vision, the courage, the boldness and the willingness to change because that is what will make this a success."

Kil-Seon Choi, Chairman and CEO of Hyundai Heavy Industries (HHI), also is enthusiastic about the potential impact of this JIP. "This effort will be indispensable in serving the oil and gas industry. Not only will it address cost and time savings, it will help to secure quality, reliability and safety," he said. "This is a humble start today and will result in significant innovation in the future."

ABS initiated its first standardization JIP in 2015 with the three leading Korean shipyards – HHI, Daewoo Shipbuilding and Marine Engineering (DSME) and Samsung Heavy Industries (SHI) – and oil and gas and engineering companies to establish new global design standardization procedures based on relevant industry standards, international regulations and class requirements across the offshore industry. The unified offshore standardization JIP, which includes these participants among a much broader group, marks the beginning of the second phase of this project.

Marine paints

orderbook backlog may keep industry afloat until shipping market improves



Kunal Bose

The fate of marine coatings in terms of demand growth and prices will at all times be finally decided by how well seaborne trade in commodities and manufactured items such as automobiles and machinery performs. To a much lesser extent, the working of the global oil and gas industry will also have a bearing on marine coatings, for all offshore structures need the same kind of protection as vessels of all types — ships carrying cargoes, cruise ships and naval ships. A global glut of shipping capacity is the order of the day as new bigger and highly efficient vessels are coming online alongside the existing fleet.

According to the World Trade Organization (WTO), growth in the volume of world trade is likely to remain sluggish in 2016 at 2.8%, unchanged from the increase seen in 2015. Imports of developed countries should moderate this year while demand for imported goods in developing Asian economies should pick up. However, economists with the WTO (World Trade Organization) expect global trade growth to rise to 3.6% in 2017. What is to be considered is that trade growth last year

AkzoNobel supports efficient on-board maintenance with new anticorrosive primer Intershield® One-2-One

AkzoNobel's Marine Coatings business has launched a best-in-class anticorrosive universal primer, Intershield® One-2-One, which delivers simplified maintenance, waste avoidance and enhanced corrosion protection.

Intershield® One-2-One, part of AkzoNobel's International® range of marine coatings, is a surface tolerant universal primer for use during on board maintenance. It is based on the company's Intershield® 300 pure epoxy technology, which provides a unique balance of abrasion and corrosion resistance with optimum levels of hardness and flexibility, delivering long-term performance and effective corrosion control.

Application of Intershield® One-2-One can reduce paint wastage significantly, as well as reducing the risk of incorrect mixing and subsequent coating failure. These benefits are possible thanks to the availability of small crew-friendly pack sizes with an equal mix ratio that can be handled with ease by users.

Intershield® One-2-One can be used as a primer on most areas of a vessel. This versatility enables simplified paint stock management for crew members who can consolidate several products into a single maintenance solution. It meets all the required on board maintenance characteristics as well as the service performance expectations of the vessel operator.

Intershield® One-2-One features enhanced surface tolerance properties that enable it to be applied to a wide range of surfaces with reduced surface preparation requirements. It has been engineered for use in temperatures as low as –50°C and will cure to dry film down to –200°C. This removes the need for weather dependent on-board maintenance in most areas, providing vessels and crew with increased flexibility in maintenance scheduling.

Robert Wong, marketing director at AkzoNobel's Marine Coatings business, said: "In an industry where crew members continue to face increased responsibilities, optimizing time spent on on-board maintenance is essential.

"With Intershield® One-2-One, AkzoNobel has delivered a simplified and versatile solution that enables crew members to use purchased coatings effectively and efficiently, on many surfaces and in many operating environments. This effectively support ship owners in preventing the onset and progression of costly corrosion, and protect the integrity of a vessel's steel, even while operating in harsh environments. It reflects the company's focus on providing essential innovations that meet its customers' maintenance requirements."

trailed world economic growth of 3.1%, extending a depressing trend in the world economy. Before the 2008 financial crisis that wrought major damages to the world economy, global trade grew at rates double the global output for decades. Since 2011, however, trade growth started declining to finally slide below the broader growth of the world economy.

From the Bank of England Governor Mark Carney to International Monetary Fund economists, everyone is saying as the world remains trapped in low growth and low interest phenomenon, the US, the European Union and China will have to do a lot more to change the economic outlook. In the grimness overtaking global trade, it is only likely that the Baltic Dry Index, which is a measure of international trade in bulk commodities, will stay low. The Index that hit an all-time low in February has now stabilized at higher levels. But freight rates are still not high enough to bring cheer to shipping companies. Their earnings being impacted by low freight over very long periods, they remain prone to postponing ship maintenance and repairing. As a result, the demand for marine coatings from dry docking is impacted.

Dry docking ship maintenance takes place in many parts of the world, marine repairing being linked to owners' locations. Even then China and South Korea have a dominant presence in dry docking. What about orders for new ships, the building of which generates maximum demand for marine paints? Recently, an official of Hyundai Heavy Industries, one of the world's largest shipbuilders said: "It is difficult to get new orders amid slowing global trade... Things are unlikely to get any better this year with the global economy still in the doldrums." A paints industry official quoting from a report by shipping market service provider Clarksons Group says that the order backlog for Daewoo Shipbuilding and Marine Engineering's Okpo shipyard numbers 118 vessels amounting to 7.82m compensated gross tonnage (CGT). This happens to be the largest backlog for a single shipyard.

The paints industry's hope is that by the time order backlogs

HEMPEL

Hempadur Quattro XO

As a universal anticorrosion primer range, Hempadur Quattro XO are tough, longlasting coatings that are equally effective on all main areas of a ship as they are on the steel areas of a power plant or an offshore structure.

quattroxo.hempel.com

AkzoNobel makes first award of carbon credits to Neda Maritime

Carlos Soler, AkzoNobel's Business Director for Southern and Eastern Europe (left) presenting 13,735 carbon credits to Costas Mitropoulos Neda Maritime Co Ltd's Technical Director.

Neda Maritime Agency Co Ltd, a leading Greek tanker and bulker owner, has become the world's first ship owner to be awarded carbon credits through landmark methodology developed by AkzoNobel's Marine Coatings business.

A total of 13,375 carbon credits, potentially worth around $60,000, have been presented to Neda Maritime via the award-winning programme. Launched in 2014, it is the first scheme of its kind that financially rewards ship owners for using sustainable hull coatings that improve operational efficiencies and reduce emissions.

The carbon credits were accrued by the tanker vessel Argenta, which was converted from a biocidal antifouling system to a premium, biocide-free advanced hull coating from AkzoNobel's Intersleek range — part of the company's International® brand — that is proven to reduce fuel consumption and CO^2 emissions on average by 9%.

Costas Mitropoulos, Technical Director at Neda Maritime, said: "We are proud to be the world's first ship owner to receive carbon credits from AkzoNobel's carbon credits initiative. As the shipping industry faces more pressure to improve its sustainability, we continue our commitment to further increase our environmental performance standards. To that respect we see a great potential in AkzoNobel's pioneering carbon credits initiative as part of our strategy to deliver sustainable and successful business."

Added Oscar Wezenbeek, Managing Director of AkzoNobel's Marine Coating's business, "This is a landmark moment for AkzoNobel, Neda Maritime and the wider shipping industry. It demonstrates how our carbon credits initiative can incentivize investment in more sustainable practices, accelerating carbon reduction within the shipping industry and enabling owners to gain from operational, environmental and bottom-line benefits from clean technologies."

Neda Maritime will use its carbon credits to voluntarily offset other sources of CO_2 emissions within its business, as part of its commitment to reducing its impact on the environment. Each carbon credit accrued represents the avoidance of one tonne of CO_2 being emitted to the atmosphere, meaning that the company has offset a total of 13,735 tonnes of CO_2 from its business.

AkzoNobel's carbon credits initiative was developed in conjunction with The Gold Standard Foundation and Fremco Group. In total, the issuance of the first carbon credits to be awarded through AkzoNobel's initiative has seen more than 126,000 carbon credits awarded to Neda Maritime and a second ship owner, which has 15 vessels enrolled in the scheme. The name of this second ship owner will be announced shortly.

About AkzoNobel

AkzoNobel creates everyday essentials to make people's lives more liveable and inspiring. As a leading global paints and coatings company and a major producer of speciality chemicals, AkzoNobel supplies essential ingredients, essential protection and essential colour to industries and consumers worldwide. Backed by a pioneering heritage, its innovative products and sustainable technologies are designed to meet the growing demands of our fast-changing planet, while making life easier.

Headquartered in Amsterdam, the Netherlands, AkzoNobel has approximately 45,000 people in around 80 countries, while its portfolio includes well-known brands such as Dulux, Sikkens, International, Interpon and Eka. The company is consistently ranked as a leader in sustainability, and is dedicated to energizing cities and communities while creating a protected, colourful world where life is improved by what it does.

with the world's major shipyards get sufficiently cleared, the global trade outlook will improve giving confidence to shipping companies to once again start placing new orders for ships in good numbers. A silver lining for paints manufacturers is that special shipyards continue to receive orders for luxury cruise vessels of very large capacity and yachts. New orders for naval ships are also coming in good numbers. Low oil prices resulting from production spurt in the US and Saudi Arabia led the Organization for Petroleum Exporting Countries (OPEC) stubbornly refusing to curtail production are the reason for oil companies holding back investment in offshore exploration and drilling. To the relief of producers of marine coatings, orders from natural gas facilities and floating production and storage and offloading (FPSO) units have picked up well in recent years.

Even while the global marine coating business is worth a few billion dollars, this segment in the overall paints industry occupies a niche position. This is because the technology in application in the area is highly demanding. Moreover, to keep pace with the requirement to keep see water pollution free so that marine life is not harmed, paints manufacturers invest heavily in R&D on a continuing basis. Environment regulations becoming stricter across the globe are the key reason for marine coatings manufacturers to be technology-driven. It is now compulsorily required of coating formulators in some countries to reduce solvent content in marine coatings.

While North America and Europe already have well-established legislation on the kinds of coatings to be used in ships and offshore rigs and platforms, emerging nations are fast catching up. An AkzoNobel official is quoted as saying: "This is particularly true when it comes to the restrictions in use of certain biocides and the push towards low or no VOC (volatile organic compounds) products. Countries like China and Korea are starting to adopt regulations that are similar to those in Europe and the US. As a global supplier of coatings, we are aware of the demands these regulation place on our products — the need for non-biocidal and low VOC products."

Industry watchers say the practice with AkzoNobel and some others is to formulate products anticipating the changes in environmental regulations. They also see in this kind of challenge significant opportunities. Claiming leadership in biocidal products compliance under all regulations, the Akzo Nobel official says "we are staying ahead of the curve by developing non-biocidal products too." The challenge here is to stay ahead of new legislative restrictions. Marine coatings allow ships and oil structures to withstand damages that saline sea water inflicts on metals by way of oxidization, corrosion and staining. They also provide protection against fouling of ship structure, particularly below the waterline. The side of a ship hull exposed to sea water without anti-fouling coating will gather unwanted organisms within a minute, slowing down the vessel's cruising speed and raising fuel consumption.

To the relief of governments and environmentalists, the paints industry is making significant strides in developing highly effective fouling protection products. An official of PPG Industries said: "The long-term trends are towards more environment friendly fouling protection products that provide superior performance. The focus in recent years for marine coatings is on achieving fuel and product performance efficiency leading to reduction in maintenance costs." Some major technologies in the area are oriented towards combining silicone with low content biocides. International Paint of AkzoNobel group has introduced the first biocide-free fouling control coating featuring unique patented slime release technology that combats micro fouling on ships' hulls, maintaining performance throughout the docking cycle.

The latest innovation in the company's Intersleek range claims to deliver outstanding macro and micro fouling control with improved static resistance, even in warm waters and is suitable for slow steaming. Slime that does build up during static periods is released by the movement of the ship through water. As a result vessels achieve reduced drag, improved fuel efficiency and reduced CO_2 emissions. The new patented fluoropolymer in Intersleek®1100SR has been developed by enhancing the slime resistant polymer groups used in earlier generations of Intersleek®. The tailored surface chemistry of this new technology specifically influences and resists the adhesion and settlement of organisms that make up slime colonization.

International Paint's Interline 9001 is a new bimodal epoxy coating for cargo tanks of chemical tankers. The coating is designed to deliver greater efficiency and flexibility allowing easy switching from one cargo to the next with minimum downtime. The best feature of Interline 9001 is that it has over "60% fewer cycling restrictions." In keeping with the demand of present difficult times, paints manufacturers are introducing products which will allow ships to cut operating costs. To give one example, Hempel Group of Denmark has added in its offerings an anti-fouling product Hempaguard, which promises to reduce fuel consumption of vessels by 6% compared to conventional anti-foulings and therefore, their carbon footprint. In the market since 2013 end, Hempaguard continues to gain in popularity. The same year saw Hempel introduce its high-solids anti-fouling products such as Globic 6000 and Globic 9000. The other industry leaders continue to enrich their product portfolios with three principal objectives — reduce operational costs of ships, give protection to marine environment and optimize energy conservation.

The pricing of marine coatings has become important as margins of shipping groups remain under pressure due to continuing low freight rates. Resistance to price revisions has made it necessary for paints companies to work closely with suppliers of raw materials that includes bringing them on board to keep them abreast of breakthroughs in technologies. Paints industry officials say they try to maintain stability in prices. But there are occasions when paints price increases become unavoidable. According to a report by Transparency Market Research, global marine coatings market will register a compound annual growth rate (CAGR) of 6.5% to become $11.88bn by 2020 from $7.65bn in 2013. As the shipbuilding industry is highly concentrated in China, South Korea and Japan with shipyards in Europe and the US concentrating on very high end vessels building, paints manufacturers will have their sights focused on Asia.

Marine coatings: driving sustainability, efficiency and profitability in shipping

An in-depth understanding of the changing dynamics of the shipping industry and continual innovation should be at the heart of hull coating solutions and product development. *Carl Barnes, Antifouling Business Manager at AkzoNobel's marine coatings business, International®, reports.*

In today's shipping industry, hull coating manufacturers must address multi-faceted challenges if they are to successfully improve the business performance of their customers. Overcapacity, low freight rates, intensified competition and increased regulation are all placing pressures on ship owners to operate more sustainably and drive as much efficiency into every part of their operations, whilst also improving, or at least maintaining levels of profitability. Faced with this plethora of challenges, hull coatings manufacturers must ensure their products and services are calibrated and focused on helping their customers; creating solutions to the issues that they face.

This requires significant investment in research and development (R&D), a fundamental understanding of the current and future dynamics of the shipping industry, and always operating at a continual state of innovation to develop new, and relevant products and services. As a pioneer of hull coatings for over 135 years, this has been the hallmark of AkzoNobel's Marine Coatings Business, via its International® range of products.

From developing environmentally friendly and eco-efficient products to the latest biocidal anti-foulings, as well as chemically resistant and anti-corrosive tank and hold coatings, manufacturers must provide a full range of coatings solutions to meet the demands of a diverse range of ship owners. In providing choice, and with an eye on future industry trends and changing dynamics, it is possible to deliver coatings solutions that are scalable in improving ship owner's operational and environmental performance, increasing efficiencies and profitability.

Precise solutions to overcome specific challenges

When introducing new solutions to ship owners, in-depth knowledge of the shipping industry is essential in driving take-up and ensuring success. This is highlighted in the recent introduction of Intercept 8500 LPP, AkzoNobel's highest-performing biocidal anti fouling which is set to revolutionize the biocidal coatings market.

Intercept 8500 LPP is the culmination of ten years of R&D, and investment in innovation by AkzoNobel's research scientists, hydrodynamicists and marine biologists. The coating provides multiple benefits to ship owners and operators, including improvements in operational, cost and environmental efficiencies. These are delivered through Intercept 8500 LPP's consistent predictable linear polishing fouling control performance, which lasts for in-service periods of up to 90 months, even on high-risk fouling routes. Intercept 8500 LPP also comes with extended performance guarantees, proven in-service performance on high fouling routes, and a unique polymer combination that incorporates AkzoNobel's patented Lubyon® technology with a silyl methacrylate self-polishing copolymer.

Big data in hull coating selection

In developing new high-performance products, a key challenge —

not just for coatings manufacturers but for all clean technology providers — is definitively proving to ship owners the benefits that they deliver. In today's industry, where there is a degree of scepticism, ship owners are not simply persuaded by clever marketing and sales strategies. While building partnership-based relationships with customers founded on trust, transparency and a credible track record goes some way to solving this challenge, they also need irrefutable evidence. They also want to know that they are selecting the right hull coating that precisely meets the needs of each vessel within their fleets, depending on the operational and environmental challenges that they face on their specific trading routes.

New technologies based on 'Big Data' have an important role to play in delivering this, as well as creating opportunities for manufacturers to provide added value consultancy services for coatings selection. In 2015, AkzoNobel launched Intertrac Vision, the shipping industry's first big data consultancy tool that provides accurate and transparent predictions on the fuel and CO_2 savings potential of all its products, including antifouling coatings such Intercept 8500 LPP, as well as foul release coatings such as its Intersleek range, prior to their application.

Intertrac Vision combines an understanding of total hull roughness (micro and macro) and roughness associated with biofouling. It also uses studies carried out by computational fluid dynamics (CFD) on different hull forms in order to make accurate predictions on the impact of fouling control coatings on the comparative powering requirements of a vessel. Collectively, the tool uses hundreds of thousands of datasets making it the shipping industry's first big data solution to accurately predict the performance of a coating technology prior to application.

Intertrac Vision consultations are available via the specially

trained AkzoNobel team. The tool requires the input of unique vessel data and coating scenarios to make bespoke predictions. Multiple algorithms and models are used to provide an accurate and detailed assessment on the impact of each potential fouling control coating or application scenario over the full drydocking cycle. Key outputs from Intertrac Vision include: ships powering requirement, fuel oil consumption, fuel oil cost, greenhouse gas emission predictions and a full cost benefit analysis.

Carbon credits: a world first

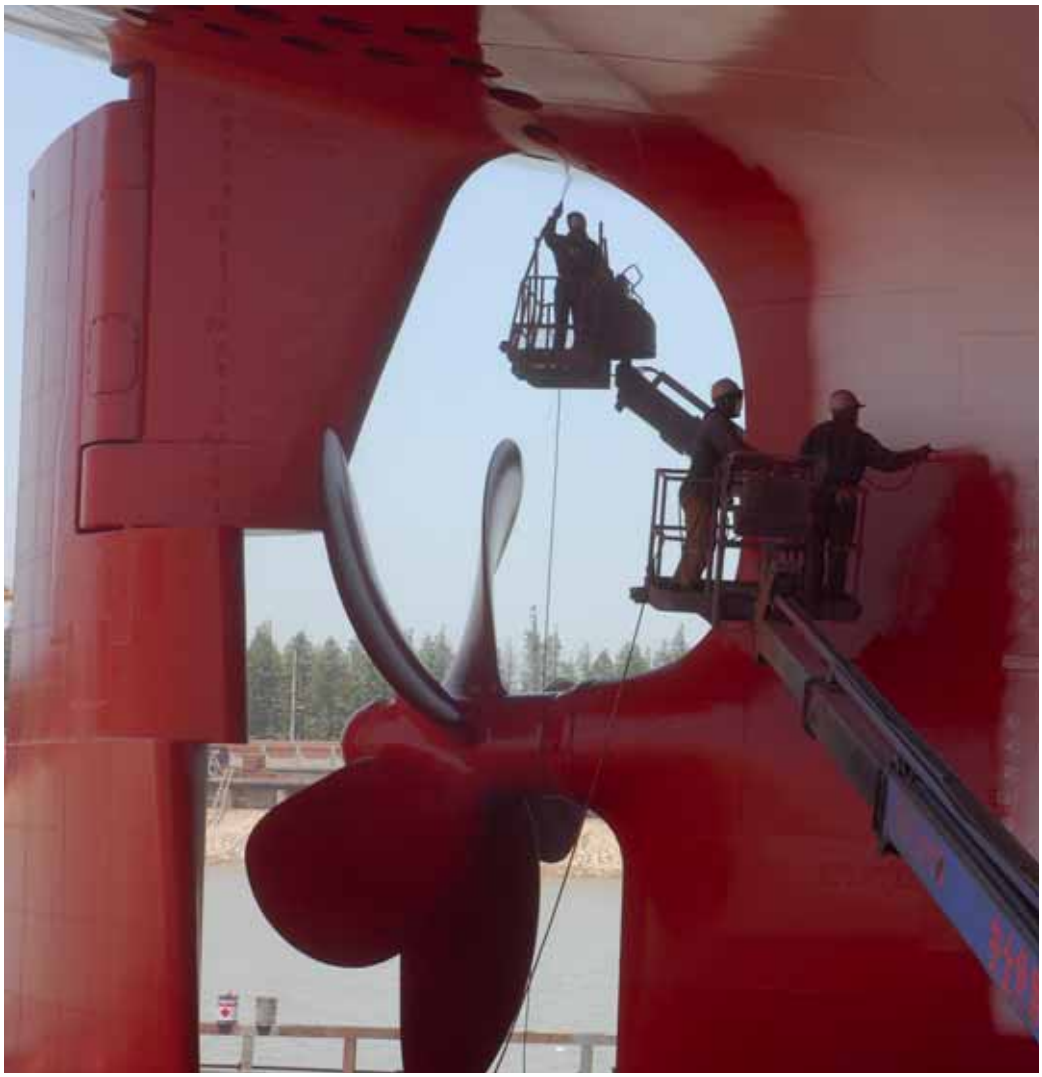
Intertrac Vision also provides ship owners with an assessment on the economic and environmental benefits of upgrading from a biocidal coating to a biocide-free coating, such as International's Intersleek range.

The latest edition, Intersleek®1100SR, is the industry's first biocide free coating to tackle slime, which costs the shipping industry 44 million extra tonnes of bunker fuel, and an extra 134 million tonnes of CO_2 emissions each year. The coating has been proven to increase a vessel's efficiency and reduce CO_2 emissions and associated fuel costs by an average of 9%. It also delivers a 40% reduction in paint volume, and a 60% reduction in VOC emissions for first time application with further savings possible at future dockings.

For vessels converting from a biocidal antifouling to Intersleek1100SR, the coating brings the added benefit of eligibility to AkzoNobel's landmark carbon credits initiative, through which ship owners can generate additional income from the CO_2 reductions they deliver by investing in more sustainable hull coatings. In May 2016, the world's first ship owner to receive carbon credits through AkzoNobel's methodology was announced. Neda Maritime Agency Co Ltd, received 13,735 of carbon credits potentially worth around $60,000. The carbon credits were accrued by the VLCC Argenta and represent the avoidance of 13,735 tonnes of CO_2 being emitted to the atmosphere. (For more details on this award, please see p26 of this issue.)

Market-leading solutions

Ultimately, AkzoNobel recognizes the diversity of the shipping industry, the differing preferences and operational requirements of ship owners and operators, and therefore the need to provide customers with a full range of products that suit the specific demands of their businesses. Through Intertrac Vision, AkzoNobel is helping customers to make smarter choices. For those upgrading from a biocidal to a biocide free coating, the option is also available to accrue carbon credits, which provide further environmental and economic benefits. Through this complete range of solutions AkzoNobel continues to set new standards of excellence, which continues to support the company's prominent position in the market.



Chugoku Marine Paints: coating marine cargo holds since the early 20th century

Chugoku Marine Paints (CMP) was formed in 1917. Over the years, it has acquired other companies that date back to as early as 1906. It has therefore been supplying coatings for dry cargo carrying spaces for all types of ships since the early part of the 20th century.

Further, since the introduction of epoxies in c.1927 (resins from Epichlorohydrin) and in 1936 (Synthesis of Bisphenol A), the company's development has expanded. Over the last 50 years, epoxy polymer systems have been used in both dry cargo holds and in ballast water systems.

Over this time, CMP has continued to design and engineer coating systems for use in cargo holds, so that they can withstand the rigours and challenges during loading and discharging operations. As a result, CMP now has a range of cargo hold systems that are second to none.

UMEGUARD SUPER H: excellent condition after a year in a coal bulker.

Today the coating systems demanded for cargo holds must:

- meet food contact requirements, i.e. the requirements of the Food and Drug Administration as outlined in the Code of Federal Regulations in the US;
- accommodate an ever-widening range of cargoes;
- have a low Volatile Organic Content (VOC), consequently high volume solids;
- enable/assist ease of removal of staining and contamination during cargo hold cleaning.
- be tough, resilient and robust enough to extend maintenance periods; and
- be in a position to load cargoes in the minimum period practical after full application of the system.

The systems in the CMP Cargo Hold Coatings range meet all of the above and can cut costs significantly, meeting budgets and reducing spend on any cargo hold strategy decided upon by the owner/operator.

UMEGUARD SX HS: Panamax application in 2009 (full area).

EVAMAX 2000F: after a year in a coal hold.

The systems are; EVAMAX 2000F, UMEGUARD SUPER H, BANNOH 1500 and UMEGUARD SX HS.

These systems have been grandfathered from high-performance systems and proven themselves to be outstanding performers in their class since before the end of the last decade (over 15 years) and having extensive track records:

EVAMAX 2000F

Is the high-performance option, having exceptional abrasion and impact resistance against hard/severe cargoes, with high volume solids and excellent workability. F = FDA compliance.

BANNOH 1500: ideal for newbuildings.

UMEGUARD SUPER H

Is a high performance, economic system providing high volume solids (low VOC), excellent durability and resistance to hard/aggressive cargoes. It also complies with FDA requirements.

BANNOH 1500

Is the newbuilding contender, developed from BANNOH 500 the well known pure epoxy coating for cargo holds of newbuild vessels since the last century. The coating has high volume solids, excellent application characteristics and FDA compliance.

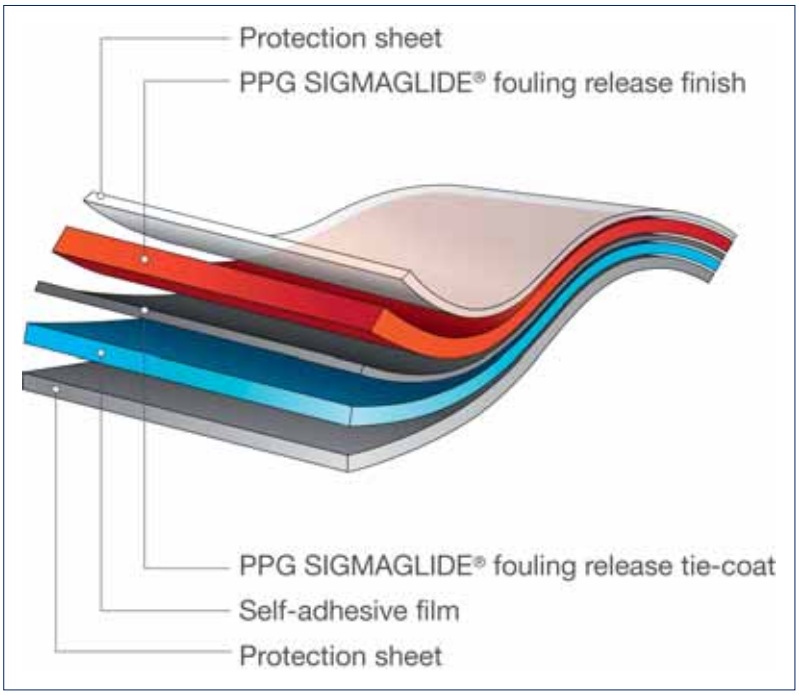
UMEGUARD SX HS

Is a good, medium-performance system, high volume solids (low VOC), has good durability, complying with FDA requirements and often used for on board maintenance in cargo holds.

PPG works with industry partners to develop eco-friendly ship hull film system

PPG's protective and marine business has received EU funding for an exciting new project which aims to produce an innovative fouling protection system for commercial vessels.

A project development group including PPG, MACtac, Meyer Werft/ND Coatings, VertiDrive and Hamburg Ship Model Basin HSVA are currently working together to establish an automatic application process for allowing an innovative self-adhesive/fouling release film to be used on commercial sea-going vessels. This process will allow shipowners and operators to enjoy the superior fouling release properties and drag reduction capabilities of the PPG SIGMAGLIDE® self-adhesive film.



PPG Product Manager Christophe Cheikh says: "The eSHaRk (eco-friendly Ship Hull film system with fouling Release and fuel saving properties) project aims to bring to the market a fouling protection technology which not only maintains the current state-of-the-art fouling protection standards but is superior to existing paint-based solutions in terms of eco-friendliness, easiness of application, robustness and drag reduction effects, all of which will lead to fuel savings and the reduction of GHG emissions."

The system incorporates a fine-tuned fouling release system, based on PPG's premium 100% silicone binder technology, and a self-adhesive film specially designed by MACtac for underwater use.

As part of the eSHaRk project, new, robotized application technology is being developed by VertiDrive which will be used to apply the film on large commercial vessels in an automated way. Furthermore, the surface morphology of the film will be optimized to enhance drag reduction, fuel savings and emissions reduction benefits to a level previously unattainable.


PPG Product Manager Christophe Cheikh.

After extensive laboratory testing, including flow channel drag reduction experiments conducted in a state-of-the-art flow channel at HSVA, several small scale in practice applications have been successfully conducted and PPG is now looking for full scale testing and validation in operational conditions before market entry with the support of ND Coatings/Meyer Werft.

The number of trial applications is continuously growing and the advantages of the system are being clearly demonstrated. To date, the film system is offering clear advantages at newbuild stage. These advantages can be grouped under two categories:

- productivity improvement with an easier and faster application of the fouling release system without the traditional constraint of overcoating intervals; and
- minimum impact on environment, health and safety requirements, waste reduction, no VOC emission, minimizing the need for safety equipment at time of application.

Going forward, both the number of trials, as well as the size of trial vessels will be increased in order to validate the system thoroughly prior to full-scale commercial launch. This validation phase will confirm the benefits for the ship operator in terms of fuel consumption and greenhouse gas emission reduction.

Cheikh continues: "Fouling is a constant challenge for the shipping industry. A number of fouling protection technologies currently exist, the most widely used being spray-on anti-fouling and fouling release coatings. However, these solutions face a number of challenges concerning their environmental impact, the efficiency of their application on ship hulls, and their effectiveness in protecting vessels against fouling."

"The new eSHaRk technology applies state of the art PPG silicone fouling release technology specially tailored for fully controlled industrial application onto a self-adhesive film specially designed for underwater exposure. This enables PPG and partners to deliver an environmentally friendly and easy to apply fouling release solution that exceeds the performance of fouling release technology currently available on the market."

"The eSHaRk solution is expected to have superior drag reduction properties compared with existing anti-fouling and fouling release technologies (up to 10% drag reduction as compared to currently available maximum 5%). This new film-based technology thus has the potential to set a new standard in the market for fouling protection products."

The PPG SIGMAGLIDE fouling release film solution under development within the eSHaRk project has a targeted launch date of 2018.

PPG strives to develop and deliver the paints, coatings and materials that its customers have trusted for more than 130 years. Through dedication and creativity, it solves its customers' biggest challenges, collaborating closely to find the right path forward. With headquarters in Pittsburgh, USA, PPG operates and innovates in more than 70 countries and reported net sales of $15.3 billion in 2015. The company serves customers in construction, consumer products, industrial and transportation markets and aftermarkets.

Dry bulk sustains major Indian ports

Despite depressed world trade, major ports in India have seen a surge in traffic in 2015–2016 — and this at a time when the country's own import-export traffic has been in decline.

In March 2015, traffic handled amounted to 53.72mt (million tonnes), compared with 52.22mt in January 2015, and just 46.85mt in September last year. Indeed, in the April 2015 to February 2016, traffic had grown by 27mt compared with the previous ten months. Furthermore, seven of the country's 12 leading ports reported handling more traffic in January 2016 than they had in January 2015.

And it is dry bulk traffic that is keeping the figures buoyant. Ports at Haldia, Kandla, Kolkata, Mormugao and Paradip have all done well, especially in the movement of coal, both in terms of imports and cabotage. The situation has also been helped by the restarting of iron ore exports.

Nevertheless, despite this mini-boom, India's major ports continue to operate well below their capacity. Traffic in April 2015 to January 2016 amounted to 522mt, compared with an engineered capacity of 893mt.

In 2014–15, both major and minor ports handled a total of 1,052mt, with something of a shift in traffic taking place from the major ports to their smaller, more agile competitors.

In 2001–02, major ports had a 75% market shares; in 2014–15, this had dropped to just 55%. This trend is, in many ways down to the fact that non-major ports have no tariff limitations imposed on them, while major ports' tariff are regulated by the increasingly controversial Tariff Authority of Major Ports (TAMP).

India is, nevertheless, planning to pump phenomenal amounts of money into major ports over the coming years to both increase port capacity and improve operational efficiencies, thereby bringing down the cost of transporting goods. It will do this by providing missing connectivity to the major ports and minimizing the cost and time for cargo discharge and loading.

Barry Cross

Vostochny Phase 3 development on track

In Russia, delivery of new equipment for Phase 3 of Vostochny Port's Coal Terminal continues apace, with the arrival of various over-sized components forming part of its giant reclaimers at Berth No 51. These were shipped by barge from the port Nakhodka.

Initial parts and equipment — mostly containerized — commenced delivery in 2015 from Marubeni Corporation of Japan, with infrastructure work having started in 2012.

Berth No 51 was built in 2014 specifically to handle oversized structures for the Terminal's Phase 3 development.

A 500-tonne bucket reclaimer will eventually be deployed in the loading of coal onto conveyor belts.

JSC Vostochny Port is Russia's main coal handling stevedore company. Around 98.9% of coal handled does so in an automated fashion, giving it an annual capacity of 14.2mt (million tonnes). At the company's Universal Handling Terminal, coal is handled using clamshell grabs, with throughput of up to 3mt.

Most of the coal handled comes from mines at Kuzbass.

In 2014, coal exports accounted for 98% of the company's turnover, of which just 2% was cabotage.

BC

RSA to import seven million tonnes of emergency grain

In South Africa, Trasnsnet Port Terminals is preparing its facilities to handle an additional 7mt (million tonnes) of import grain to offset domestic shortages brought about by the driest spell the country has experienced since 1992.

This will be the largest importation of grain over the past seven years and will take place in the period up to April 2017.

The amount of 3.8mt of the total will be maize, which is completely at odds with South Africa's normal role as a net exporter of maize. The country normally consumes 10.5mt of this commodity annually.

In 2007–08, South Africa imported 1mt of maize, along with other commodities such as wheat, soyabean, rice, peanuts and sunflower.

Transnet has set up a dedicated team to oversee the increase in import capacity for grain.

Cape Town, Durban, East London, Port Elizabeth and Richard's Bay will all be utilized, although Durban has the largest grain terminal, which handles around 1.4mt per annum. Nevertheless, it will have to use inland silos as well as those within the port to handle the growth in tonnage over the next few months.

Movement of grain around the country will be the responsibility of Transnet Freight Rail, which has committed 3,284 wagons to transport domestic and over-the-border maize cargo. No fewer than 2,481 of these wagons have recently been added to the wagon pool, as imports are ramped up.

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'Green Port of the Future' boosts rewards for energy efficiency

Investing in energy efficiency at the Port of Long Beach is about to pay off more than ever.

Through a new incentive, the port is increasing the benefits for tenants who replace their old, inefficient electrical equipment with new technology — and boost the overall sustainability, resilience and competitiveness of the port in the process.

Effective April 1, port tenants purchasing new lighting, climate control and other equipment eligible for rebates through two Southern California Edison (SCE) programmes can apply for a matching rebate from the port. The port incentive is called the Energy Efficiency Rebate Match (EERM) Program.

"We're giving our tenants another great reason to upgrade to high-efficiency equipment that helps the environment and their bottom line," said Port CEO Jon Slangerup. "Their success equals our success."

For more than a decade, SCE has rewarded its customers for using less electricity. In the case of commercial users, the utility's core incentive programmes are known as Express Solutions and Customized Solutions. The port developed EERM to encourage tenants to participate by sweetening the deal with matching rebates. To introduce the new programme, the port held a workshop on 5 May, where port and SCE representatives explained how tenants can apply.

The matching incentive is the port's latest measure for accelerating energy efficiency strategies under its Energy Island Initiative, a comprehensive program for transitioning to renewable power sources and self-generation systems. By focusing on clean energy generation, conservation and power projects, the port is seeking to become a sustainable energy network, or "island," integrated with the grid, yet capable of supporting cargo operations during outages and emergencies.

"We're launching the rebate programme to cut energy demand prior to looking at new power generation," said Heather Tomley, the Port's Director of Environmental Planning.

Making the best and highest use of all electrical equipment reduces the amount of power tenants need to operate and increases the sustainability and resiliency of the entire port complex, Tomley said. "Whether we're talking about the electricity we use now or future energy demand, our best-practices approach includes finding the most economical ways to achieve our energy goals."

A major driver of EERM and other Energy Island measures is the growing demand for electricity within the port. Lease and regulatory clean air requirements — including California's shore power rules requiring ships to plug in at berth to cut emissions — are increasing demand for electricity. Reducing consumption figures prominently in regional efforts to meet local, state and federal clean air targets, as well as the port's own goal of driving emissions down to zero.

The port's matching rebate will help get the word out about SCE incentives that few tenants have used to date, said SCE Senior Account Manager Damon Hannaman. "As the demand for electricity increases, the Port of Long Beach is leading the way to ensure port operations are cleaner and more sustainable."

Port of Duluth-Superior commemorates National Maritime Day

US Merchant Marine veterans, current seafarers and maritime industry stakeholders gathered on Friday 20 May 20 to commemorate National Maritime Day in the Port of Duluth-Superior.

Mike Piskur, programme manager for the Conference of Great Lakes and St. Lawrence Governors and Premiers, delivered the luncheon's keynote address: "Bringing out the Best in the Great Lakes-St. Lawrence Maritime System." His remarks highlighted the Conference's first-ever regional maritime transportation system strategy — a strategy to double trade, build new markets, support the region's industrial core and grow its economy.

The Conference of Great Lakes and St. Lawrence Governors and Premiers is a non-partisan partnership of eight US States and two Canadian Provinces — chief executives from Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, Ontario and Québec. Piskur manages the Conference's work on maritime transportation, aquatic invasive species and water use data. He also co-ordinates the Conference's public communications and government relations. Through the Conference, the Governors and Premiers work as equal partners to grow the region's $5 trillion economy and protect the world's largest system of surface fresh water.

National Maritime Day honours the historic and ongoing service and sacrifice of our nation's Merchant Marine and celebrates the contributions of the US maritime industry. The commemorative event, which commences with the presentation of colours and a short memorial service to honour those seafarers, is hosted locally by the Propeller Club of Duluth-Superior. This year's event in Duluth was held in advance of the official date of 22 May.

National Maritime Day is a time-honoured tradition that recognizes America's Merchant Marine for their legacy of service and sacrifice, safeguarding the nation and its trade corridors during times of war and peace. It traces its history to 1933 when President Franklin Roosevelt, with Congressional support, set aside May 22 as National Maritime Day. The date was chosen to coincide with the sailing of the first steamship, the SS *Savannah*, in 1819 from its homeport in Savannah, Georgia to Liverpool, England, signalling the start of an era of American technological leadership. In the later 20th century, the day overwhelmingly became a celebration of the Merchant Marines. Today, National Maritime Day is observed across the country as a combined salute to merchant mariners, veterans and the entire maritime industry, focusing attention on the importance of maritime and its value to America's economy, national security, balance of trade and quality of life.

Upgraded Port of London Ship's Bridge Simulator to boost trade and growth

The Port of London Authority (PLA) has invested £250,000 upgrading its ship's bridge simulator, adding a full tug bridge simulator in a move that is set to enable a boost in port trade and helps terminals verify their expansion plans.

The Thames is the UK's busiest waterway, handling over 45 million tonnes of cargo a year. For over a decade the bridge simulator has been an essential tool for training the PLA pilots who guide ships to and from their berths on the Thames.

The PLA recently announced plans to recruit twelve new pilots this year to help facilitate increased traffic on the Thames and the simulators will play an integral role in their training.

PLA marine operations director, Peter Steen said: "This upgrade integrates the latest hydrographic modelling, allowing trainees to learn the characteristics of the Thames from the North Sea right through to central London. It gives pilots the chance to experience all kinds of ships before they go on-board and 'drive' them for real. It's rare that you would manoeuvre large ships without tugs helping, so the addition of the totally interactive tug simulator really takes the experience to another level."

PLA research completed last year showed that Thames terminals have plans to invest over £1 billion in their operations over the next five years, several looking at handling larger ships.

"Many organizations come to the simulator for research and development purposes, to check their proposed new berth plans and to see how their new ships will handle on the river, sometimes before they've even left the shipyard for their maiden voyage," commented Steen. "This enables them to adjust their plans, if need be, and reduce the risk of any unforeseen issues when the vessels actually arrive on the Thames."

Jason Hornsby, Navigator Terminals UK commercial manager said: "We have frequently utilized the PLA ship's bridge simulator to help develop future investment projects that would allow an assortment of vessels to visit our Thames terminal."

Stuart Strutton, Kotug harbour towage UK general manager said: "The integration of real hydrographic data and weather modelling into the tug simulator, offers our team very real scenarios to train on."

In addition to its core role in PLA pilot training, the simulator is also used for coaching pilotage exemption certificate (PEC) holders and specialist training for senior officers from shipping companies, tug masters and pilots from other port authorities.

The PLA simulator team are all Class 1 Unrestricted pilots who bring their everyday knowledge and experience into the training environment. Most training course are attended, in part, by a tug master from one of the tug fleets operating on the river and this is seen as an important addition to the experience and training offered.

Full mission bridge simulator

- includes full engine controls, bow and stern thrusters, radar, ECDIS, speed logs, a portable pilotage unit and Azimuth Control Device propulsion and steering;
- variable parameters based on Thames hydrographic modelling, flood and ebb tide, wind speed and direction, meteorological conditions including fog, rain and snow;
- over 70 ship types can be simulated;
- record, pause and rewind allowing review and retry of scenarios;
- print outs of each exercise for post-exercise discussion and evaluation;
- training on traffic management scenarios is available

Tug bridge simulator

- five kinds of tug can be simulated, Voith, ASD, conventional and rotor/tractor;
- variable parameters based on Thames hydrographic modelling, tug line management, flood and ebb tide, wind speed and direction, weather like fog, rain and snow;
- record, pause and rewind allowing review and retry of scenarios; and
- view over the tug bow or stern are available.

The Port of London comprises over 70 independently owned and operated terminals and port facilities along the tidal Thames.

The Port of London Authority (PLA) is responsible for navigational, safety and related matters on 95 miles of the tidal Thames from the sea to Teddington in west London. The PLA provides navigational, port control / Vessel Traffic Services, safety, pilot, diving and other services for users of the Thames.

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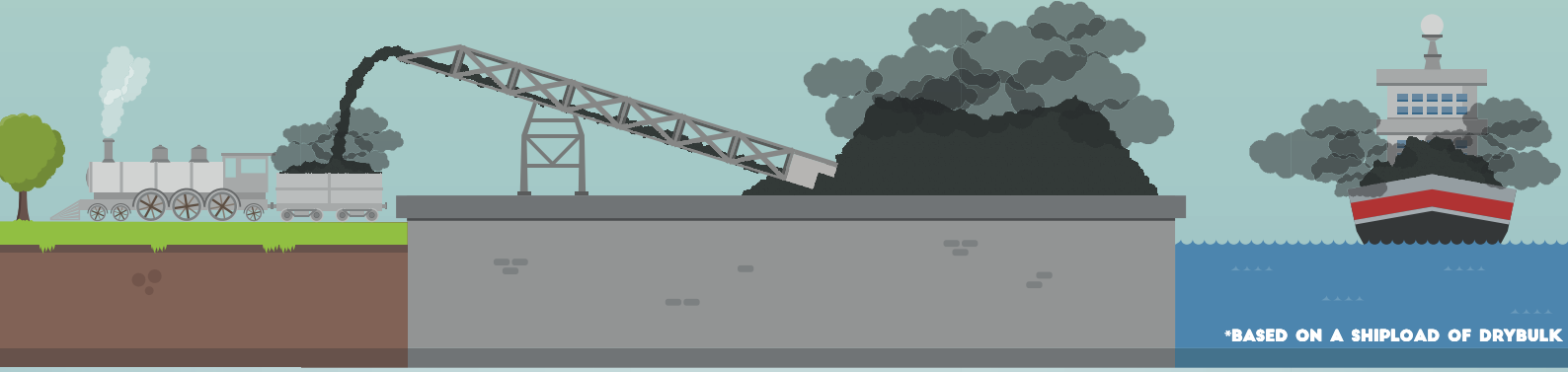

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Regional report on the Netherlands

Work begins on mammoth lock system at the port of Amsterdam

The port of Amsterdam is upgrading its port infrastructure as it seeks to consolidate and expand its role as one of northern Europe's key dry bulk ports and industrial hubs, writes Michael King.

It has been on the drawing board for the best part of a decade, but finally work has begun on the port of Amsterdam's huge new lock system. At 500 metres in length, 70 metres in width and 18 metres in depth, it will be the port's fifth lock at Ijmuiden, the entry point to the North Sea Canal that feeds Amsterdam's cluster of bulk cargo terminals.

The new sea lock is being financed, designed, built and maintained under a 26-year contract by the Open IJ consortium which consists of BAM, VolkerWessels and investment company DIF. It will be operated alongside the existing Northernlock, Middlelock, Southlock and small lock at IJmuiden.

According to Femke Brenninkmeijer, the Port of Amsterdam's cluster manager for Energy, the new lock will be the 'Formula One' of maritime locks. Dredging is already under way and full construction is due to start in July.

"To give you an impression, the size of the Amsterdam Arena, Ajax football stadium, fits easily into the new lock. "The new lock will be finished in 2019 and it will be the biggest lock in the world," she said.

Femke Brenninkmeijer, Port of Amsterdam's cluster manager for Energy.

To finance the project, the Dutch Ministry of Infrastructure and the Environment will contribute a maximum of €604 million, the Province of North Holland €56.76 million and the City of Amsterdam a maximum of €105.25 million. For the construction of the lock, a subsidy under the European Union's European Transport Network (TEN-T) programme of €11 million has now been granted.

"The new lock will be tide-independent. We'll be open 24 hours a day. That gives us more operational security. It also gives our port a gateway for bigger ships, and a faster gateway as we can handle two ships at the same time," said Brenninkmeijer

Mark Eggens, business analyst at Port of Amsterdam, said capacity at the current lock system was already almost maxed out, so the new lock was a necessity. "It gives us the room to grow," he added.

The port is also examining how best to proceed with plans to create new maritime clusters outside the IJmuiden locks. "We

already have the lightering facility there," said Brenninkmeijer. "We are looking to improve our position and the lightering facility shall be part of this. There are offshore, gas and oil opportunities. But we're in negotiations with stakeholders about moving this forward."

The port has, however, created with partners in the region the Amsterdam IJmuiden Offshore Port (AYOP), a network linking oil, gas, offshore wind, port and maritime industries to local government bodies with a remit to promote regional offshore industries. "The Amsterdam–IJmuiden port area is perfectly located for serving offshore wind projects," said Brenninkmeijer. "We are linked to the primary West European shipping routes and Amsterdam Schiphol Airport is only 15 minutes away enabling fast air transport of cargo, emergency supplies, executives and personnel. New offshore wind projects in the vicinity of Amsterdam are foreseen in the coming years."

Last year terminals in the Amsterdam North Sea region handled a total of 96.5 m tonnes of cargo. The port of Amsterdam alone handled 78.4mt (million tonnes), down marginally from 79.8mt in 2014. "We had higher revenue in 2015 at €147.4m, but volumes were down and that was mostly due to a fall in dry bulk cargoes," said Brenninkmeijer.

"For coal we saw slower demand from Germany which is in an energy policy transition and it was also a relatively warm winter," said Eggens. "There were fewer imports of coal across the Northern Range ports."

"We are an energy port and we want to stay one," explained Brenninkmeijer. "Coal prices were down and this forced terminals to deliver more often on just-in-time terms. For the coming years we expect that coal volumes will stabilize because Germany will close lignite mines and decommission its nuclear power plants in the years through to 2022. Our focus is to keep our coal volumes and strengthen the position of our coal terminals when the new lock and lightering capacity comes on stream."

"Last year, demand for scrap increased," said Eggens. "The increase is due to the growing position of Amsterdam as an export port for scrap and secondly, the opening of a third terminal. These are the most important reasons for the increase of 200,000 tonnes in 2015."

Elsewhere at the port, Cargill moved forward plans to expand capacity at its IGMA terminal last year, opening a 37,000m^2 warehouse last autumn. "They now have extra capacity for soya and corn," said Brenninkmeijer. "The agribusiness is a mature market, but this strengthens the port's position and we expect volumes to stabilize this year."

VCK Group also expanded its operations at Amsterdam this year. Back in 1998 the operator opened the world's first all-weather terminal enabling transshipment operations in all conditions under cover. VCK has now commenced building its fourth all-weather terminal for handling forest products, metals and paper. "It is expected to start operations at the end of this year or at the start of next year," she said. "They have 225 metres of quay and the investment cost is in excess of €10 million. The overhead crane will have a capacity of up to 50 tonnes"

The Solitaire *of Allseas at USA terminal in Amsterdam.*


Mark Eggens, business analyst at Port of Amsterdam.

Recently the Port of Amsterdam welcomed the *Solitaire* of Allseas at USA terminal in Amsterdam. The newly established joint venture Dutch Offshore Base (Ter Haak Group and Zwagerman Offshore) organized the replacement of a 350-tonne-capacity crane with an 850-tonne deck crane with the heavy lift crane barge *Conquest MB1*.

The opening last year of Israel Chemicals Ltd. (ICL) new European Shared Service Centre office in Amsterdam has also boosted the port's position for fertilizer and chemical business. ICL has a long-standing relationship with the city and has been operating a fertilizer plant in the Amsterdam port area since the 1980s. The new ICL Shared Service Centre office will provide a range of corporate support for its minerals, food and agriculture business services, including finance, procurement and human resources. "ICL opening its Shared Service Centre office has added volume but also emphasizes the attractiveness of Amsterdam port and city as a European business hub," said Eggens. "This is our strategy for the port. We want to be more than a transit port, we want to work with the market to create added value for the region.

"If you compare Amsterdam to other ports we have a highly educated labour force, top class local finance and excellent legal services support so it makes sense for companies such as ICL to set up here while also putting cargo through the port."

In conclusion, the port of Amsterdam is looking to the future with optimism. The opening of the new lock system will dramatically increase the port's annual capacity, and the lack of dependence on tides means that the port will be open 24 hours a day. Continued development and improvement at the port will keep it busy and relevant for many decades to come.

Beco partners with C. Klein International for attachments

Beco sells and manufactures C. Klein International attachments for excavators and wheel loaders from 10t and more; these products are used to handle a range of commodities, including coal. C. Klein International BV (CK) and BV Beco have partnered with regard to engineering, manufacturing and sales of CK attachments for construction and mining machines with an operating weight of ten tonnes and more. Through this collaboration, Beco has acquired the exclusive rights to manufacture and to sell the corresponding CK attachments worldwide.

Kees Klein's original company, C. Klein Graafwerktuigen BV in Rotterdam, developed in-house, manufactured and sold the well-known CK attachments until November 2015.

C. Klein Graafwerktuigen BV, the specialist in buckets, bonus buckets and other attachments for 'big' wheel loaders and rock buckets for 'large' excavators, has a long history and has built a big reputation in the world of handling of bulk materials, including coal.

The CK attachments find their distinction in design, materials and the way they are manufactured. Characteristic of the CK attachments are the high degree of filling, low fuel consumption while filling, maximum reliability, durability and safety. In 2014, the 'New Generation' CK attachments were launched where the aforementioned characteristics are better reflected.

The collaboration combines the strengths in the areas of engineering, production and sales. Kees Klein and Leon Klein focus in this co-operation on the engineering while Beco takes the sales and manufacturing on its behalf. Kees as well as Leon Klein have very much experience in the segment of buckets and bonus buckets for the 'big' wheel loaders and rock buckets for 'large' excavators. In addition, Beco has a modern production facility with large capacity and high flexibility.

"With this co-operation, I have met my desire to develop high quality and distinctive attachments and to continue the brand CK. The company Beco fits in terms of mentality and quality awareness very well with us. Through this partnership we can also continue to supply the CK attachments to existing relationships in the future," said Kees Klein.

"For us, the segment of handling bulk goods is an important sector. We supply besides attachments for excavators and wheel loaders also hydraulic and mechanical grabs. Through this partnership we are able to create synergy benefits and added value for our customers," said Henk van Vuren (CEO of Beco).

For repair and overhaul of the relevant CK attachments the customer can contact Beco. Beco has also the necessary technical (material) specifications and drawings. By partnering with Kees Klein the customer is assured that the revision is carried out in accordance with the original design and material specifications and so the relevant bucket retains its original properties.

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Increasing draught will significantly improve Zeeland's coal throughput

Zeeland Seaports is banking on a major dredging project to boost its coal volumes, writes Michael King.

Zeeland Seaports expects the dredging of the River Scheldt to help its stevedores attract more coal cargoes following the closure of a power station at the port last year.

Zeeland Seaports, which encompasses the ports of Vlissingen and Terneuzen and offers access to the North Sea via the Western Scheldt, currently boasts a maximum draught of 16.5 at Vlissingen and 12.5 metres at Terneuzen. But boosting the maximum draught to 17 metres is expected to make the port's coal handlers more competitive when it comes to attracting all-important Capesize vessels.

Francesco Faes, Commercial Manager, told *DCI* that EPZ's power plant at the port closed down in the last quarter of 2015

photo: Gijs Proost

Aerial view of Zeeland Seaports.

leaving a sizeable hole in the port's coal volumes which fell to 4mt (million tonnes) last year. The station generated some 1mt+ of coal imports each year, primarily handled by Ovet which has terminals in both Terneuzen and Vlissingen as well as an active fleet of floating cranes operating throughout the Western Scheldt.

"For coal throughput this year, Ovet is now looking for new niches they can serve so they can keep volumes up," said Faes. "One of the most important competitive factors is draught. We've been working with the Dutch/Belgian government for some time to increase the draught of the Western Scheldt from 16.5 metres to 17 metres. This means dredging as well as introducing dynamic keel-clearance.

"It took a lot of time to convince Dutch/Flemish Scheldt Commission (VNSC), a co-operation body run jointly by Belgium and the Netherlands, that we need this, but the decision has been made to proceed, and we hope it will be executed this year.

Ovet terminal.

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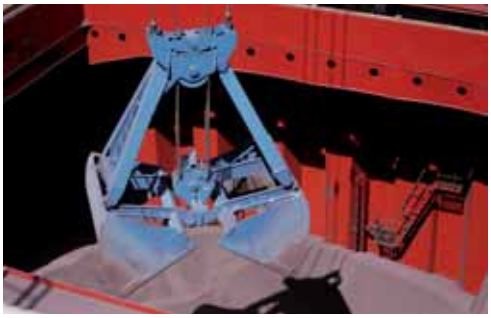

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Fertilizer giant Yara is a major user of Zeeland Seaports.

"We are continuously working together with the Dutch/Belgian Governments in different ways to improve nautical access to Vlissingen Port. Now we're permitting and once it's permitted we will start to do the dredging and support work.

"The dredging will help a lot of companies, but it will also help Ovet attract new coal business."

Last year terminals at Zeeland Ports handled 33mt of cargo in total. The loss of coal throughput was the main reason the port recorded a drop in dry bulk traffic — from 10.7mt in 2014 to 10.3mt in 2015.

Coal imports shipped via Zeeland are mostly onward shipped by barge and rail to power plants in Germany or, in the case of met coal imports, consumed by local steel manufacturers.

The port's other major dry bulk commodity is fertilizers and this commodity has a very different pattern of distribution. Last year Zeeland handled some 4mt of fertilizer. Much of the cargo is handled by Verbrugge Terminals which has a facility in Terneuzen from where the cargo is distributed around the Netherlands and to the rest of Europe.

Francesco Faes, Commercial Manager of Zeeland Seaports.

"The big driver of the fertilizer market is the previous year's harvest and the prices of agricultural products," said Faes. "If farmers are having a good year, they will buy fertilizer for the next year. But if they have a poor year, because prices are bad, they hesitate. Weather also influences this but it's the farmer that decides."

Unlike coal imports which could be impacted in the long-run by falling demand from Germany as the country weans itself off coal-fired power, the long-term outlook for fertilizer demand is more buoyant. "In the long run we believe fertilizer will be in increasing demand as the world population increases and more and more people are eating meat which needs need more fertilizer compared to grains," explained Faes.

He expects fertilizer at the port to stabilize this year after a 5% increase was recorded in 2015 compared with 2014. The port's fertilizer business was given a major boost last year when Vlaeynatie opened a new terminal, primarily to handle incoming volumes for Plantacote, a subsidiary of SQM Vitas which has built a production facilities on Axelse Vlakte in the port area of Terneuzen and plans to distribute its products worldwide.

"We now have more competition for fertilizer cargoes which is always good," said Faes. "We also of course have Yara Sluiskil's huge plant on the Ghent–Terneuzen canal and Rosier operates another production plant.

"Yara runs three ammonia plants, four CO_2 plants, two nitric acid plants, two urea plants and two nitrate granulation plants. They move fertilizer either direct at their own berths, or by using stevedoring companies in the port. They produce here and from here send to many destinations in Europe and further afield."

Another new arrival at the port is Bulk Terminal Zeeland which offers customized solutions for bulk processing and storage from its terminal in Vlissingen including specialized distribution and transshipment options. The five-hectare terminal offers draught of 11.5 metres and a 225-metre quay. "They are looking for minor bulk commodities and currently handle some grains, some metals and ores, alloys and metal residues etc.," said Faes. "They are a good addition.

"Also the bulk division of Pacorini Metals in Vlissingen, which handles a.o. ferroalloys, is expanding.

"So all in all, it's an exciting time for Zeeland Seaports."

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The controlling operational offices of the RC Inspection Group are strategically based around the globe, operating worldwide and represented in each important, active economic centre. This gives the advantage to perform the services on short notice and guarantee unbeaten turnaround times for reporting and for issuing the analytical results. All global services are co-ordinated from the head-office in Rotterdam where a permanent team of specialists in dry bulk commodities is working around the clock, monitoring each job.

Except for its skills, the company takes high value in a personal relationship with its customers. By adding a personal touch in the communication and services, RC Inspection wants to make the difference in fulfilling the customer's needs.

As RC Inspection Group companies aspires independent, fast and reliable services for the analytical results, the group keeps the analysis in-house conducted by its group company 'RCI Analytical Services'. The laboratories are to date strategically located in The Netherlands, Ukraine and Mongolia and equipped with the most modern and advanced instruments to drive accelerated turnaround times and up-to-the-minute reporting through a service driven approach and innovative use of technology.

Besides rendering the analytical services, the company also offers supply of analytical equipment, auditing of laboratory management systems and implement/manage laboratories as outsourcing to the industry.

As the global dry commodity markets are rapidly developing, RC Inspection is adapting to all necessary requirements to deliver only guaranteed high quality services. Since 2009, RC Inspection has been certified according to the ISO 9001:2008 Quality Management System Standard. In January 2015, the company has strongly expanded the scope of services and have been granted a new official certificate of approval.

Per April 2015, the company is proud to announce it is now accredited as by ISO/IEC 17020:2012 compliant organizations by the Dutch "RvA" with registration number: I 308.

"We find such accreditations highly valuable, ensuring a true

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quality assurance both from RC Inspection to our customers but also for their respective customers."

RC Inspection underwent an evaluation process that included quality management system development, a management system documentation review, pre-audit, initial assessment and clearance of non-conformances, all of which work to identify corrective actions that eliminate non-conformance to the quality management standard.

The accreditation of compliance with ISO/IEC 17020:2012 recognizes that the policies, practices and procedures of the company can be ensured with consistent quality and excellent expertise in the knowledge of the products and the provided services.

With these accreditations and certifications, the customers can be ensured that RC Inspection is dedicated to maintaining the highest efficiency and responsiveness in achieving its ultimate goal — guaranteed customer satisfaction.

The RC Inspection Group companies are

- LME listed — without any sort of limitations on geographical locations or metals
- Member of the MMTA
- Certified with ISO 9001:2008
- Accredited with ISO/IEC 17020:2012
- Accredited with ISO/IEC 17025
- Member of Verein der Kohlenimporteure
- Approved laboratories under GlobalCOAL SCoTA
- Superintendent and surveyor member of GAFTA

RCI Ltd. In Hong Kong is associate member of LBMA

- RC Uluslarasi Gozetim Ltd Sti. (Turkey) is a member of the Accredited Inspection Companies (AGDF)
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Damen commences building two transshipment crane barges

Vessels built for stock in anticipation of continued commodities growth

Damen Yichang Shipyards has commenced construction of two identical Crane Barge 6324 vessels. Designed as a particularly cost-effective transshipment platform, the barges are being built on a speculative basis in response to client demands to ensure short delivery times.

Damen's Crane Barge 6324 is a low-cost transshipment barge designed for ship-to-ship, ship-to-barge or ship-to-quay operations. The design is also suitable for flexible harbour services being able to transship dry bulk, containers and breakbulk. The 63-metre-long vessel boasts 750m^2 of deck space, with additional below-deck lashing stores.

Damen's Crane Barge 6324 is a low-cost transshipment barge designed for ship-to-ship, ship-to-barge or ship-to-quay operations.

"These Crane Barges are perfectly suited for shifting coal, iron and agribulk materials — all of which are internationally important commodities." comments Design Engineer Hugo Hoekstra. "Bigger bulk vessels and port developments require different infrastructure which is expensive and time-consuming. These transshipment barges relocate the loading and lightering to a location with sufficient depth. For operators, such as port authorities and harbour logistics companies, working in this very competitive market, these vessels will serve as a 'no-frills' option — they are as functional as they need to be."

"We have great confidence in this product and in this market — that's why we are building these two vessels for stock. A potential buyer will be able to take advantage of a very fast delivery time."

To ensure an optimally efficient design, Damen's in-house Product specialists have collaborated with numerous other departments within the company. For example, the jib rest has been optimized to provide greater safety during transshipment and, alternatively, for servicing sheaves of the crane.

Both Crane Barges will be installed with a Liebherr CBG 350 crane — providing efficient loading capabilities with grab operations of 35 tonnes at 36 metres and hook operations at 45 tonnes at 36 metres. The double drum mooring winches are positioned in such a way to enhance safety during mooring operation and minimize the potential for hazards. Damen's roots in the production of workboats comes out in the detail, fulfilling the company's goal of delivering high quality, reliable and easy to operate and maintain vessels.

"For this product we cooperate with partners like PON for generator sets, Van der Leun for electrical, DMT for the winches and Liebherr for the crane. This relatively new product complements our portfolio," Hoekstra continues. "Damen is able to provide complete packages of products to serve the specific needs of our clients. A one-stop-shop for your new built vessels, spares, services or maintenance and repair jobs. Damen serves the bulk industry as they serve any industry. You don't only buy a vessel, but become part of the family. To start you off with your transshipment operations, we've included crane driver-training to optimize your throughput."

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Operating around-the-clock, RBT has a wide knowledge of dry bulk commodities and is continually expanding its specialization to understand and provide the right answer to all your challenges. Our future lies in serving our clients not only with effective transhipment and storage, but also by being a solution thinking partner.

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Eurosilos for petcoke in Oman

Recently Larsen & Toubro assigned ESI Eurosilo to the design and delivery of two Eurosilos that will serve as a logistic link between production and shipping at the Orpic refinery in Sohar, Oman. The proven performance in coal storage made the Eurosilo the best option for petroleum coke (petcoke).

Orpic is one of Oman's largest and most rapidly growing businesses in the Middle East oil industry.

The remarkable integration of refinery and plant operations, together with ambitious growth plans, has positioned Orpic as one of the industry's most forward-thinking companies.

Following the strong commitment to safety and sustainability of Orpic, the contractor Larsen & Toubro, chose the Eurosilo system for the storage of green coke.

Also the very limited space was a deciding factor. Two silos, of 42,000m³ each, will streamline the logistics flow between the continuous production of petcoke and the periodic loading of transport ships at the nearby port. Therefore the filling rate of the silos amounts up to 80tph (tonnes per hour), while the reclaim capacity is up to 1,040tph .The 3D impression shows the positioning of the silos including four truck loading lanes.

The main criteria to select a Eurosilo storage system are:

- minimum footprint;
- no dust emission;
- no segregation;
- well proven fire protection system; and
- high degree of automation.

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Dunlop launches range of industrial rubber sheeting

Industrial rubber sheeting may not sound particularly exciting but in actual fact it is widely used across the Netherlands in the agricultural industry as well as a many other industries for a wide variety of purposes including chute lining, conveyor skirting, screening and wear and corrosion protection. For some years now, the market for rubber sheeting in Europe has been dominated by Asian imported product, especially from China. But if Netherlands-based Dunlop Conveyor Belting has its way then that situation could well be about to change as they have recently launched a brand new range of Dunlop Ultima rubber sheeting.

Dunlop's strategy is based on offering a top-quality European manufactured product that is competitively priced, totally safe to handle, long-lasting and which has an order and delivery system that is flexible, fast and easy. The company believes that this combination will be more attractive than imported rubber sheeting from Asia with all the associated quality, logistical and commercial issues.

Dunlop Conveyor Belting technical director, Dr. Michiel Eijpe, explains why it is now able to manufacture top-quality sheeting at highly competitive market prices. "The quality of any rubber product, especially its durability, wear resistance and strength is largely determined by the quality of the raw materials that are used. We have managed to achieve greater economy without compromising the quality by investing in brand-new equipment and developing highly efficient new production processes."

Eijpe goes on to explain that the new Dunlop Ultima rubber sheeting range, which is exclusively made in Dunlop's Drachten factory in the Netherlands, has been designed and developed strictly in accordance with DIN 7715 international standards. "Our Research & Development team has made sure that Ultima is exceptionally resistant to wear and has excellent tensile strength. It is also fully resistant to the harmful effects of ozone and ultra violet, which causes rubber to crack and degrade." Safety is also an important factor. "Like all of our products, Ultima is safe to handle and safe to use with livestock because it fully complies with the strict European regulations (REACH) concerning the use of potentially hazardous chemicals within the manufacturing process. These regulations do not apply to manufacturers located outside of Europe of course."

Speed of service

Dunlop feels that it also has a number of other advantages . To make the ordering process quick and easy, the company has created a dedicated Internet website and on-line payment system.

The website allows customers to select the products and quantities they want to order and even calculates the cost of delivery based on the post/zip code. Orders are then fed directly to a specially adapted warehouse in Holland for the fastest possible turnaround.

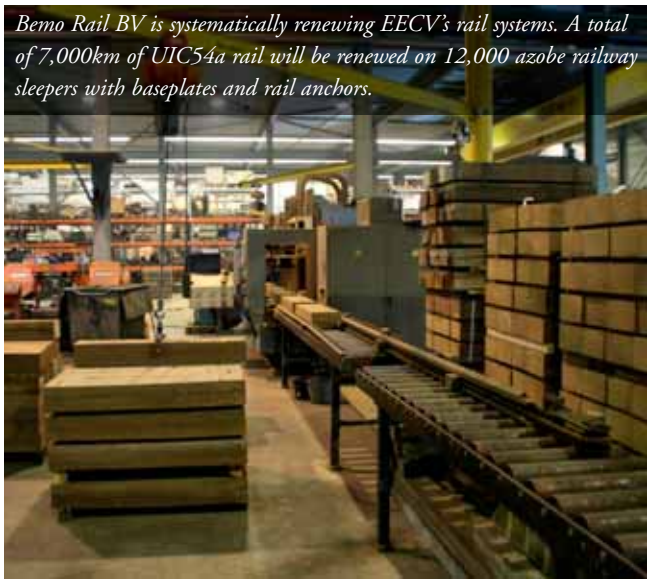
Sales & Marketing Director Andries Smilda is particularly excited by what is a very new approach, not only for Dunlop but also for industry in general. "We have always competed on quality but thanks to a lot of hard work by a lot of people behind the scenes we now feel that we have added competitive pricing and enhanced customer service to the customary Dunlop quality advantage."

Bemo Rail BV supplies new rail system to Ertsoverslagbedrijf Europoort

Bemo Rail BV will renew several rail systems for Ertsoverslagbedrijf Europoort (EECV), located in the Europoort area of Rotterdam port, for the modernization of its iron ore storage fields and logistical installations.

In a time-frame of a few weeks the rail system will systematically be renewed according to a strict schedule. In April 2016 and November 2017 a total of 7,000km of UIC54a rail will be renewed on 12,000 azobe railway sleepers with baseplates and rail anchors. Bemo Rail will oversee the construction of the earthworks and building of the roadbed with 10,000 tonnes of ballast material, all within the precise tolerances of rail construction.

Work started on 29 March 2016 and on Saturday 26 March the first ship arrived with ballast material, which was discharged at Dintelhaven. The sleepers and baseplates are drilled in Bemo Rail's workshop in Warmenhuizen.



Bemo Rail BV is systematically renewing EECV's rail systems. A total of 7,000km of UIC54a rail will be renewed on 12,000 azobe railway sleepers with baseplates and rail anchors.

EMO invests in conveyor belts

The supervisory board of HES International granted EMO/EKOM approval for Project 030. The realization of Project 030 is combined with Project West of which approval was granted in December 2015. In March the majority of the contracts will be closed for the construction-, civil- and electrical works and for the deliveries of the electrical- and mechanical rotating equipment.

EMO

EMO (Europees Massagoed-Overslagbedrijf B.V.), the European dry bulk goods and transshipment company, is the largest terminal for coal and iron ore in Europe. The biggest seagoing vessels from all over the globe berth along the EMO quay. Its machine-driven transport conveyor system moves cargo across the terminal for storage, processing or transshipment.

EMO serves clients in the energy and steel sector. Power plants produce energy for consumers and industry. The steel industry processes millions of tonnes of iron ore, transhipped by EMO to become numerous products, from cars to industrial machinery, as well as steel construction for the building sector. EMO's clients come from all over Europe.

The LC Packaging promise: quality and sustainability around the globe

Founded in 1923, packaging producer and distributor LC Packaging certainly has made its mark. Originally Dutch, the family-owned company has grown from a local player to an international packaging expert with its own FIBC (flexible intermediate bulk container) production locations, offices and warehouses in 16 countries in Africa, Asia and Europe. The year 2015 was a successful one, resulting in a €157m turnover and many exciting achievements, solutions and projects.

LC Packaging FIBC.

International presence and local service

Just last year, LC Packaging opened a new office in Abidjan, Ivory Coast to serve the west African market, an important addition to the southern African operations in Johannesburg, South Africa. The African market has become increasingly important: it is the fastest growing region for the LC Packaging Group. But there is also still room for expansion in Europe: in 2015, LC Packaging opened the first Nordics office in Malmö, Sweden. Marcel Schouten, Director FIBC at LC Packaging, says: "LC's strategy is simple: we go where our customers go. Either by setting-up an office or warehouse in the proximity of our customers, or making sure our international sales team is present in new markets, such as South America and the Far East."

Smart procurement: cross-border solutions

For international key accounts LC Packaging offers a so-called smart procurement solution. All the systems are in place for dedicated international sales and service teams to offer high level, cross-border service, enabling customers to purchase their packaging centrally, instead of placing an order for each country or area separately. Also, the call-off process for packaging in stock and the billing process can proceed through one single contact. Delivery and local service are in the hands of the various LC Packaging offices with local logistics and packaging experts.

Industry expert

LC has years of experience in different industries, for example food and pharma, chemical industry, animal nutrition, mining and minerals, disposal and recycling, and construction. The FIBCs are adjusted to industry standards and compliant with legal and industry specific requirements, offering full protection during transportation, storage and operations, and are produced according to the highest production and testing standards. Advanced operations systems are also in place for just-in-time delivery.

Marcel Schouten.

Quality is the complete package

LC is one of the first packaging experts with a dedicated internal Quality Department. The company says: "Quality is the complete package." This means that LC not only offers its customers Quality excellence by a dedicated quality department, but also compliance with a comprehensive portfolio of quality standards and, where needed, offers quality advice to help customers meet their quality programmes. Says Schouten: "Because we have own production locations and dedicated exclusive production partners, we not only have full control on the production (and thus the quality), but we are able to offer an extensive range of FIBCs, cost efficient benefits, flexible, tailor made production and guaranteed delivery."

Sustainable and responsible purchasing

LC Packaging also believes that a product and service can only be of high quality if it is produced in a sustainable and responsible way. LC's FIBC production locations and production partners are SA8000 certified: the leading global standard for corporate social responsibility. LC Packaging International is also EcoVadis, ISO 14001, ISO 22000 and OHSAS 18001 certified, and is a member of the UN Global Compact (UNGC), following the UN principles on Business and Human Rights. Schouten says: "Recently, all of LC's production partners signed the LC Packaging Global Supplier Code of Conduct, prescribing values and principles to which LC has committed worldwide. This is a non-negotiable code of conduct, based on the SA8000 standards and the principles of the UNGC and International Labour Organization (ILO)." In other words, LC's customers can be assured they are purchasing responsible, high quality products that comply with all market demands on sustainability and CSR.

Reconditioning service for FIBCs

Did you know FIBCs can be reused up to six times? LC Packaging offers its customers a reconditioning service for FIBCs with a safety factor of 6:1 and above. Worldbag, part of the LC Packaging Group since 2009, is LC's reconditioning and recycling brand and a sustainable service to its customers, with cost savings as a result. In January 2016, Worldbag was successfully audited again for the ISO 14001 certification (environment).

Wind of change for Ovet

Ovet B.V. is a stevedore, whose core business is the transshipment and storage of dry bulk. With its four floating cranes, it has the flexibility to operate at both of its terminals in Terneuzen and Vlissingen as well as on the river Scheldt and even in Ghent and Antwerp.

Since Ovet was founded in 1957, coal has been the main product handled at its terminals. However, as the market share of coal in Europe is decreasing, Ovet faces many changes in the supply of dry bulk cargo.

In Terneuzen, Ovet was founded as a local transshipping company for the Coke Factory in Sluiskil. Nevertheless, when the factory closed its doors in 1999, Ovet already had expanded its business. New clients with a diversity of products provided Ovet with new reasons for existence.

Now Ovet needs to deal with a similar situation at its terminal in Vlissingen. As the adjacent coal power plant EPZ was forced to shut down by the end of 2015; again diversification in products will be the solution to survive. New products require new ways of transshipment and also new ways of storage. Therefore, Ovet not only offers the standard open storage possibilities, but also covered storage in separated compartments, fully ventilated and GMP-certified.

Besides all these external changes, Ovet also faces a big internal modification, as its managing director Johan Martin retired as from the end of January 2016. Therefore, its new managing director Vincent Courtois will find some challenges in this changed market situation, which creates also great opportunities to go into new directions. In short: Ovet goes on a wind of change.

RollDock expands

RollDock Shipping B.V. (part of the Roll Group) confirmed the purchase of its seventh, the *RollDock Sky*. This is the third semi-submersible multipurpose heavy lift vessel bought from Larsen & Toubro India. She will go directly into service after some upgrades.

The 'RollDock Sky'

After RollDock and L&T ended their co-operation in 2013, L&T continued building a third semi-submersible multipurpose heavy lift vessel. During visits to the L&T yard by RollDock staff, RollDock was impressed by the quality and progress. Despite moderate market conditions, the management, supervisory board and shareholders decided to purchase the vessel and to name her *RollDock Sky*. The *RollDock Sky* is a sister vessel to *RollDock Sun* and *RollDock Sea*.

Two additional vessels

Furthermore, RollDock has two vessels under construction which will take the fleet up to seven vessels within the next 12 months. In cooperation with BigLift, BigRoll Shipping was founded and four open wide deck ice class vessels were ordered at the COSCO Shipyard Dalian. The first MC Class vessel is nearing her completion and she will soon enter into service for BigRoll Shipping.

"We are very proud that despite the unfavourable economic times, we are still able to maintain the growth strategy of our business" said CEO Roll Group.

About the Roll Group

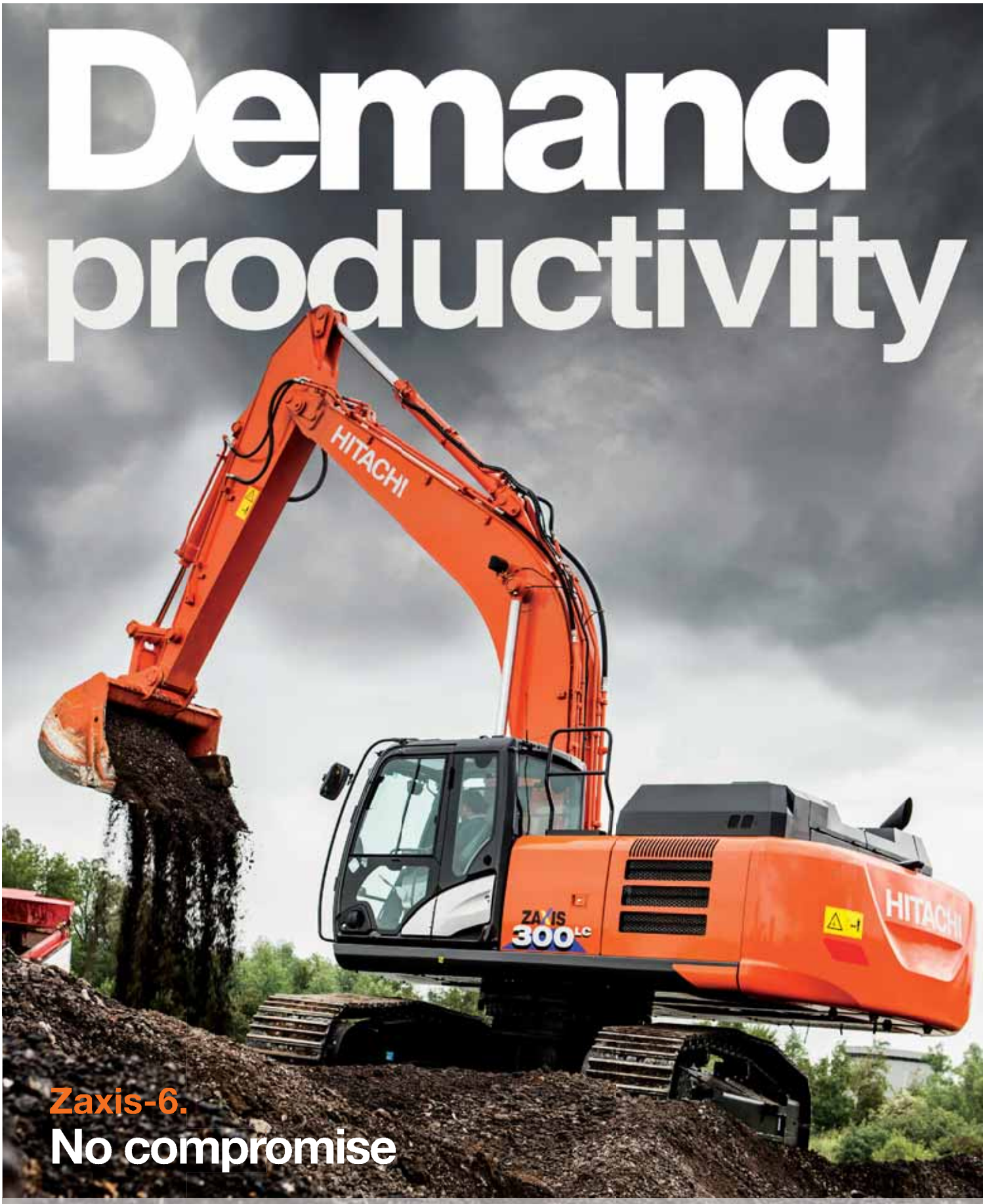
The Roll Group is a global provider of engineered heavy lift, transportation and installation solutions, by both land and sea. The Group has the capability to transport large, oversized cargo and has a large in-house engineering department which makes it unique in the industries it serves.

RollDock Shipping, the marine transportation division of the company was founded in 2006. The fleet now comprises five semi-submersible multipurpose heavy lift vessels with a further two MC Class vessels under construction. The RollDock vessels have three methods of loading and discharging; roll-on roll-off, float-in float out and lift-on lift-off.

Total solutions: factory to foundation

With a larger fleet, RollDock Shipping B.V. increases its flexibility to further enhance the services provided to its clients. There is often more than one solution to handle large, oversized or heavy structures or components. By combining the services of RollDock with Roll-Lift, the organization has the in-house ability to consider all available options and to provide a full 'factory to foundation' solution.

Demand productivity



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ARDELT — dry bulk handling efficiency and expertise

Kocks Ardelt Kranbau GmbH is a member of the Kranunion group of companies and has been building cranes for more than 110 years. By using the experience gained from supplying several thousand harbour cranes over this time, Ardelt has advanced to become one of the leading manufacturers of lifting equipment for handling bulk materials.

In particular, the development of the double jib level luffing system together with the integration of hoppers and unloading equipment into the crane system, are key-factors behind the advance to achieve higher handling performances and unrivalled efficiency.

The Tukan K is a unique, compact ship-unloader. The design configuration allows for very short cycle times between hatch and hopper coupled with best control of dust for cargo such as coal. Naturally the cranes are equipped with power regeneration to ensure the lowest possible cost per tonne moved.

Two of the largest Ardelt cranes have been operating successfully in Wilhelmshaven, Germany for the last three years. The primary task for both cranes is the unloading of coal carriers for supplying a nearby power station. These cranes are able to achieve a free digging performance of up to 2,400tph (tonnes per hour).

The established double jib level luffing system with its short rope lengths, provides precise and fast positioning of the grab. The grab used at port of Wilhelmshaven is a four-rope grab manufactured by Verstegen and has a capacity of 44m³ with a deadweight of approximately 19 tonnes. These dimensions are necessary in order to provide the handling volumes required.

Recently two more cranes of the same size went into service for voestalpine in Corpus Christi, Texas. These cranes will handle Capesize vessels laden with iron ore pellets. The cranes were selected thanks to their compact design which eliminates the need for a separate hopper, freeing up valuable quay space and also enabling the working of adjacent hatches.

The grab depth optimization system patented for Ardelt ensures smooth operation and minimizes interruptions that result from shutdown due to over-filling of the grab, or loss of performance from insufficient grab filling.

Kranunion is an association of three crane manufacturers specialized in lifting and transporting heavy loads;-

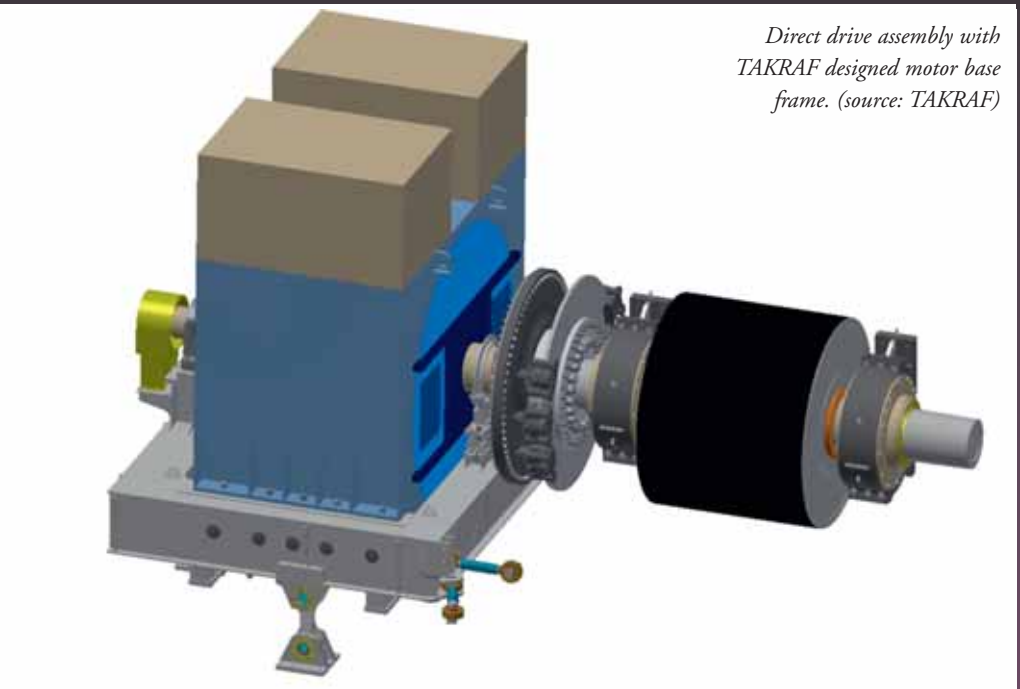
Kirow is a renowned expert for railway cranes and slag pot carriers.

Ardelt is widely respected for double jib level luffing cranes.

Kocks is an acknowledged expert in Goliath cranes and innovator for STS container cranes.

Takraf is awarded contract to supply world's most powerful belt conveyor system

TAKRAF, an integrated solutions provider to the global mining, material handling and minerals processing industries, has recently been awarded the supply of the principal ore transportation system for the Chuquicamata Underground Mine Project by Chile's state-owned copper mining company, CODELCO — the world's leading copper producer.



Direct drive assembly with TAKRAF designed motor base frame. (source: TAKRAF)

Chuquicamata is one of the largest open-pit copper mines and the second-deepest open-pit mine in the world and is located 1,650km north of Santiago, Chile. The mine, popularly referred to as 'Chuqui', has been operating since 1910. The Underground Mine Project is being developed to access the ore body situated beneath the present open-pit mine and aims to extend mining operations for a further 40 years. The new mine is scheduled to be in operation in 2019.

TAKRAF's innovative belt conveyor system will overcome a number of technical challenges including significant elevation change from the underground mine to the surface, and will comprise a variety of uphill tunnel conveyors that transport copper ore from underground storage bins. The system will also include a number of feeder conveyors as well as an overland conveyor feeding into the existing conveying system.

The conveyor system will be installed with advanced gearless drive technology with the uphill tunnel conveyors boasting the highest drive power ever to be installed on a belt conveyor. In fact, total installed drive power for the entire system will be around 55MW. Gearless drives eliminate the need for a gearbox, hereby significantly reducing the number of main wear parts. This results in increased efficiency and reliability, as well as less maintenance being required. Further advantages include a considerable reduction in the drive system's footprint and the amount of instrumentation required.

Safety, as well as the ease and speed of maintenance are critical success factors for a project of this nature. TAKRAF's innovative chute maintenance solution will allow for all regular chute maintenance to be conducted from outside the chute, with no person having to enter the chute. This is a particularly important safety point, especially in underground environments.

Another significant achievement will be the installation of a newly developed steel cord belt, ST10000, on the uphill tunnel conveyors. This will mark the world's very first conveyor system to employ this premier steel cord belt technology. The conveyor system will boast a design capacity of more than 10,000tph (tonnes per hour) and, in order to manage and dissipate intense heat generated by the system, a complex cooling system has been included in the project scope, which requires that no heat be dissipated to the underground environment. TAKRAF's total scope includes a variety of engineering disciplines as well as various components' supply and extensive site assistance.

"This order is another significant milestone for TAKRAF in the Chilean copper industry and we look forward to supporting CODELCO in their aim of being the world's leading supplier of copper. Our industry-leading conveying technology and proprietary material handling equipment are widely used by customers around the world. Our customers are increasingly demanding innovative and cost-effective solutions to global issues as ore reserves are depleted and mines are required to dig deeper", says Dr. Frank Hubrich, TAKRAF's CEO.

TAKRAF is an integrated solutions provider to the global mining, bulk material handling and minerals 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 brand of products into TAKRAF, the offered portfolio for the mineral beneficiation and processing sectors has been considerably enhanced.

Bulk Material handled by Experts

Tenova TAKRAF is a key supplier of individual machines and integrated systems for handling bulk materials in mine stockyards, ports, power stations and metallurgical plants. Each project is approached from the end-user's viewpoint in order to deliver optimized solutions that meet and exceed requirements and expectations.

Complex material handling operations starting from train unloading via stockyard handling and blending to ship loading are handled on the basis of extensive experience and know-how in bulk handling. Stackers, Reclaimers, Stacker/Reclaimers, Scrapers, Ship Loaders and Ship Unloaders are reliably in operation all over the world.

Total technology solutions for mining, bulk materials handling and minerals beneficiation.

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Tenova is a worldwide supplier of advanced technologies, products, and engineering services for the metals and mining & minerals industries.

igus® receives 10,000th readycable®

Robotic welding systems have been widely used in large-scale automated manufacturing facilities, particularly in the automotive industry, for a number of years. Faced with cost-down pressures from their customers, small metalworking job shops are now starting to consider implementing automation. When the operating costs of robotic welding are compared to manual welding the results are now clearly in favour of the robot. Additional benefits of automating are increased productivity, more consistent welded joints and improved quality.

Cyber-Weld, a Warwickshire, UK-based provider of robotic welding solutions, provides a simple cost analysis to its potential customers. Using manual welding, the overhead burdened cost is around £35k PA for a single shift, with an average 'Arc On' time of 25%. The average robot 'Arc On' time is 75%, three times that of a manual welder, resulting in an additional 200% production capability. With an entry level robot and operator costs of £17.5k, the payback time is less than 12 months.

Potential users do have concerns though. How easy are they to programme? Where to find trained staff to operate them? How reliable are the robots?

When choosing a partner, reputation should always be the first consideration. A reliable partner must provide advice on which robot to select and be able to provide a full turn-key solution with support from the initial inquiry through to the installation. Prompt delivery, machine commissioning, employee training, trouble shooting, repair and offering regular system overhauls are other key factors. Look for a company that is a strategic partner for one or more of the leading robot manufacturers.

Cyber-Weld regularly uses igus® as a supplier and partner for cable assemblies on its robotic welding machines for the same reasons and has bought over 100 readycable® drive cables. Cyber-Weld's last purchase marked a milestone for igus®; being the 10,000th order for the product series. These highly flexible cables provide power and signals to the robotic head, grippers or other attachments and are usually mounted externally to the robotic arm. Particularly on a six-axis robot, this cable is subject to a great deal of rigorous movement, which can lead to premature failure if incorrectly specified.

"We expect the cables to outlive the mission time of the installed robotic system, which is approximately 10 to 15 years," stated Mike Jones, General Manager, of Cyber-Weld. "igus® is always helpful and is happy to come onsite to look at our requirements, which is a big plus factor for us. A local supplier with a good reputation, igus® also helps us shorten our lead-times."

The readycable® assembled drive cables series has bending radius from 7.5 x od. Harnessed cables are tested in igus® e-chain® cable carriers through many millions of cycles. There is a choice of servo cables, signal cables and feeder cables with a total of seven cable quality levels for the same electrical requirement, offering an affordable and durable solution for all applications. The readycable®

order from robotics company

assembled drive cables also have a number of certifications and regulatory conformities including UL, CSA, CE Desina. These extremely reliable cables are designed for high stress applications and are also available with flame and oil resistance.

It is no contradiction to say that good cables cost less. Fast delivery throughout the world is a significant purchase criterion, and igus® can provide that with a presence and stock in more than 40 countries. This saves time, money, part storage capacity and is applicable to 1,040 igus® cable types, which can be ordered without any minimum quantity purchases or surcharges.

igus director, Justin Leonard, presents Fraser Reid, managing director of Cyber-Weld, with the 10,000th readycable® order.

In the igus® test facility in Cologne, numerous parallel tests are conducted under the most severe conditions. Currently, more than two billion double strokes and 1.4 million electrical tests are carried out per year, with the test results stored in an extensive data-base, providing precise and reliable data about actual service life. The test data for e-chains®, cables, and also for ready-assembled systems, are so extensive that igus® has secured a functional guarantee for its variety of e-chain® systems based on the particular application.

The igus® reputation appreciated by Cyber-Weld comes from this extensive testing and more than 25 years of industry experience in continuous-flex cable. Further information and the on-line readycable® product finder can be found on the igus website, including searches by machine producer and cable type.

About igus®

Based in Northampton in the UK, and with global headquarters in Cologne, Germany, igus® is the largest producer of injection moulded polymer bearings and reinforced plastic cable carriers in the world. Product lines include industry-leading e-chain cable carriers, chainflex continuous-flex cables, iglidur® plastic plain bearings, igubal® spherical bearings, drylin® linear bearings and guide systems. The company has 26 subsidiaries across 31 countries and employs more than 2,150 people worldwide.

With plastic bearing experience since 1964, cable carrier experience since 1971 and continuous-flex cable since 1989, igus® provides the right solution based on 100,000 products available from stock with between 1,500 and 2,500 new product introductions each year.

New bulk storage facility at busy harbour

Rubb Building Ltd has designed, manufactured and constructed a new port storage structure at Belfast Harbour.

This is the fourth steel framed fabric clad building the company has delivered to the harbour, which is Northern Ireland's principal maritime gateway and logistics hub. Around 70% of Northern Ireland's and 20% of the entire island's seaborne trade is handled at the harbour each year.

Rubb harbour structures provide large, clearspan internal spaces that are illuminated by natural light through Rubb's translucent roofing system. This allows a brighter, safer, more efficient working environment than conventional warehouse structures. Rubb relocatable buildings offer flexible storage warehouse solutions as they can be easily and quickly reconfigured/relocated to suit the changing requirements of a busy port.

Rubb worked with main contractor McMillan Construction to install the 32.5m wide × 76.5m long port structure at Belfast Harbour. The building features 6.75m-high sidewalls, with outside tapered column legs, which ensure all internal walls have a straight vertical face. This helps to maximize the internal space.

The facility sits on a 1m high concrete wall and has an internal apex height of 13.5m from internal floor level. It

provides 25,340m³ of clear storage space.

A 6m × 6m roller shutter door was installed in one sidewall of the building. Personnel can access the building via three pedestrian doors. The facility was constructed in less than three months and will be used for the storage of steel and other materials.

The hot dip galvanized steel frame and high tenacity PVC covering membrane require very little maintenance. Rubb port buildings are designed to withstand difficult environmental and corrosive conditions. The durable PVC membrane cladding on Rubb port warehousing structures will not corrode in a marine environment. Rubb fabric structures can be custom designed to support a variety of bulk handling methods.

RDS launches LOADMASTER α50 at HILLHEAD 2016 exhibition

RDS Technology will be displaying its wares at the Hillhead 2016 exhibition in the UK, which is due to take place at the end of this month (June). On show at its stand will be the LOADMASTER α50, LOADEX 100, LOADMASTER α100, iSOSYNC and WEIGHLOG α10.

LOADMASTER α50, the enhanced colour touchscreen replacement for the LOADMASTER 8kiX is an on-board weighing system for larger loaders which will be making its world début at the Hillhead exhibition. The LOADMASTER α50 is designed to help increase loading efficiency, cut vehicle movements on site and ensure lorries are correctly loaded first time.

LOADEX 100 is a retrofittable scale installed on both tracked and wheeled 360° excavators and material handling machines to weigh the amount of material in the bucket, grab or clamshell.

LOADMASTER α100 is an on-board weighing scale for wheeled loaders. A CAN based system combining cutting edge sensor technology and signal processing techniques, the LOADMASTER α100 is designed to provide precise and consistent bucket weight information and to emphasize the gains in productivity and profitability that can be achieved with such technology.

LOADMASTER α100 is designed to operate within the fastest loading environments and toughest of conditions, to reduce cycle times and maximize tonnes per hour performance.

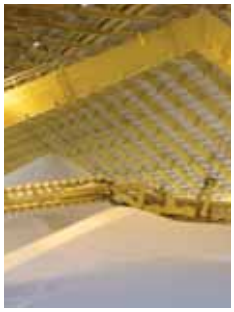
iSOSYNC enables control of the loadout operation and inventory, productivity and traceability management.

The software can be used with either LOADMASTER α100 or LOADEX 100 and allows the rapid transfer of job information from a central computer to the loader or excavator and the resultant load information is sent back to the PC upon completion.

For smaller loaders and skid-steers, RDS offers the WEIGHLOG α10, which also benefits from a colour touch screen display. This instrument is designed to be a user friendly on-board weighing system which provides accurate and consistent bucket and total load results, meaning stock management and check-weighing operations can be controlled more effectively.

RDS Technology, a Topcon Positioning Group company, supplies over 100 original equipment manufacturers worldwide with custom solutions, as well as supplying standard 'retrofit' products through a network of specialist independent distributors in over 30 countries where customer service is the highest priority. Headquartered in Minchinhampton in the United Kingdom, RDS pioneered the use of electronics for agriculture and continues to lead in other sectors of mobile machinery.

Full-Portal Reclaimer



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Efficient electric material handler for scrap recycling

SENNEBOGEN 830 WITH 17M RANGE

The Dutch company HKS Metals put a new SENNEBOGEN 830 material handler with electric drive into operation in mid-2015. Featuring a 17m range and a viewing height of 4.2m, the machine is primarily used to feed material into the shredder. In addition, an 821 and an 825 — both mobile machines — are available for sorting and preparatory work respectively.

For over 15 years HKS Metals, a subsidiary of TSR headquartered in 's-Gravendeel, the Netherlands, has relied on the green SENNEBOGEN material handlers within the group to collectively handle up to a million tonnes of iron scrap and 100,000 tonnes of non-ferrous metal every year. When a new acquisition was due, a balance between quality and price was key for site manager Henry Heuvelman. "The simple technology, high reliability, and excellent after-sales service via the dealer Kuiken made the decision easy for us," says Heuvelman.

Electric drive for a long service life and operation without refueling

In contrast with the existing mobile machines, which are used for on-site sorting and loading of materials, the new SENNEBOGEN 830 is mainly used for feeding material into the shredder. Mounted on a four-point base frame, the electric material handler is positioned centrally next to the shredder, easily covering an area of 900m² thanks to its 17m-long equipment set. The advantages of the electric drive are clear. Along with around 50% lower energy and operating costs, noise emissions are also significantly lower compared with diesel-powered machines. With longer maintenance intervals and operation without refueling, the electric drive is not only environmentally friendly, but it is also extremely durable when in operation.

Customized machine with excellent overview

In close co-operation with SENNEBOGEN and the local sales and service partner Kuiken NV, the SENNEBOGEN 830 has been optimized to local conditions. The electric material handler is powered by a 132kW motor and features numerous panoramic cameras. The Maxcab Industry cab, which can be raised up, brings the driver to a viewing level of 4.2m for an optimal overview of the working range covered by the 17m-long equipment set. The cab itself is fitted with armoured glass and an inclined windshield for optimum viewing, and an additional floor window perfectly adapted to ambient conditions. Under a full-service contract, Kuiken takes care of regular maintenance.

A new SENNEBOGEN 830 electric material handler is put to use at HKS Metals for feeding scrap into the shredder. The mobile material handlers 821 and 825 deal with loading and sorting.

"Our machines are constantly in use; our primary objective is to minimize downtime and servicing times. With longer servicing intervals and exceptional reliability, the new SENNEBOGEN electric material handler helps us to work even more efficiently," says Heuvelman.

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FLSmidth to supply equipment to Russian port

FLSmidth has signed an EPS (engineering, procurement and supervision) contract worth more than €160m with the Russian marine export terminal owner OTEKO-Portservice LLC for the engineering, supply and supervision of material handling equipment. The equipment is to be installed at the port of Taman on the Russian Black Sea Cost, approximately 1,500km south of the capital Moscow.

The order is part of the construction of a new cargo terminal to handle the increasing export of coal, iron ore, sulphur and fertilizers from production sites in Russia. Included in the scope of supply is: railcar unloading, screening and crushing, stockyard machines, shiploaders and associated conveyor systems including auxiliaries such as dust suppression or sampling.

"FLSmidth and Oteko have worked jointly on this project for a long time and have now found a technically and commercially viable solution that allows this project to go ahead despite the headwind from the commodity market. It is a good example of how customers can benefit from engaging with FLSmidth early in the development of a project. This order includes supplies and services from various FLSmidth business units and is particularly valuable in times with low capital investments in the mining and minerals industry," Group Executive Vice President of the Minerals Division Manfred Schaffer comments.

KABELSCHLEPP Metool designs lightweight cable carrier

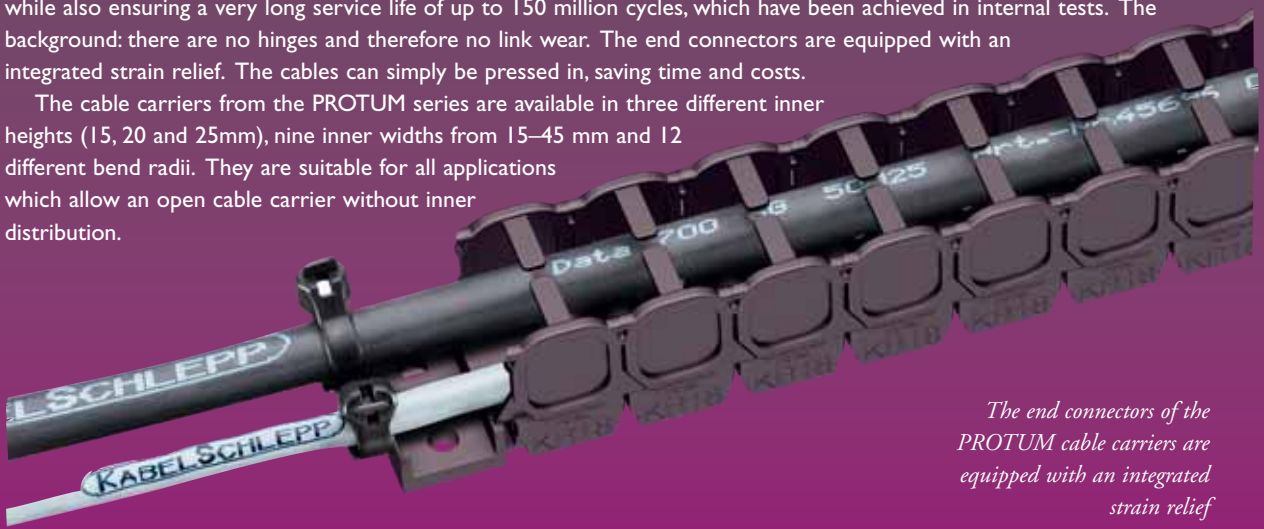
LIGHTWEIGHT AND LOW NOISE UP TO 150 MILLION CYCLES: PROTUM FROM KABELSCHLEPP METOOL

The small and lightweight cable carriers from the PROTUM series are suitable for low cable weights and short unsupported applications. Compared with conventional solutions, they feature a particularly favourable ratio of usable interior space to outer dimensions.

The small and lightweight cable carriers from the PROTUM series are suitable for low cable weights and short unsupported applications.

The cable carriers from the PROTUM series are designed to produce a particularly low level of vibrations, ensuring very quiet running. The design consisting of the so-called PROTUM band with push-in side parts achieves an extremely quiet unrolling of the cable carrier while also ensuring a very long service life of up to 150 million cycles, which have been achieved in internal tests. The background: there are no hinges and therefore no link wear. The end connectors are equipped with an integrated strain relief. The cables can simply be pressed in, saving time and costs.

The cable carriers from the PROTUM series are available in three different inner heights (15, 20 and 25mm), nine inner widths from 15–45 mm and 12 different bend radii. They are suitable for all applications which allow an open cable carrier without inner distribution.



The end connectors of the PROTUM cable carriers are equipped with an integrated strain relief

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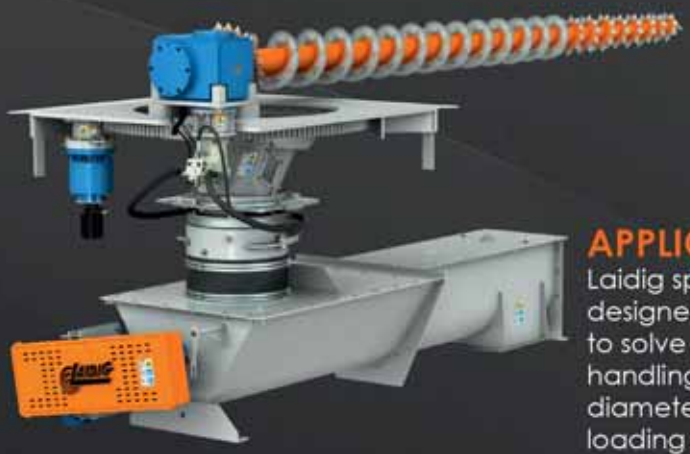
EXPERTS IN

MATERIAL HANDLING SOLUTIONS

FULLY AUTOMATED TURNKEY SYSTEMS

Laidig's turnkey storage and reclaim systems offer superior material handling performance and dependability in the harshest environments.



APPLICATION SPECIFIC

Laidig specializes in custom-designed and engineered systems to solve all of your material handling needs, including large diameter applications to assist in loading ships at port facilities.

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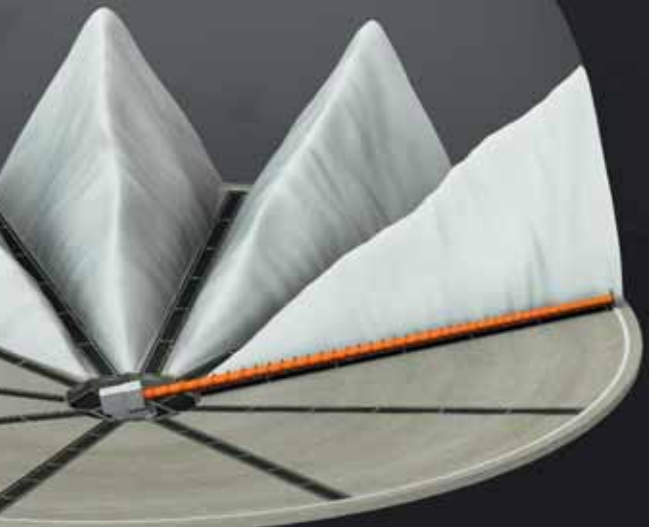
Laidig's systems are engineered to provide **completely automated, near-total clean out,** while maintaining first-in-first-out (FIFO) material distribution.



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Siwertell systems chosen for Indonesian chemical plant

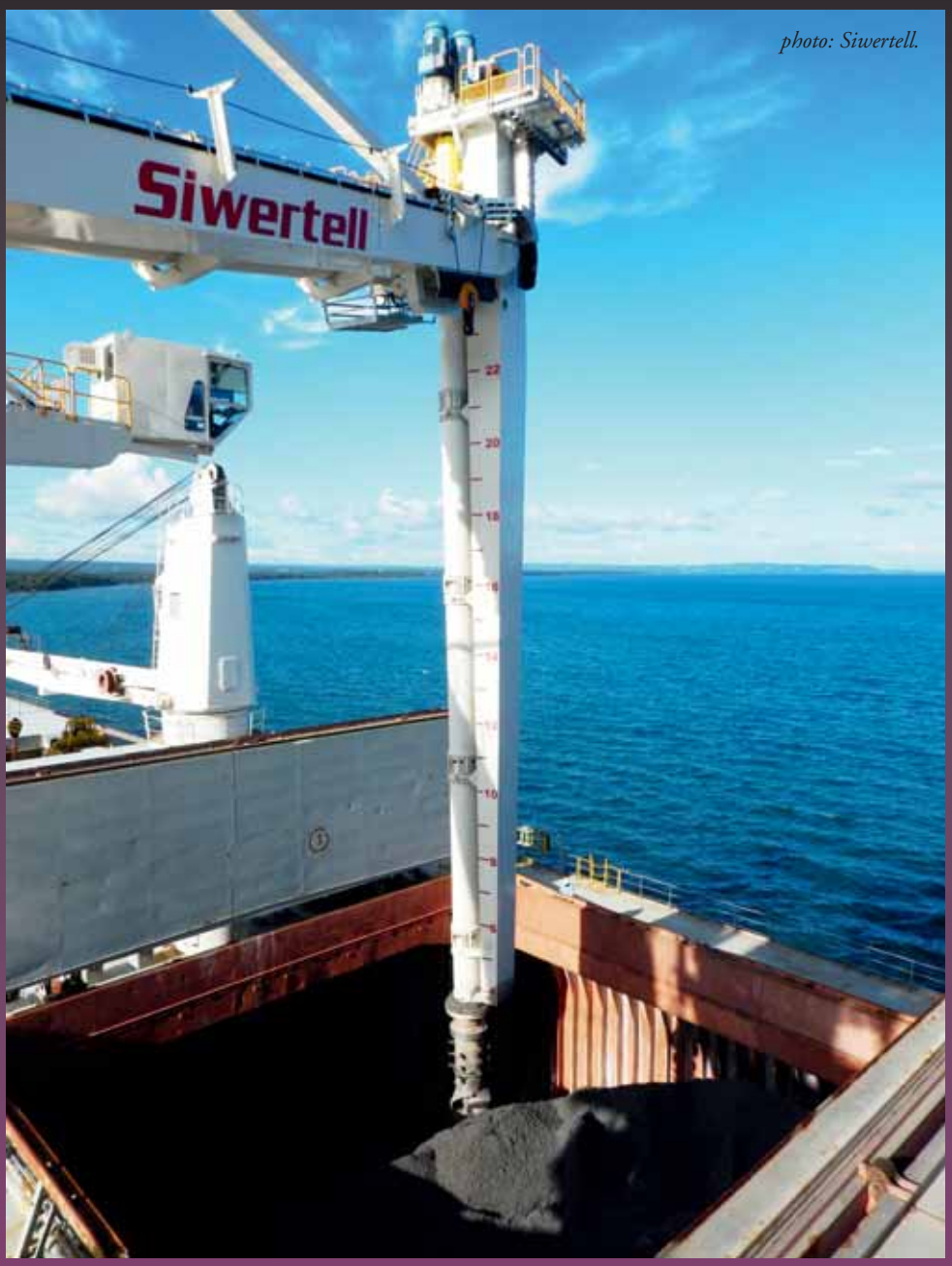


photo: Siwertell.

Siwertell, part of Cargotec, has received an order from PT Asahimas Chemical, one of AGC Asahi Glass's consolidated subsidiaries in Indonesia, to provide coal unloading and conveying equipment for installation at its chemical plant site in Cilegon, Indonesia. The coal is used to generate power for the plant. The order was booked into Cargotec's 2016 first quarter order intake.

The contract calls for the delivery of an ST 790-D ship unloader with a rated capacity of 1,400tph (tonnes per hour) and two jetty belt conveyors. The order includes supervision of the construction and commissioning phase and spare parts appropriate for two years of operation. The components will be constructed in Sweden and China and are scheduled for delivery by June 2017.

"An increasing number of operators around the world are appreciating the virtually dust-free nature of our unloaders, loaders and conveyors," says Pierre Öhrwall, Siwertell Sales Manager. "For this client, extremely clean coal handling is absolutely essential, because any significant amount of coal dust would have the potential to contaminate the chain of production processes at the chemical plants. As an indicator of the importance placed on cleanliness, the coal stock is stored undercover.

"Consequently, in this case a Siwertell system was almost self-selecting because of the high priority placed on exceptional environmental performance. Combining a Siwertell screw-type unloader with Siwertell's totally enclosed belt conveyors arguably delivers the cleanest possible solution."

Dust emissions at the transfer point from the unloader to the conveyors are controlled by Siwertell's standard arrangements; the conveyors have cover belts and the unloader has belt lifters with dust-extraction filters.

"Asahimas Chemical will also benefit from Siwertell's other well-known qualities including high performance, low energy demands, reliability, ease of operation, light weight construction and excellent, global after-sales service," adds Öhrwall.

Siwertell ship unloaders and loaders are based on unique screw conveyor technology, in combination with belt conveyors and aeroslides, and can handle virtually any dry bulk cargo, such as alumina, biomass, cement, coal, fertilizers, grain and sulphur. Siwertell's product portfolio includes ship unloaders, mobile ship unloaders, shiploaders, conveying systems and complete bulk terminal solutions, all of which are designed to ensure environmentally-friendly and efficient cargo operations.

Siwertell is part of Cargotec. Cargotec's (Nasdaq Helsinki: CGCBV) sales in 2015 totalled approximately €3.7 billion and it employs almost 11,000 people.

Exciting times for CASE Construction Equipment

Bauma 2016 show is a success for CASE

CASE Construction Equipment made a big impression at the BAUMA 2016 exhibition, attracting a high number of visitors from all continents on its stand throughout the week.

The layout of the stand reflected the brand's focus on the customers, making it easy for visitors to find the offer for their business in the display organized by sector: Urban Construction, Infrastructure, Quarrying and Recycling. CASE machines and Iveco vehicles were shown together to highlight how the two lines provide a complete solution for construction businesses.

The CASE Europe Africa Middle East team was on the stand throughout the show to welcome customers from across the region and discuss their requirements. The Service and Parts teams and CNH Industrial Capital were also available to explain all the ways the brand is able to support customers in partnership with its dealers, providing complete business solutions that include tailored financing packages, extended warranty, planned maintenance programmes, competitive cost of ownership, and efficient parts and technical service.

The brand showcased its full line of equipment and services, complemented by Iveco vehicles for the construction industry. At the show CASE unveiled new D Series crawler excavator models, the 580ST backhoe loader featuring the new backhoe boom and loader arm, new features for the CASE® SiteWatch™ and CASE® SiteControl™ systems, and new plug-and-play attachments optimized for its compact wheel loaders.

A full, immersive CASE experience

Following its successful introduction at Intermat 2015, CASE offered once again its stand experience app, which led visitors on a guided tour, providing access to multimedia material on the products and services on display as they walked around the stand.

An excavator simulator provided visitors the opportunity to experience what it is like to operate a CASE machine. This proved to be a big attraction, with over 750 visitors proving themselves in the driving simulator contest that challenged participants to uncover the CASE logo against the clock, rewarding every day's fastest operator with an action camera.

The brand also organized a twice-daily shuttle to a gravel pit located in the nearby village of Aschheim, where it offered test drives on the latest CASE products for aggregates applications. This activity was very successful, attracting a total of over 250 visitors from around the world, of which more than 160 from Europe and around 35 from Africa and the Middle East. All appreciated the opportunity to see and test drive the machines in a real work situation.

CASE graders win Diesel Progress Excellence in Equipment Engineering award

The CASE 856C grader won the Diesel Progress Excellence in Equipment Engineering Award in the Graders

category. The award, which is organized by Diesel Progress magazine and ZF, recognizes the achievements in engineering and design of engine-powered machinery.

New technologies expand the CASE® Site Solutions offering

CASE further expanded the offering in its CASE SiteControl™ range with the new RTK+ correction signal delivered via GSM. This service is delivered by a high-density RTK network of over 500 base stations owned by CNH Industrial. This enables the customer to work almost anywhere without the need for a fixed base station for the RTK correction signals. This is the biggest network in the market, and it uses the very latest technology with consequent unique benefits. The signal is more stable and accurate: if one of the base stations slips out of service, another one takes over without disrupting the signal or affecting its accuracy. The server calculates a specific set of correction data for the location of the machine at the time, guaranteeing full accuracy independently of its distance from the base station. The correction is delivered through multiple formats to ensure the best compatibility with any type of equipment such as dozers, graders and excavators from many brands.

CASE also unveiled the upgraded user interface of its SiteWatch™ telematics portal, which has been redesigned using the latest web development technologies to improve navigation, add a new maintenance forecasting functionality — a first in the market — and other features facilitating fleet management.

New attachments for CASE compact wheel loaders

CASE introduced at the show new plug-and-play optimized attachments to perfectly match the performance of its compact wheel loaders: the Snow Line, which includes a snow blower, snow plough, U-snow plough and an angle broom; and the Road Line with an angle broom, pick-up broom and asphalt planer.

This is the latest step in the brand's vision for its compact wheel loader range as a pure tool carrier. In the evolution of this range, the brand has developed specific features for the management of powered attachments, such as third and fourth function, creep speed, High Flow and all-in-one joystick, so that these machines can fulfill their vocation as pure tool carriers. It now taken this further by working with selected partners to develop lines of new plug-and-play attachments optimized to perfectly match its compact wheel loaders' performance.

New products expand and upgrade the CASE crawler excavator and backhoe loader offering

CASE unveiled five new models in the D Series crawler excavator range – the CX130D, CX160D and CX180D in the medium range and the CX490D and CX500D heavy models. CASE also introduced a new backhoe design with in-line cylinder geometry and inner Extendahoe on its 580ST model.

Iveco vehicles for the construction industry

Also on display were Iveco vehicles for the construction industry: the medium-weight New Eurocargo 4x4 on its first public appearance, the 7.2-ton Daily 4x4 and, in the heavy-duty segment, the Trakker 6x6 and Astra HD9 8x6.

About CASE

CASE Construction Equipment sells and supports a full line of construction equipment around the world, including loaders/backhoes, excavators, motor graders, wheel loaders, vibratory compaction rollers, crawler dozers, skid steers, compact track loaders and rough-terrain forklifts. Through CASE dealers, customers have access to a true professional partner with world-class equipment and aftermarket support, industry-leading warranties and flexible financing.

CASE Construction Equipment is a brand of CNH Industrial N.V., a World leader in Capital Goods listed on the New York Stock Exchange and on the Mercato Telematico Azionario of the Borsa Italiana.

Van Beek's Liner Filler fills container liners very fast

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

Van Beek has developed its Liner Filler for very fast loading of bulk goods into 20ft containers. This screw conveyor, also called a container filling screw, is very fast; a container liner is 85% full in less than half an hour!

20 ft containers ideal for bulk transport

Fitted with a liner (a sort of big bag that lines the inside of the container) containers are ideal for the transport of bulk goods from far-flung places: an efficient use of space because they are not round and are easy to transport by truck, rail or ship.

Liner Filler eliminates only disadvantage

There was really only one disadvantage: container liners can only be filled via a relatively small hole on the front of the bag and not all logistics companies have the facilities for this. The Van Beek Liner Filler is a cost-efficient solution for this, without using pneumatic air or conveyor belts.

Operation

Operation is as easy as it is efficient. The Liner Filler is a horizontally installed screw conveyor on a (mobile) platform, fed from an inlet hopper or opening installed above it. This inlet hopper can be filled from a silo, a Dino bulk truck loader, with bags or a shovel. The installation can be fitted as an option with wheels so that a forklift truck can move it.

A truck with a 20 ft container reverses so that the screw slides into the opening of the liner. Thanks to a construction lamp operated via the switch cabinet, this is also possible in bad weather. A filling detector is fitted at the end of the screw.

Proven in practice

The Liner Filler has already proved itself in practice when loading granulates (plastic granules), powders (such as flour), catalyst and flakes. In particular the plastics processing and food industry are grateful to make use of the options that this special screw conveyor offers.

Alternative method with XL Dino

For companies which have the option and space to stand containers vertically, Van Beek has another alternative filling method. The XL version of the Dino bulk truck filler with its dump height of more than 6 metres is in fact long enough to fill a vertical 20ft container from the top.

Conveying and loading systems

Among other things, BEUMER supplied a troughed belt conveyor with horizontal curves and a length of 3.5km for the Thai cement producer, the TPI Polene Public Company. (all photos: BEUMER Group GmbH & Co. KG)

BEUMER's complex systems for handling bulk materials

A powerful global partner

The BEUMER Group uses its newly created Conveying & Loading Systems (CL Systems) division to develop and implement complex system solutions throughout the world for different industries, such as mining and the cement industry. The team is made up of experienced staff from the branches distributed around the world who work together on the projects. What they all have in common is that they understand the user, which means that they can develop tailor-made solutions. This is demonstrated by three impressive completed projects.

Dr Andreas Echelmeyer, who has headed the Conveying and Loading Systems division in the BEUMER Group at its headquarters in Beckum since August 2015, stated that "We can use our comprehensive expertise in system solutions to advise our customers and provide them with complete plant systems. Each industry poses its own unique challenges." The most important point is to listen carefully to the customer and then ask the right questions. This can only be done locally. Employees positioned around the world are therefore in close contact with the customer. They are familiar with the specific customs of the particular country, understand the language and are wise to the particular requirements of the market and the customer. They identify appropriate potential and any possible need for action. The operators for whom BEUMER has successfully commissioned conveying plants includes the TPI Polene Public Company Ltd. The third-largest cement producer in Thailand uses this complex system solution to transport crushed limestone from the quarry to the blending bed.

Difficult environment safely overcome

Echelmeyer was aware that "The challenge lay in the nature of the ground between the quarry and the cement plant." It was exceptionally demanding. We had to make allowances not only for numerous obstacles but also for a steep downhill section of the conveyor." The team designed a complex, but above all cost-

Transfer tower in the feed area.

BEUMER managed to route the conveyor along a very narrow stretch of land in Vietnam for the cement producer Cong Thanh.

effective, integrated system comprising a total of eight belt conveyors covering a distance of 6,129m. BEUMER also supplied a PLC plant control system, transfer stations, filter systems and foreign body collectors.

The system is designed for a conveying capacity of 2,200tph (tonnes per hour). The key items in the limestone transport system are two downhill belt conveyors operating in the generator mode followed by a troughed belt conveyor with horizontal curves. The material passes from the crusher discharge belt the first two troughed belt conveyors. The material is then transferred to a long overland conveyor with a speed of 4.5m per second by an accelerator belt with a speed of 2.6m per second. Three more conveyors finally transport the material to the blending bed.

Cost-effective operation guaranteed

One particular feature of the downhill conveyors is their power generation. With a total of 640kW/h generated energy that is fed into the power grid, they make a substantial contribution to the cost-effective operation of the overall system. "We have a great deal of experience with conveying systems that can negotiate horizontal and vertical curves and operate in the generator mode" explained Echelmeyer. During the development it was necessary, for example, to ensure safe and carefully controlled stopping of the large belt system to avoid problems during unavoidable events, such as a power failure.

BEUMER supplied four further belt systems with a total length of 989m to deal with the discharge from the blending bed and supply the material to the raw mill feed hopper. The conveyors

Transfer situation before the blending bed.

were all built and installed in only eleven months. The commissioning phase, lasting three months, was followed by performance tests. The team then handed over the entire plant to the customer. Echelmeyer emphasized that, "We supervised and monitored the installation and commissioning to ensure long-lasting, trouble-free, operation. This always forms part of our service." The standard scope of supply also includes intensive training of the operating and maintenance personnel.

Complex and curved

Cong Thanh, the Vietnamese cement producer, also relies on the system solution expertise of the BEUMER Group for transporting crushed limestone from the quarry to the blending bed. The CL team discussed the various technical options intensively in a joint workshop held with the producer. Various routes were worked out and compared on the basis of the narrow terrain that was available. Echelmeyer explained that "We have appropriate software for this, with which we can match satellite and aerial photographs with topographical data." One conveyor section that drops steeply in some places with numerous obstacles in the terrain and seven road crossings was particularly challenging.

A total system consisting of four conveyors with a combined length of 3.5km is now in use, BEUMER also supplied a PLC plant control system. The main component is an overland conveyor with three horizontal curves and a total drive rating of 600kW. It is designed for a continuous conveying capacity of 2,200tph.

The heaped material is transported in trucks from the quarry face to the crusher. The limestone that has been pre-crushed to less than 100mm is then transferred by discharge conveyors to an accelerator belt that feeds the long belt conveyor.

The troughed belt conveyor for downhill transport is one meter wide, with a distance between centres of 3,200m, and drops 70m. The conveying speed is 4.5m per second. The low operating costs are a special feature. Due to the downhill section the operation of the fully loaded conveyor is virtually energy-neutral. Its consumption during continuous operation is less than 200 kilowatts, which means that not even 0.1 kilowatt is required per tonne of transported material. According to Echelmeyer, "This, together with the low maintenance and repair costs, contributes substantially towards cost-effective operation." After the installation and commissioning his team submitted the plant to a performance test that it passed successfully on all points.

Through the middle of the rainforest

The CL Systems division of the BEUMER Group has also been very successful in Indonesia. The plant construction company Sinoma International Engineering Co. Ltd. was awarded the contract by the Indonesian end customer, Cemindo Gemilang, to supply a turn-key cement plant to Java. It should reach a daily clinker production of 10,000 tonnes. Sinoma commissioned BEUMER with the design and supply of an overland conveyor between the quarry and the plant.

The challenges in this project were not only the demanding topographical routing but also the evergreen rainforest. Joint discussions were held between the BEUMER team, Sinoma and the end customer. The team worked various routes out and compared them. "The very narrow corridor of land in addition to the tropical climate required a complex and sophisticated design" explained Echelmeyer. Among other things his team designed a solution with tight horizontal curves that fitted optimally into the landscape.

The entire system now comprises six conveying plants with a total of length of 7.6km. BEUMER also supplied acceleration and discharge conveyors and a PLC plant control system.

The route of the overland conveyor for the end customer, Cemindo Gemilang, passes through the middle of the rain forest.

Controlled loading ensured

The system is designed for a maximum continuous conveying capacity of 3,000tph. The main component is a 7.4km-long overland conveyor. Upstream of this troughed belt conveyor is an intermediate hopper with a capacity of about 120 tonnes. The material passes from this hopper via a variable-speed discharge conveyor to a downstream acceleration belt that feeds the overland conveyor. This controlled loading system ensures cost-effective operation of the plant, especially during the start-up phase. It also has a favourable effect in the dimensioning of drive components and the belt, and reduces the operating costs.

According to Echelmeyer "The acceleration belt with a speed of 4m per second protects the belt of the overland conveyor and increases its service life." For further protection there are also upstream units for collecting any iron and non-ferrous metals. The limestone is then transported to the blending bed on short troughed belt conveyors.

The troughed belt conveyor has a width of 1,200mm and a distance between centres of 7,381m. One tail drive and two head drives are installed, each with a rating of 545kW. The plant conveys the material at a speed of 5m/s and negotiates a height difference of minus 188m.

Protection of people and animals

The conveying system also runs past villages and for long sections passes through rainforest that deserves to be protected. The CL Systems team has taken numerous design measures to reduce the noise impact on people and animals. Echelmeyer explained that "Among other things, we have used low noise idler rollers and appropriately dimensioned protective hoods at the drive station." This means that the limestone passes through the rainforest in virtually silent mode. The construction time lasted only one year.

About BEUMER

The BEUMER Group is an international manufacturer 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 4,000 people worldwide, and achieves an annual turnover of about €700 million. With its subsidiaries and sales agencies, the BEUMER Group serves customers around the globe, across a wide range of industries. DCi

Achmed Ammoura, chief erector in the BEUMER Group, at the belt conveyor with horizontal curves.

Lightening the bulk load

with continually evolving shiploading technologies

A 1,500tph fertilizer shiploader which was installed by VIGAN at the UST LUGA port in Russia in 2015.

Louise Dodds-Ely

VIGAN is gaining ground in shiploading

Since its first shiploading installation 25 years ago, the Belgian company VIGAN, better known for the manufacturing of its continuous pneumatic ship-unloaders, has also gained expertise in shiploading technology for agribulk and fertilizer. It is now recognized as a key player and partner of reference in this niche market.

Continuous shiploaders are used for uninterrupted transportation of product, rather than discontinuous shiploaders fed by trucks.

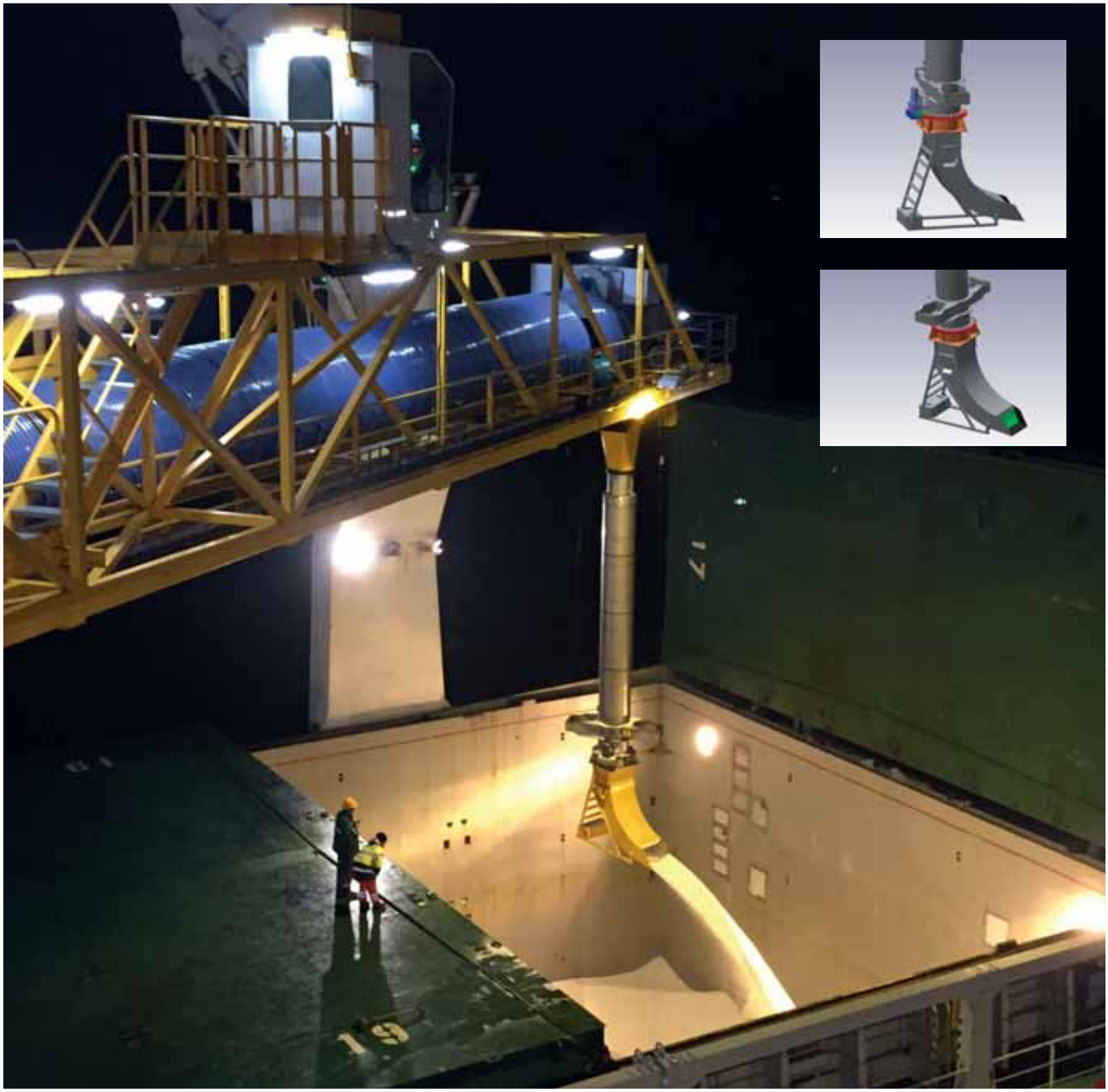
The loading is carried out mechanically: the cargo can be transported into the loading boom by an integrated belt or chain conveyor and discharged by gravity into the ship hold thanks to a telescopic loading chute. The loading boom is usually mounted on a slewing ring and can reach up to 40 metres to ensure optimal hatch coverage. The combination of telescopic and rotating movements allows continuous and uniform loading operations of the ship holds.

VIGAN loaders are designed for almost any kind of products in bulk (with density from 0.2 to 1.8 t/m³), and are suitable for all size of barges or ocean going vessels.

Customized solutions for more efficiency

The whole loading structure can be mounted on a self-propelled gantry on rails usually with cable reels; on a self-propelled gantry on rubber wheels, with diesel generator; or on a fixed structure.

VIGAN loading machines guarantee a capacity of up to



2,000tph (metric tonnes per hour).

Several optional devices are available to adapt the loader to specific working conditions.

For instance, the 1,500tph fertilizer shiploader designed in 2015 for a client in Russia, was equipped, at the end of its telescopic loading arm, with a slewing elbow that is playing the role of thrower.

The advantages of this system include:

- it is simple, reliable, and allows a good distribution of cargo in the hatches, including trimming;
- it is purely static — there is no belt, no drum, no electrical feeding, no guiding roller…; and
- there is no limit in the slewing angle of the loading head — it can do as many turns as needed with its 360° slewing motor, in order to increase the shiploading radius, there is no electrical connection.

VIGAN mechanical loaders are suitable for many applications. As each case is different, and each customer has specific requirements, VIGAN prepares special designs according to each specific bulk handling operation.

VIGAN shiploaders are fully customized and specially manufactured.

A new loader for CARGILL

VIGAN exports 98% of its equipment…but this time it is in Belgium!

VIGAN already counts the CARGILL group among its long-term clients for its ship-unloading equipment. In 2015, for CARGILL's soy and rapeseed processing facility in the Port of Gent (Belgium), VIGAN installed a 300tph shiploader designed for the loading of vessels up to 5,000dwt.

The shiploader is fixed, and the loading system is fed by a new chain conveyor (not delivered by VIGAN) that is built above the new installation.

The boom is mounted on a rotating ring with electrical motor.

The 21.5m chain conveyor is telescopic with a horizontal movement of 7 metres for a loading radius between 11 and 18 metres.

The end of the boom is equipped with a Moduflex vertical telescopic loading chute.

The telescopic loading beam is linked to an automatic cleaning filter that is mounted on top of the telescopic chain conveyor.

A control cabin is mounted on the loading beam for a good visibility of the ship's hold.

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A loader for Cargill in Belgium commissioned at the end of 2015.

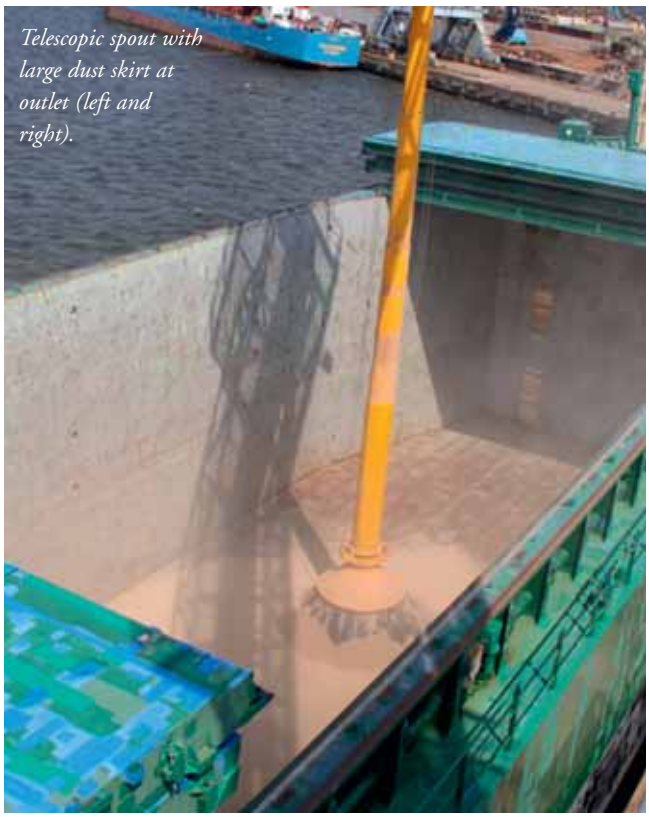
Dust control

In most ports, controlling dust emissions is a major concern and a prerequisite.

VIGAN loaders fulfill these requirements thanks to various alternative solutions, without compromise on efficiency and reliability:

- a fully retractable cover of the telescopic belt conveyor boom;
- automatic self-cleaning filters mounted on the top of the integrated belt conveyors; and
- the dust-free loading head and/or a dust suction equipment which can be installed at the telescopic loading spout.

For instance, the bottom of the telescopic spout can be equipped with a large dust skirt at the outlet.



Telescopic spout with large dust skirt at outlet (left and right).

A level sensor controls the automatic luffing of the skirt at the bottom of the loading pipe during the loading process. The dust skirt always remains in contact with the pile of grain in order to control dust emissions. The luffing occurs by automatic step of 20cm.

A bright future for shiploaders

During recent years, VIGAN has sold shiploaders in Kazakhstan, Poland, France, Latvia, Russia and Belgium, with capacities varying from 350 to 2,000tph.

For some time, VIGAN has been enjoying more requests for shiploading projects, mainly in the European region, and for higher-capacity equipment.

Last year, VIGAN signed a contract with Szczecin Bulk Terminal (part of Copenhagen Merchants group) in Poland for the delivery of a 1,000tph shiploader for the loading of grain vessels of up to 60,000dwt.

VIGAN is particularly proud that Copenhagen Merchants, to which it already supplied a shiploader in Liepaja (Latvia) five years ago, repeated an order for a high capacity shiploader, demonstrating its trust in VIGAN's reliable and efficient shiploading technology.

Several other shiploading projects are also underway, mainly in France and in Eastern European countries.

Cleveland Cascades – at the forefront of loading chute technology

The development of dry bulk shiploading technology responds to the key requirements and drivers of the industry. Productivity is high on every operators list of priorities, so in order to be profitable, the loading rate as well as overall efficiency and operating costs, are crucial factors. Protection of the material during loading is also an essential part of the process, to ensure

Cascade chute loading grain.

that the material arrives at its destination in the same condition as it left its source and does not degrade during the loading process. Finally, the health, safety and environmental impact of the loading process must be assured. This is not only confined to the developed economies, but is an area ever-increasing focus in developing countries as well.

The development of loading chute technology at Cleveland Cascades has been driven by these factors and addresses all of them directly to ensure the company maintains its position as a leader in the sector.

The Cascade system of inclined cones is renowned worldwide for its ability to control environmental pollution from dust emissions during loading. The cascade limits the material flow velocity to a controlled speed. The shape of the cone holds the material to prevent particulate separation and minimizes material degradation. The significantly reduced product velocity creates a 'mass flow' of material moving as a single mass through the chute, onto the stockpile, practically eliminating dust at source and at the same time preventing material degradation and material segregation.

Cleveland Cascades specializes in dry bulk loading chute technology, so invariably the chute is part of an integrated port loading system. The company has always recognized this and has developed engineering capabilities and business relationships to ensure the solution for the port operator is seamless. The company has in house bespoke engineering capability to design each chute to interface effectively with upstream feeder systems. Every chute is designed to suit its specific application. The company has developed well established business relationships with most of the world's major conveyor system manufacturers, who recognize the company's specialist chute expertise, enabling co-operation over multiple projects in numerous applications worldwide.

The Cascade system supplied to the Port of Newcastle, Australia, for loading grain has a capacity of 2,800m^3 per hour, through a 31-metre-long chute. It has auto raise-lower capability and is fitted with a fixed head chute and upper deflector in order to interface with the on-site shuttle boom conveyer.

To effectively handle grain, the GRP cones are lined with UHMW PE liner and electrical components which come in to contact with the material, are certified to ATEX zone 21

Cascade technology creates a 'mass flow of material through the chute.

standard. Two interchangeable outlet options include a standard skirted arrangement and a trimmer spout, which extends to 1.5m from the chute and helps ensure maximum utilization of the ships hold space.

Although the company is best known for the Cascade controlled flow technology chute, its experience and expertise in its core product sector has been transferred to conventional free fall chutes. The investment has enabled the launch of both free fall cone and tube chutes. The cone system utilizes a series of vertical cones suspended from chains or strops, allowing the material to fall vertically to the pile. The tube system uses of a series of telescoping concentric tubes which remains rigid and is ideally suited to applications which require trimming spouts or jet slinger devices.

The Port of Riga, in Latvia operates a free fall cone chute for loading fertilizers in to bulk vessels. The 8.5-metre-long chute loads up to 500tph (tonnes per hour) through stainless steel cones and is fitted to a Telestack TS542 mobile radial telescopic conveyor. The relatively light weight but robust, high performance chute is ideally suited the conveyor and the application.

In some cases, operators need to handle various materials through the same loading conveyor. Where the material properties vary greatly, particularly moisture content, it is possible that different chute technologies may be required to effectively handle each material. In such cases a Cleveland Cascade can engineer different types of chute to be interchangeable. For example, one project in Canada had a requirement to load up to 1,200tph of titanium slag and metal concentrates through a 20-metre-long chute. But metal concentrates have a relatively high moisture content and can become very sticky.

Consequently, Cleveland Cascades engineered a free fall telescopic tube for metal concentrates and free fall cone arrangement for titanium slag. The interface with the conveyor loading system and the two chute type were designed to be interchangeable to increase flexibility and asset utilization for the port operator. The system was designed to have relatively quick and easy chute changeover procedure.

Even the most reliable and advanced technology still requires spare parts, service and maintenance to keep the equipment operating efficiently and Cleveland Cascades prides itself on a strong product support package throughout the lifetime of the product, wherever in the world the chute is installed.

Free fall cone chute loading fertilizer.

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Innovative dust solutions from Telestack Ports and Terminals

At the very heart of the Telestack Ports and Terminals business is its understanding and experience in the industry. Having generated decades of experience in the aggregates, mining and ports and terminals businesses, Telestack is one of the primary stalwarts of bulk material handling equipment. The division has recently added to its global portfolio with the installation of an innovative and custom-designed shiploading system for Premier Periclase, in Drogheda, Co Louth in Ireland. Critical to the installation was the successful control of fugitive dust, increased loading rates and improved general working conditions — all major reasons for the Telestack investment!

As part of the RHI Group, Premier Periclase produces sintered magnesia from seawater — RHI's basic raw material for the production of high quality refractory products. Founded in 1936 as a cement plant, the site in Drogheda has been producing high-quality sintered magnesia from seawater since 1980. Premier Periclase is an important global provider of seawater-based large crystal sinter magnesia and use this material to produce bricks for high-temperature kilns in the steel, nonferrous metals, and glass markets. In Drogheda, low-iron material that is very rich in magnesia is extracted from seawater and fired at 2,300° Celsius in vertical shaft kilns to produce approximately 70,000 tonnes of sintered magnesia a year which is then fed from a fixed plant conveyor directly onto coaster vessels for export using the TS-331 radial telescopic shiploader.

Prior to the Telestack TS-331 installation, Premier Periclase was using an ageing shiploading system that was difficult to manoeuvre and was inflexible and cumbersome to operate. The system did not allow any adjustment to accommodate the varying size or location of the vessels and loading was slow and difficult at best. In addition the unit allowed the material to freefall into the hold of the ship thus generating more dust despite reducing the conveyor's loading rate in an effort to slow the movement of material. As a result loading was slow, inflexible and inefficient — all in an effort to reduce the dust levels that were of a concern not only to the company but also the neighbouring premises.

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The TS-331 was fitted with fully galvanized dust covers on the full length of the outer conveyor, side wind plates on the inner conveyor, a retractable canvas telescopic dust cover on the inner conveyor, a fully enclosed hood at transfer point, dust extraction system on the feed-in and transfer points and an integrated compressor for dust extraction in the under-carriage. The entire shiploading process is now virtually dust-free and simple to operate using the fully functional radio remote control.

In addition the telescopic Cleveland cascade chute with its angled cones (which slows the trajectory of material into the vessel) also allows for added dust control as well as a fully controlled manner of discharge. The chute design eliminates material freefall due to the cone angles and spacing the 'soft loading' discharge also greatly reduces degradation and impact abrasion. Since the Telestack installation, Premier Periclase has reported a significant reduction of fugitive dust during the shiploading process and a much improved rate of loading.

As demonstrated in the picture the Telestack TS-331 radial telescopic conveyor allows the operator to load the vessel from one fixed feed-in point. The radial telescopic features ensure that the vessel can be loaded without the need to stop and re-position the shiploading system resulting in less downtime when trimming the vessel. This translates into an increase in the production rate as well as a significant reduction in the loading time.

Carl Donnelly, Telestack's International Sales Manager explains, "This is an important reference site for Telestack as it demonstrates clearly the improvements that can be achieved by installing these proven designs from Telestack. Our involvement from the start is important as it is our job to clearly understand the technical and commercial needs of the project and make specialist recommendations based on our experience. Our experience in the industry is invaluable and the results are testament to this."

Telestack, specialist in the complete design, manufacture, installation and commissioning of mobile, bulk material handling systems, has a global proven record in a range of applications including mining and quarrying, stockyard management, ports and inland terminals, power stations, rail yards, steel mills, cement kilns and many other bulk material handling industries and offer a range of solutions and reference sites along the logistics chain from pit, to port to plant.

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TMSA
Tecnologia em Movimentação

TMSA: the port terminals shiploader specialist

TMSA Bulk Handling Technology S/A is one of the big suppliers in the South American market for bulk solids material handling equipment. The company has particular expertise in port terminals, heavy duty equipment and long-distance conveyors.

Based in the city of Porto Alegre, Brazil, this year TMSA celebrates its 50th anniversary. Since 1966, it has been dedicated to the production of machines and equipment for milling and grain storage facilities. However, its product line soon included equipment for handling and preparing bulk materials, such as cement and minerals.

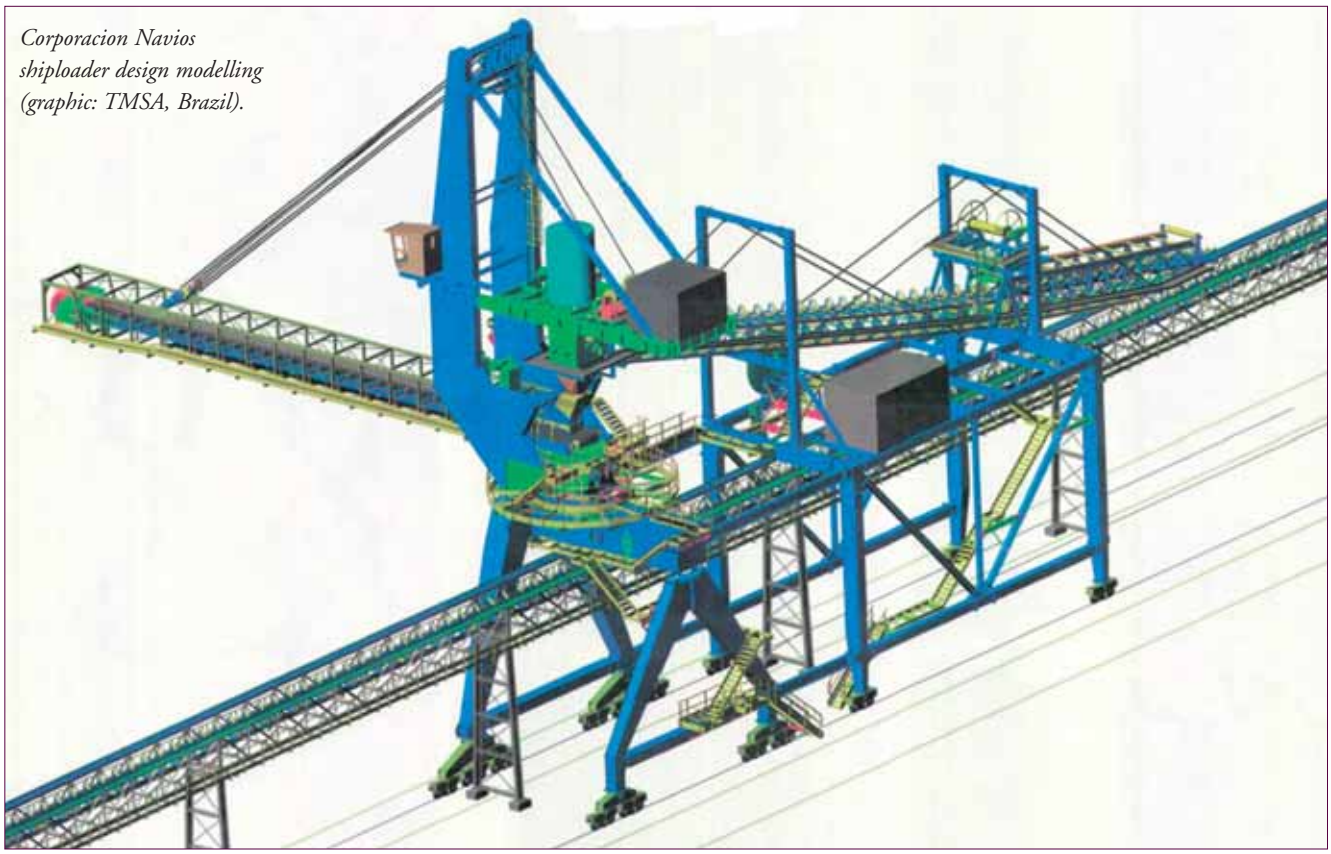
Today, after more than five decades in operation, TMSA always seeks practical solutions for the specific needs of its customers. It is recognized as a manufacturer of high quality and high operational availability equipment, due to the quality and robustness of the designed systems. It has a 35,000m^2 manufacturing facility, housed within a land area of 80,000m^2. TMSA has large and highly integrated fabrication and engineering capabilities, with in-house mechanical, structural, electrical, automation and de-dusting specialists, all under ISO 9001:2008 certification.

TMSA product lines includes all shiploader designs available on the market with more than 75 custom built and supplied ship and barge loaders, today with six new machines under design and fabrication. In terms of recent port terminal applications, TMSA has been working on:

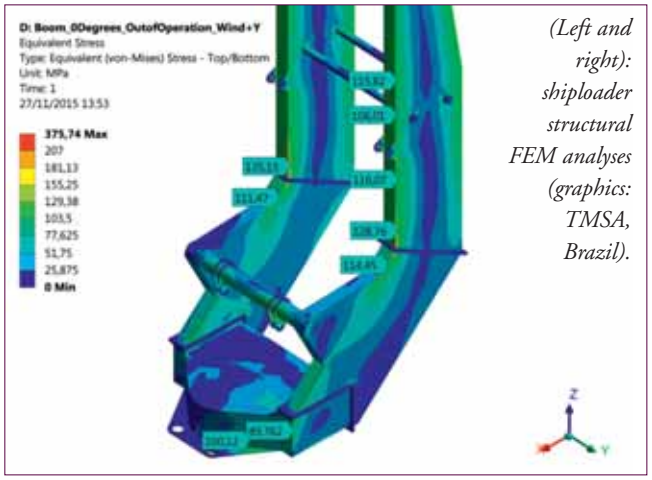
Corporacion Navios shiploader, Nueva Palmira, Uruguay

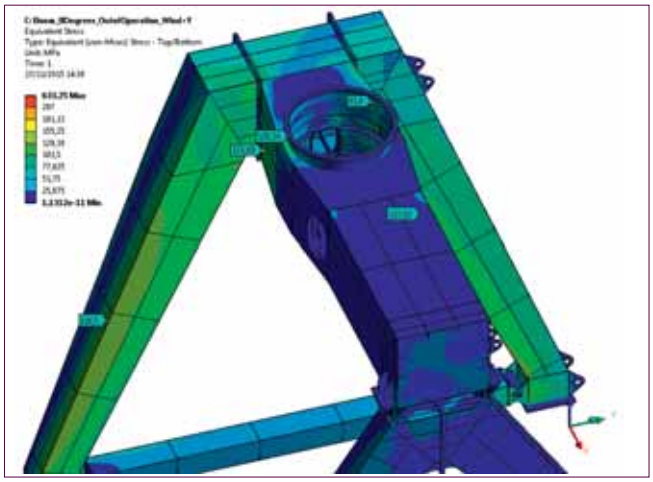
This project consists of one travelling, luffing and high angle slewing boom. It will handle iron ore at 3,900tph (tonnes per hour) or grains at 2,400tph. It was a challenge for the engineering team to design a machine capable of handling two very different materials in an environmentally friendly operation, with filters for grains and a dry fog system for iron ore.

The machine slews 260°, in order to load vessels of up to Baby Capesize — 150,000dwt — on the west side of pier and



Corporacion Navios shiploader design modelling (graphic: TMSA, Brazil).





(Left and right): shiploader structural FEM analyses (graphics: TMSA, Brazil).

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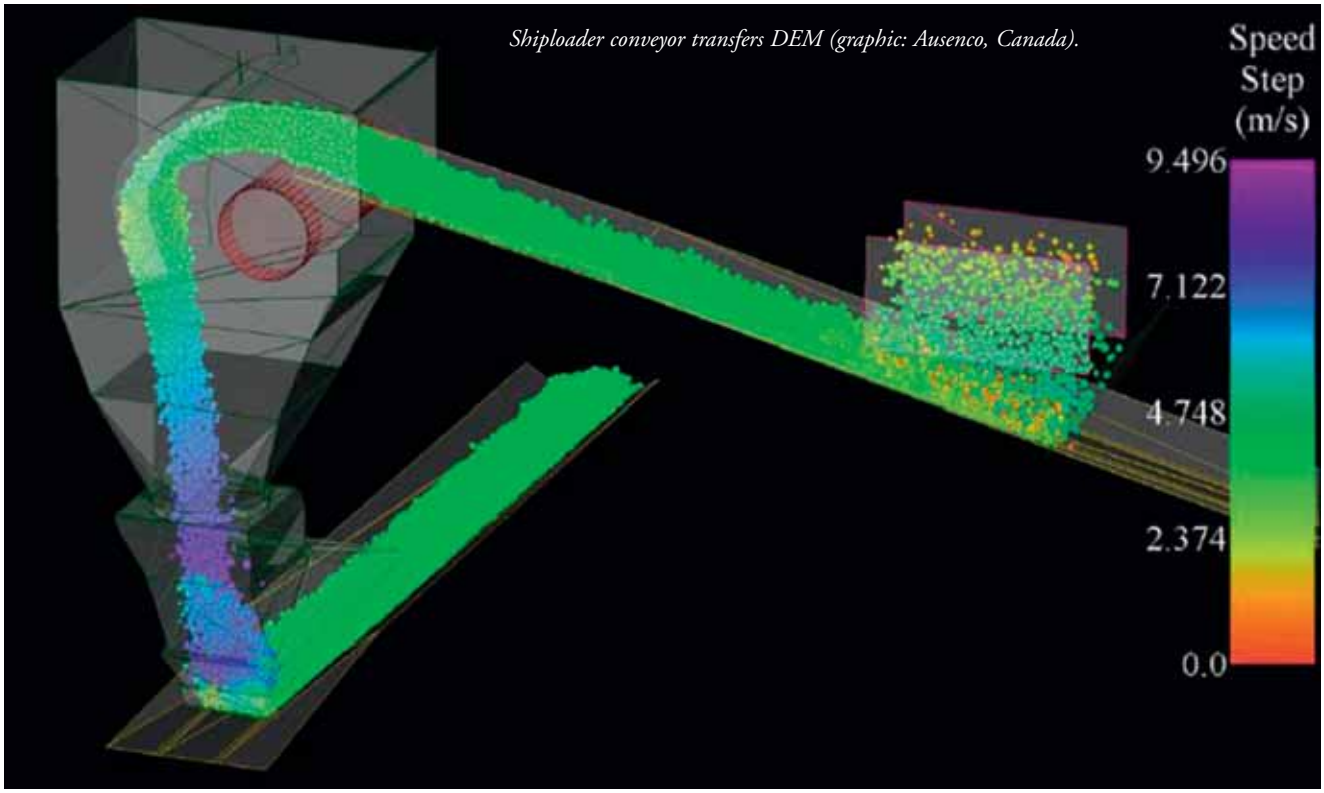


Shiploader conveyor transfers DEM (graphic: Ausenco, Canada).

Panamax vessels of up to 80,000dwt on the east side.

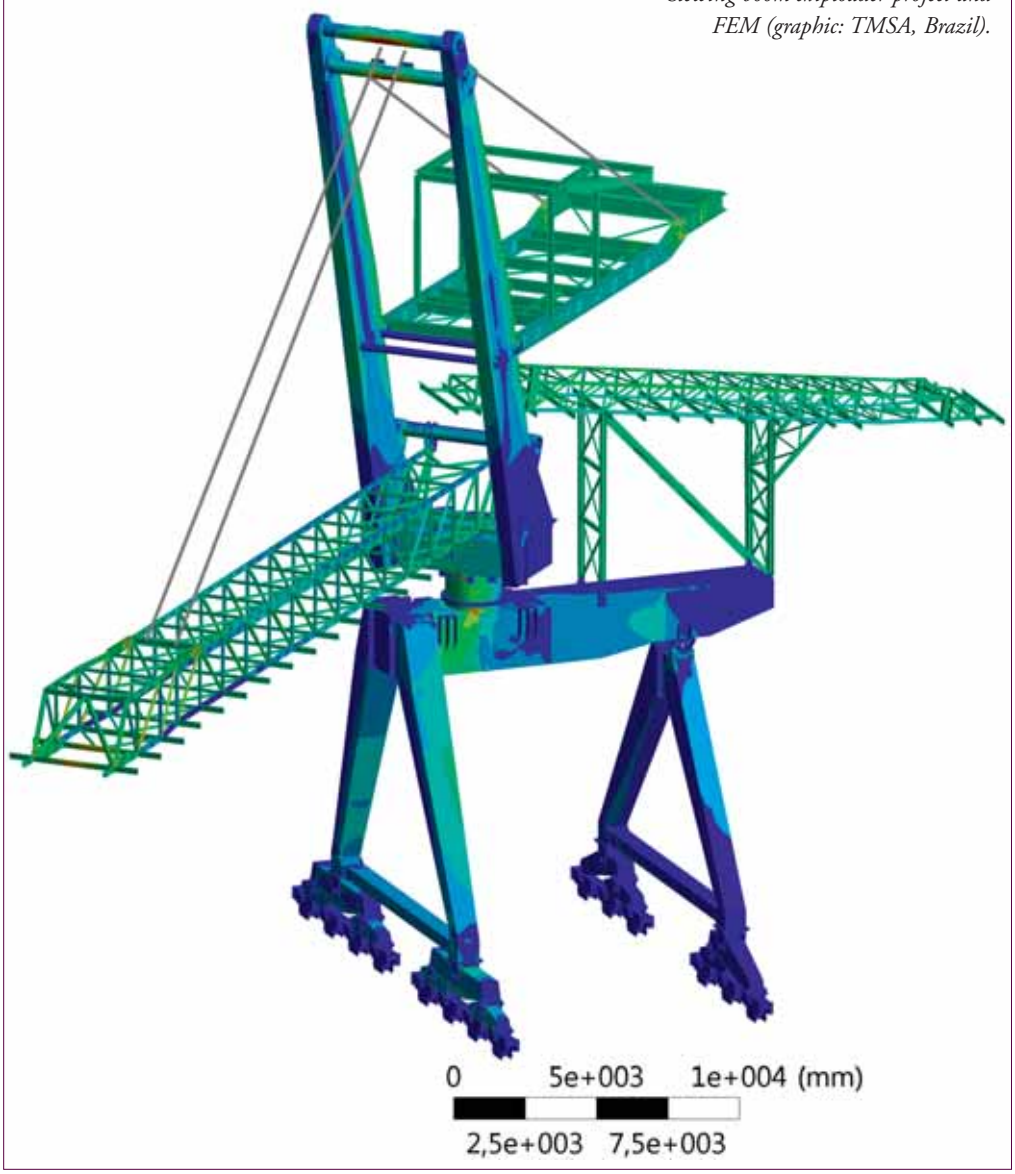
The methods of FEM (finite element modelling) and DEM (discrete element modelling) together with other possibilities of construction and manufacturing are indispensable for a supplier of sophisticated machines as ship loaders.

The shiploader mechanical design was audited and approved by the Ausenco Company.

The machine will have frequency inverter for all movements, softening impacts during operations, reducing maintenances and enhancing reliability. Site erections are schedule to begin July and finalize in December 2016.

ADM SHIPLOADERS, SANTOS, BRAZIL

The slewing boom shiploader loads grains at a capacity of up 2,000tph. The new concept aims to cover extensive environmental restrictions on the emission of fine particulates. In recent years, this aspect is becoming increasingly critical in Santos, because the city reached the



Slewing boom shiploader project and FEM (graphic: TMSA, Brazil).

The enclosed belt conveyor inside the shiploader boom (graphic: TMSA, Brazil).

limits of the port.

TMSA developed enclosed conveyors that reduces dust emissions to environment. The new design demanded a new machine capable of meeting the design loads with lower final weight on a pre-existing pier. For this purpose, the finite element method has been widely used in all structural elements, focusing on optimization of the relationship between resistance and weight.

HBSA SHIPLOADER, BARCARENA, BRAZIL

Slewing boom shiploader which can handle grains at a rate of 2,500tph for grains, loading ships up to new Panamax

Slewing boom shiploader (photo: TMSA, Brazil).

Travelling and luffing shiploader ready to start the loading process at APPA port (photo: TMSA, Brazil).

122,000dwt. This project is currently under test and commissioning. It will be able to load up to 6.5 million tonnes of grains per year.

APPA Shiploaders, Paranagua-Brazil

In 2015, the APPA port replaced four of its 1,500tph shiploaders, which have been in service for decades at the port facility.

Operator standing on the hatch cover, using a remote control to fill the corners of the hold (photo: TMSA, Brazil).

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Shiploader finalizing the loading process at one ship's hatch (photo: TMSA, Brazil).

The new travelling and luffing shiploaders offer an increased belt conveyor capacity of up to 2,000tph and an extended movable car inside the boom to load large vessels of up to Capesize (125,000dwt).

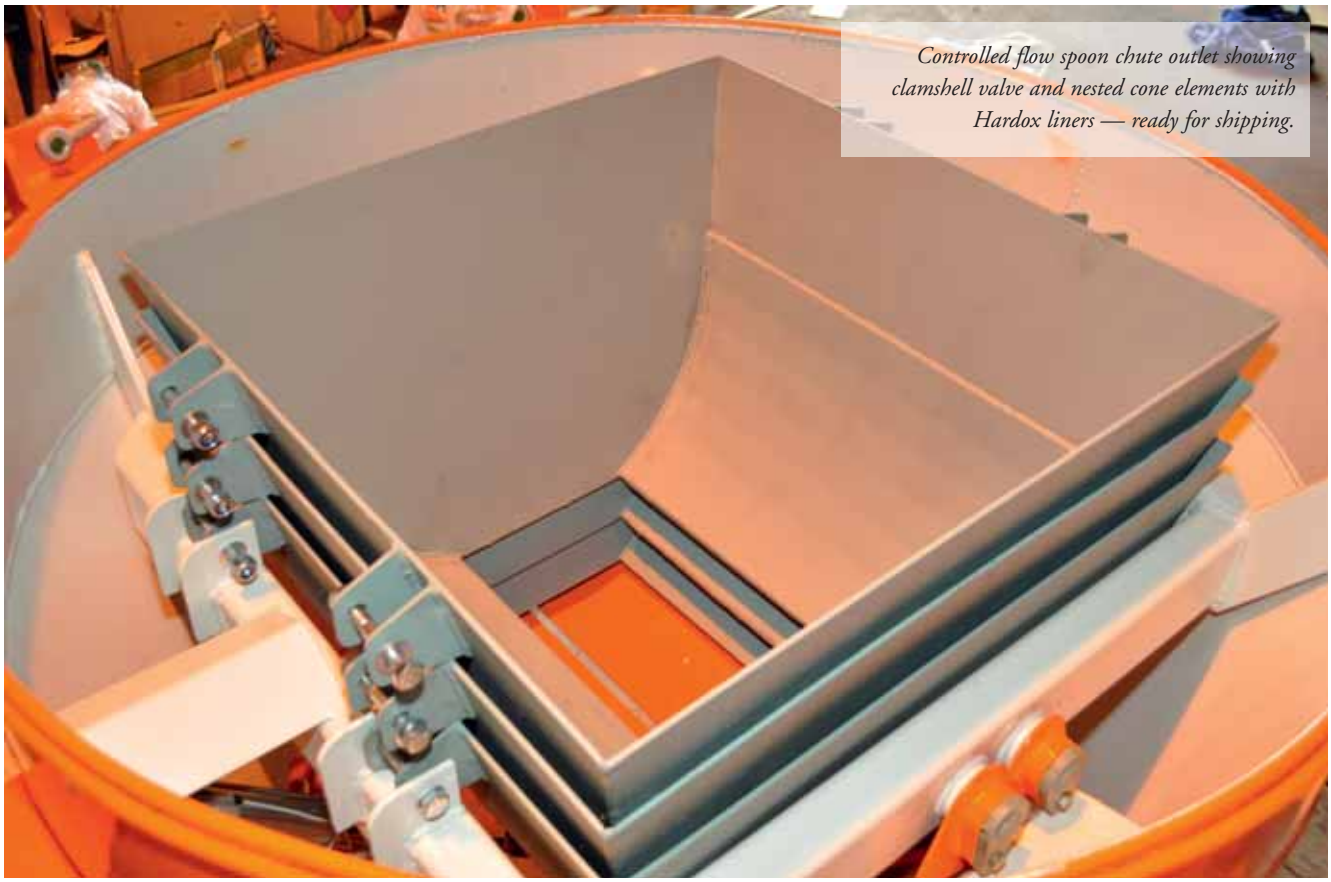
The frequency in the number of ship holds to be loaded has combined with shorter loading times and better organization at port facilities. This in turn has put greater demands on shiploaders, in terms of durability, capacity, environmental protection, security and automation, as well as reduced environment pollution.

TMSA offers different solutions for the conveying of bulk material. Its wide technological portfolio also includes belt conveyors that can be open, covered or enclosed, such as the RopeCon system, pipe conveyors, overland conveyors or conventional trough conveyor belts with high capacities of up to 20,000tph.

TMSA has the knowledge and experience to assist its customers make the right shiploader and conveying system choices, which will better fit the needs and budget of each project.

Shiploader in parked position with boom up at 85° (photo: TMSA, Brazil).

LoadFast Systems – GraviLoad: 'innovate or die'



Controlled flow spoon chute outlet showing clamshell valve and nested cone elements with Hardox liners — ready for shipping.

Aerospace, automotive and communications technology companies have all evolved and innovated to maintain market share. LoadFast Systems are experts in hoist and crane technology with international success and looked to apply that technology to diversify into new sectors. Research into the bulk material handling sector revealed one provider hiding behind a patent and technology that has not evolved for over 20 years and since the patent has expired other companies are now copying that technology to grow their market share.

LoadFast Systems does not function with a 'me too' mentality and spoke to many customers of the incumbent provider and, from first principles, developed the ideal set of characteristics for the perfect chute.

The GraviLoad team at LoadFast Systems now designs and manufactures purpose-designed shiploading chutes for integration in port facilities and provides a full design, analysis and manufacturing service for clients worldwide.

GraviLoad produce a range of chute systems from traditional free-fall systems through to the innovative and unique, patent applied for, telescopic controlled flow spoon chute.

Controlled-flow spoon chute — head chute — ready for shipping. Inset, AutoCAD drawing of head chute.

Controlled flow spoon chute — outlet — with shroud and sensors, ready for shipping.

Incorporation of these chutes in shiploaders significantly reduces the dust and damage to the materials being handled, when compared to conventional cascade chutes.

Designed from fundamentals, LoadFast achieves:

- design and manufacture to the client's requirements;
- true 'plug-and-play', with no on-site tuning required;
- wide tolerance to variations in flow rates and material properties;
- significantly lower lifetime cost; and
- wear properties optimized by the use of a wide range of materials and coatings.

The products are fully designed using 3D computer-aided design and fully integrated within the overall design of the shiploading system. A key feature is LoadFast's own in-house discrete element modelling (DEM) where it provides full-size video and statistical data of the chute's performance prior to manufacturing as part of the client sign-off process.

LoadFast Systems also designs and manufactures all of the electronics and control systems to suit any application.

The chutes can be optimized for flow and wear life for a range of commodities from animal feeds through to cement clinker. As each chute is designed to suit the specific application, LoadFast can apply the right compromises throughout the design process. All products are manufactured from a range of materials including specialist high-strength/low-weight Hardox steel, stainless steel (if budget permits), through to high-density polyethylene (HDPE) and the provision of ceramic liners for high-abrasion situations.

Being purpose-designed does not mean higher prices, as the chutes are optimized to suit the specific customer requirement and optimization does not mean that the chute only performs within tight parameters. GraviLoad product development has optimized the velocity distribution over a wide range of flow rates, compared with the significant changes that are seen in a cascade chute that can result in either choking or free-fall.

LoadFast Systems' major competitors are an industry that is reluctant to adopt innovative solutions and the companies that manufacture conventional cascade chutes. LoadFast Systems

Cone elements ready for shipping.

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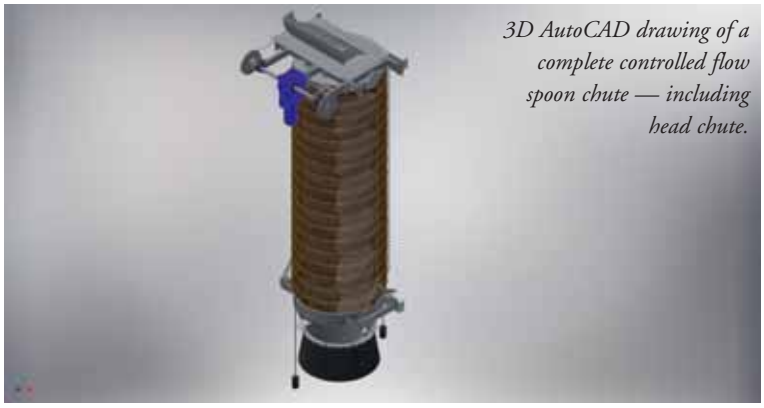
believes that chutes that were developed over 20 years ago and have not moved on significantly and have defects, such as:

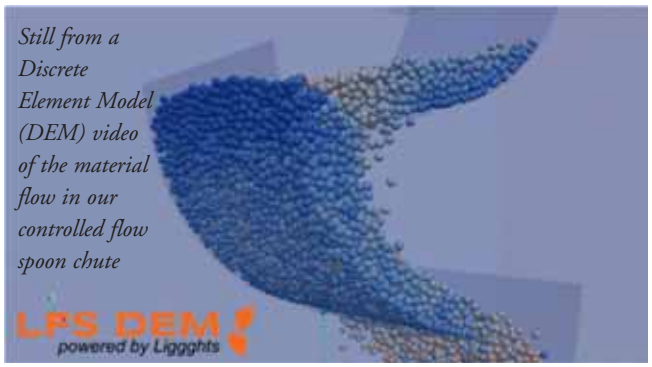
- not working at low flow rates where they become a freefall chute leading to damage and dust;
- not working at high flow rates where they become choked;
- limited in material selection because of their design, leading to premature wear; and
- being sensitive to material properties requiring specialist set up on installation.

LoadFast Systems are competitive by using material flow fundamentals and modelling to create the optimum flow and are innovating further with the inclusion of different flow shapes that are specifically optimized to reduce wear as well as lower dust and damage.

LoadFast Systems' innovative design, technology and competitive pricing have attracted the attention of the majority of shiploader manufacturers and demand is growing.



3D AutoCAD drawing of a complete controlled flow spoon chute — including head chute.



Still from a Discrete Element Model (DEM) video of the material flow in our controlled flow spoon chute

Recently LoadFast delivered controlled-flow spoon chutes for a cement clinker application in Colombia. These were designed in 3-D from standard components in four weeks and then were extensively modelled in DEM and carefully optimized for flow. Manufacturing the chute assemblies was achieved in a further four weeks to a tight client schedule. Full documentation and certification was supplied as standard.

LoadFast Systems – GraviLoad is a Scotland-based company. It has a high level of internal engineering expertise and manufactures in quality assured facilities in Europe. Working with expert partners such as SSAB and Glasgow Caledonian University, LoadFast constantly pushes the boundaries of reducing dust and wear, and to provide the best products. Its technology can also be applied to land-based systems such as silos and transfer points.

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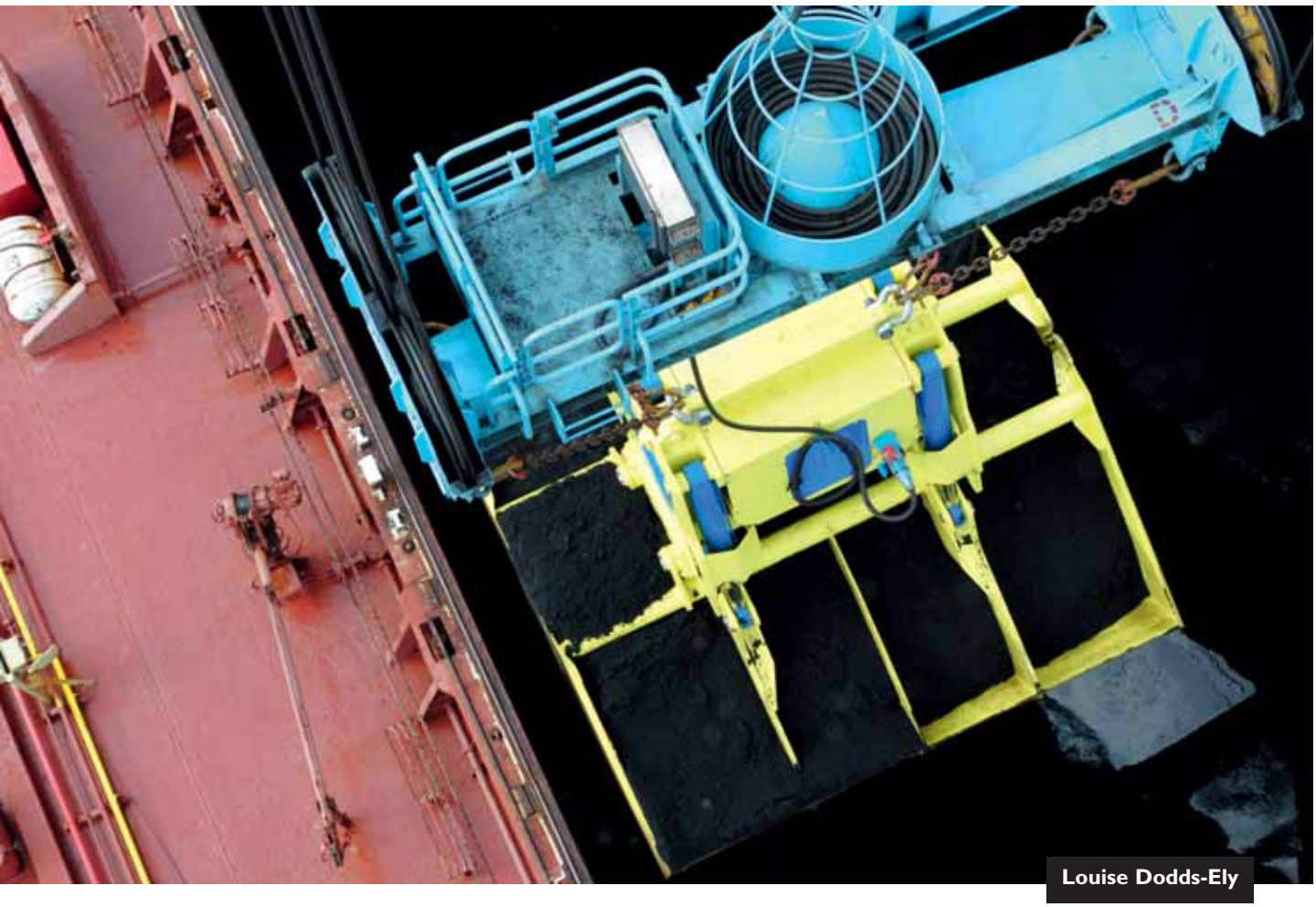
Getting a handle on coal

update on the latest handling technologies



Louise Dodds-Ely

CFS Handling – well known in the coal market

Civettini talo & c sas — under the brand name CFS Handling — is a major designer and manufacturer of bulk handling equipment for commodities including coal. The company remains at the forefront of the industry with the development of its electro-hydraulic buckets as well as its mechanical rope grabs.

The company's product range includes mechanical, hydraulic and electro-hydraulic buckets as well as hydraulic and electro-hydraulic grabs.

In the coal sector the CFS handling brand is very well known.

CFS is able to offer a wide range of buckets and grabs to meet the needs of its customers. Its equipment is widely used in industry sectors including: ports, cement, steel works, scrap, coal, grain, zirconium, demolition, waste, shred material, turning chips, urban solid waste, paper, cast iron ingots, ores, slag, bales and so forth.

The CFS team aims to meet its customers' needs as closely as possible, as each different material handled has its own specific characteristics that may require its own grab.

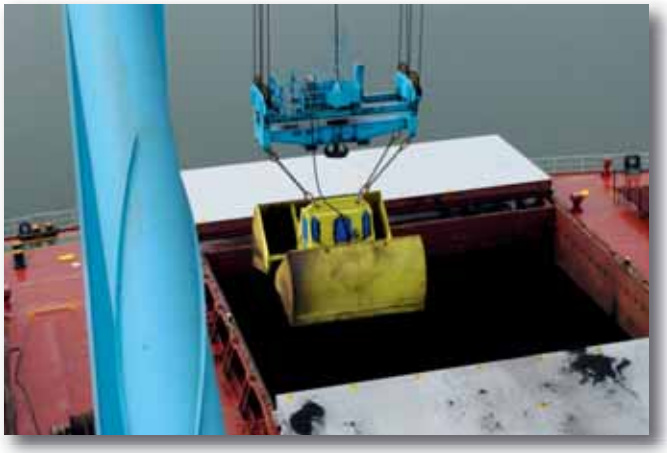
The company has 30 years of experience, so it is able to guarantee high quality, good prices, excellent design quality and customer focus.

CFS Handling is in operation worldwide. Its equipment can be found in countries from Brazil to Russia, for large production machines with buckets from 18m^3 to 40m^3, with hydraulic Bosch Rexroth special applications for faster closure and optimized landing costs and boarding.

CFS Handling uses wear-resistant building materials which

characterize its machines, such as Hardox 500 for the blades or automatic greasing systems on the bucket. This enhances the grab's features and decreases maintenance time, prolonging bucket life.

Civetti Italo & c sas continues to research materials and components of increasing sophistication and high-performance, such as hydraulic grabs fitted with diesel engines of 60kW and the ability to lift 20m³ with a remote control for cereals and for use with the cranes used by its customers who have not yet adopted the use of port cranes such as those supplied by Terex Gottwald or Liebherr.



Increasing performance of coal transshipment terminals

Mobile stacker with adjustable angle of inclination and built-in magnetic cleaning system, producer TTS LLC, Latvia

These days, many coal transshipment companies are facing a very difficult situation — coal prices are low, and terminals are not fully loaded. These factors trigger a reduction in handling rates and increasing competition. Therefore it is almost impossible to maintain cargo traffic simply by reducing transshipment rates.

Clever stevedores are choosing the path of expanding the range and quality of their services, and increasing the efficiency of their work processes.

TTS has many years of experience in designing and manufacturing of transshipping equipment for coal handling in seaports, production locations, process plants. Sometimes these are large complex turnkey terminal projects, often just separate equipment units for a particular task. One example project illustrates how small investments by the customer can significantly improve efficiency and offer the market a new quality service.

The customer of this project was a coal terminal in the port of Vysotsk, Russia. This company has been operating since 2004 and is engaged in the loading of Russian steam coal to vessels up to Panamax size for export to the countries of western and northern Europe. There are 680m of berthing line in the operation. In 2015, the cargo turnover amounted to 5.68mt (million tonnes) of coal. The following coal handling systems are in use at the terminal:

- the load is supplied in open cars by railroad. Daily unloading rate is up to 300 cars;
- unloading of wagons is carried out by ten universal hydraulic unloaders;
- to transport cargo from unloading area to the warehouse, ten front wheel loaders are in use;
- a number of mobile conveyors with adjustable angle of inclination are used for storage of cargo (stacking); and
- the loading of ships is carried out by 14 gantry cranes.

The customer tasked TTS with improving the coal cleaning from metal contaminations and increase the efficiency of stacking (to increase the height of the stack up to 10m and stacking performance up to 600 tonnes per hour at a maximum angle of inclination of the boom). In addition, the equipment had to be inexpensive and easy to maintain, and the term of commissioning as short as possible. Also an important part of the technical project was a necessity to ensure the firmness of the mobile conveyor's receiving hopper upon hits of the bucket while contacting with the wheel loader.

To achieve this task, TTS engineers developed a non-self-moving mobile stacker with built-in magnetic cleaning. Despite design simplicity, all set tasks have been solved. Instead of the commonly used electrical magnets, TTS used permanent magnet of large length. Such a magnet requires no power supply and has a constant high power for the extraction of metal contaminants. The increased length of the magnet (almost two times greater than the standard one) provides more efficient extraction of contaminants from deep layers of coal on a conveyor belt.

Particular attention is paid to the strength of the boom and the construction of the receiving bunker. The housing of the hopper is significantly enhanced with special steel in the contact area with the loader's bucket and is able to withstand high impact loads, even in the cold. A reinforced wheel chassis makes it possible to move the stacker quickly between storage areas without the risk of damage upon the uneven surface of the technical passages of the warehouse.

A powerful single hydraulic system provides fast changing of the boom angle to reduce dusting during the early stacking. The drive of the chevron conveyor belt is also hydraulic, which makes it possible to smoothly vary the speed of the belt and stacker performance without expensive frequency converters and complex control system.

As a result, the customer gained a new level coal metal contamination cleaning system, increased by 3% occupancy of the warehouse and cut equipment mechanical repair costs.

The main profit is certainly improved cleaning, because pollution is critical for steam coal consumers. For stevedores, poor cleaning means fines from cargo owners, shipment delays on complaints and low competitiveness. Therefore, coal cleaning positively impacted the attractiveness of the stevedore for shippers, as a company offering a new level of quality service in the region. A reduction in maintenance costs and a significant reduction in stacker downtime due to damage will reduce the rate on the transfer of cargo and strengthen competitiveness.

Successful co-operation with the customer on this small-scale project has enabled TTS to win the tender for the project for the modernization of the entire terminal. At the moment, TTS's engineers are completing the project, which will increase annual handling to 14mt without increasing storage space and costly restructuring of the existing berths.

Dust-controlled coal loading from Cleveland Cascades

DCI recently reported 'Cloudy Prospects for the Coal Trade' (see p2 of the February 2016 issue), identifying greater uncertainty about the direction of the global market for coal. A slowing global economy, led by China and a move away from coal for electricity generation, particularly in Europe, were cited as reasons to justify a cautious outlook. Prices for coal, softened in 2015 reaching the lowest level since before the financial crisis of 2008. Nevertheless, despite relatively soft global demand and weak prices, some analysts feel that there is light at the end of the tunnel. The market is said to be at or near the bottom and is unlikely to go any lower. In addition, it should not be forgotten that the global trade in coal remains a vast market, estimated to be 940mt (million tonnes) in 2015, making it one of the biggest sectors in the global dry bulk industry.

Cascade chute shiploading chute.

Cleveland Cascades loading chutes are particularly well suited to handling coal and the sector has always been a major part of the company's business. The first coal handling chute was delivered to South Africa in 1995 and since then the population of coal handling systems has grown consistently. In 2015 it accounted for approximately 25% of sales and the systems were delivered worldwide to customers in North and South America, Asia, Australia as well as in Europe. The product types delivered last year in to the coal sector also varied widely, including cascade ship loaders, transfer chutes and free-fall vehicle loading chutes.

In addition to the key criteria of loading capacity, coal handling facilities often focus on minimizing dust pollution and preventing both material degradation and material segregation. Environmental health regulation, intended to protect the handling facility and its neighbours, is a growing concern in developing countries as well as the advanced economies. Most applications nowadays have a requirement to effectively control dust emissions during handling. In addition, coal can have a relatively wide range of particle sizes and some handling systems can damage larger pieces and reduce their size.

The Cleveland Cascade chute is specifically designed to address all these key performance criteria for coal handlers. The Cascade solution directs the material flow down a series of inclined cones, which limits the flow velocity to a controlled speed. The shape of the cone holds the dry bulk in such a way that prevents particulate separation and minimizes material degradation. The significantly reduced product velocity creates a 'mass flow'. A stream of material moving as a single mass through the chute and onto a stockpile with minimized segregation. The controlled descent of the material prevents air separating the particles and largely eliminates dust generation at source.

Port Kembla, in Australia operates an 18-metre-long Cascade chute for loading vessels on their quayside. Utilizing a pivoting head chute, the Cascade is fed via a pivoting shuttle boom up to a discharge rate of 890 cubic meters per hour. The cones are lined with 6mm ceramic tiles to load 1mt per annum of the very abrasive material.

In addition to loading vessels, coal handlers often load the material to stockpile and Cleveland Cascades has built numerous systems over the years for these applications, utilizing both the Cascade controlled flow and conventional free fall technology.

IEC has long experience of operating Cascade chutes in its power generation stockyard. The 17.8m-long system, includes cones lined with 6mm ceramic tiles to handle the highly abrasive material at a loading rate of up to 3,000 tonnes per hour.

A big part of the package provided by Cleveland Cascades is ongoing product support, from the moment the product is delivered and throughout its operating life. Commissioning engineers can visit site to help install and optimize the operation of the chute according to customer needs, upon delivery. Manuals are comprehensive and detailed to give the operators the information they need to maintain the product and maximize its operational efficiency. On site technical advice, repair and maintenance is also available during the life of the product using factory trained engineers. Cleveland Cascade engineers have extensive international experience maintaining, servicing and optimizing Cleveland Cascade systems all over the world. To complete the support package, original OEM spare parts can be supplied with the original order and subsequently during the life time of the chute.

Cleveland Cascades stockpile chute.

Belt service around the clock with REMA TIP TOP

Case study

Maintenance work on conveyor belt systems is a fundamental requirement when it comes to keeping industrial operations in the Rhenish lignite mining area up and running.

At 6am sharp, work starts on the early shift for the REMA TIP TOP fitters in charge of servicing the many kilometres of conveyor systems in the Rhenish lignite mining area. Whilst bucketwheel excavators carry coal and slag around the clock and conveyor belts transport the mined materials, the service and repair specialists are also working 24/7, repairing damage to the conveyor belts, replacing belt sections or renewing belt splice points. Since the start of 2016, REMA TIP TOP has been responsible for all belt service work for RWE Power's three opencast mines, performing and organizing repairs. As a result, REMA TIP TOP has been able to build on its position as global leader in the belt service area and has won the hitherto largest service order in the German industrial sector.

As transport arteries, conveyor belts are a key component of supply chains for bulk material transportation. Irrespective of the size of the opencast mine, for operators, the high availability of the conveyor systems is a deciding factor for their economic efficiency. It is imperative to prevent system outages and standstills in order to guarantee continuous and smooth processes. Extending the service life of the conveyor systems is also an important factor. Preventative maintenance is therefore one of the core tasks in the daily operations of an opencast mine.

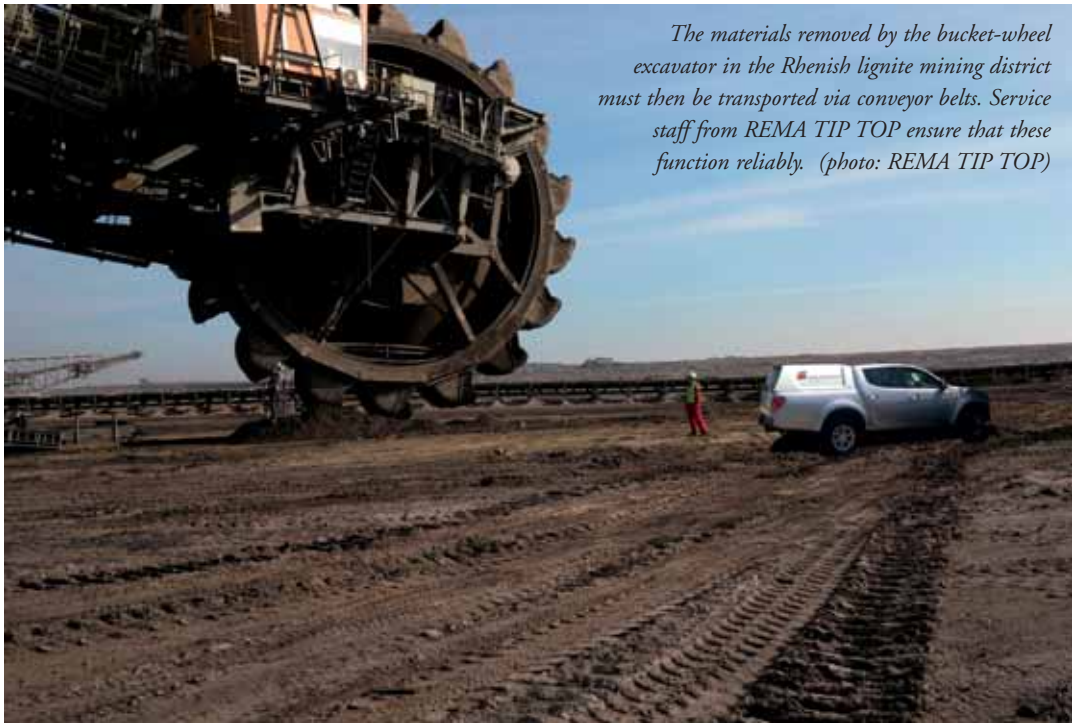
Despite careful matching to the special operational requirements, wear and abrasion cannot be excluded. Sooner or later, the harsh conditions, the properties of the transported materials and continuous operation will cause damage to the belt. In large-scale mines in particular, where endless kilometres of belt conveyor perform unlimited transportation of raw materials and slag, there is always a pending queue of continuous repair work. And this is no different for the Rhenish lignite mining region: as much as 100 million tonnes of coal are conveyed here every year. In Garzweiler alone, the second-largest opencast mine in this region, conveyor systems with a total length of almost 100 kilometres carry around 600,000m³ of materials (coal and slag) — these belts have a width of up to 2.8 metres. No wonder then that there's a lot to be done here.

A major order for REMA TIP TOP

To keep the belts running smoothly, 100 qualified fitters from the REMA TIP TOP site in nearby Desdorf have recently been deployed in the RWE opencast mines. In fact, the repair specialist has been providing services to the energy company for over 50 years, but only for some of its belt service requirements. REMA TIP TOP was one step ahead in the tendering process for the ongoing major order issued by RWE Power in Germany.

"REMA TIP TOP's capabilities, working methodology, capacities and equipment convinced us to award them the tender to manage all our belt service requirements for the next three years," Hans-Jürgen Dralle, machine technology manager at RWE Power AG in the Cologne/Essen, explains. "For us, it is always important to create jobs within the region. We can stay true to this principle by transferring the responsibilities to REMA TIP TOP in Desdorf," Dralle continues. In all three opencast mines, REMA TIP TOP has set up a service and repair support point with a total fleet of around 40 service vehicles. This has

established the best starting conditions for the management and execution of repair works.



The materials removed by the bucket-wheel excavator in the Rhenish lignite mining district must then be transported via conveyor belts. Service staff from REMA TIP TOP ensure that these function reliably. (photo: REMA TIP TOP)

Belt service and repairs

A conveyor belt consists of belt sections, made of rubber, measuring from several to 300 metres long, with internal steel cords providing stability. Vulcanization splices the individual sections together to form long belt lengths. The inspection and maintenance of these splicing points is a key task of belt servicing. Not forgetting belt replacement and repairs. Damage to the belt, such as longitudinal tears, cross-fractures, breaks or cover plate damage is managed and rectified using the extrusion process. Belt sections which are under greater stress must be replaced by new sections — yet another job for the specialists.

A belt monitoring system introduced by RWE detects cases of damage on each individual belt and logs this damage. This provides RWE and REMA TIP TOP with a continuous overview of what damage needs to be repaired. Daily belt inspections, in which experts pinpoint and record areas of damage, are also part of the work schedule. Using this log as a basis, RWE plans maintenance and repair work in close consultation with the Desdorf service team.

The repair materials used for the belt repairs in the Rhenish lignite mining region are produced in REMA TIP TOP's own production facilities. Both the vulcanizing solutions and the non-vulcanized cover plates, as well as the STZ strips (strips made of uncured rubber which are used during production of a belt splice to recover the stripped cord segments), are manufactured in the Poing works in Munich and delivered directly to Desdorf. The materials are stored here until they are used. Thanks to its own production facilities, REMA TIP TOP can guarantee a consistently high availability of materials for its customers, and as a result, smooth procurement and repair processes without waiting times — completely in line with the client's interests.

Naturally this major order from RWE is the largest to be won by REMA TIP TOP in the industrial area in Germany. However, the company has already handled numerous major international conveyor system projects in the past. In the Los Pelambres Chilean copper mine, one of the most profitable copper mines in the world, for example, two of the world's most powerful conveyor belts, with a total length of 23 kilometres, were fully replaced without any interruption to operations whatsoever. "However, as well as projects of this kind, our specialists, products and technologies are also employed in much smaller operations, guaranteeing a continuous and efficient running of their conveyor belts," Patric Scheungraber, a board member at REMA TIP TOP AG, explains. "In every quarry and every gravel pit, the reliability of the conveyor systems is vital." Belt maintenance and repair work is just as important for the operators — and REMA TIP TOP is available to help with advice and hands-on assistance.

At a glance: 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 the automotive sector. The company provides a global service network and offers a broad range of rubber products, linings and coatings for the industrial sector as well as for repairing tyres. In almost 100 years of corporate history, the company has gained unique expertise in material development and industrial services and is active in the business segments Material Processing, Surface Protection and Automotive.

For decades, REMA TIP TOP has had a strong presence in large and small assisted regions all over the world. Thanks to the group structure, the global network and own production facilities, the company is able to offer its national and international customers a complete range of service and product solutions.

At Bauma 2016, REMA TIP TOP introduced the M³ System (Monitor – Maintain – Manage). The electronic monitoring of individual conveyor belts and the entire belt system involves three elements. The BTM Belt Thickness Monitoring System is used to measure layer thickness for the continuous wear measurement of the drive and running sides of the belt during operation. The RFID Belt Rip Detection System is used to monitor the belt in real time. Thanks to innovative RFID antenna technology, the entire width of the belt can be monitored at once. If a longitudinal slit appears in the belt, the system brings the belt to an immediate standstill. The Steel Cord Scanning system monitors steel wires and belt connections. The system locates defective wires in the belt and provides a clear graphic display of any problematic points. The REMA M³ system is completed by the connection to the Computerized Maintenance Management Software (CMMS). The software makes it possible to initiate preventive maintenance measures at an earlier stage, thereby preventing undesirable system downtimes and allowing lower costs.

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Dome Technology: storage AND handling and reclaim systems for coal

Dome Technology project for ADM.

Safe and efficient coal handling translates into cost savings and a boosted bottom line for coal companies. Selecting the ideal material-handling system is essential, and Dome Technology is an industry leader not only in storage facilities but also in the optimal handling systems inside and outside the Domesilo™.

Companies interested in working out details early in the project might consider the design-build approach, wherein an engineering team designs not only the storage facility but also all the equipment and systems for moving product. This engineering takes place while a project is still in the discussion stages; engineers refine the design, thus helping customers determine the project's feasibility by providing a realistic preliminary bid based on hours of initial, detailed design.

Handling and reclaim

Selecting the right reclaim and handling systems — not just those moving product within the structure, but loading and reclaim systems too — is key for future financial success. Working with a single team that engineers the storage structure and its material-handling systems results in a seamless, efficient facility.

Coal throughput rate is of utmost importance as it determines the material-handling systems. With both low- and high-volatility coal, "the goal is first-in, first-out. That helps to minimize residence time and the likelihood of fire and explosion," engineer for Dome Technology Adam Aagard said.

The stacker reclaimer is common for more highly combustible varieties of coal handled by a mechanized system, and the greatest benefit is increased control over where the pile is built and what portion is reclaimed. For instance, if a hot spot is detected, site managers can remove product from a specific area in a hurry.

Another option for some types of coal is a full hopper system. Similar to funnels situated side by side as the 'floor' of the facility, this model allows coal to flow through the structure under its own weight rather than by loader. Dome Technology has installed this type of 100% live reclaim in projects of various sizes, with the largest being in domes that hold 60,000 metric tonnes.

Indonesian, PRB or similar types of coal require particular attention to detail when designing and operating to ensure safe storage and handling.

Conveying systems

Conveyors require their own monitoring to ensure proper function, and Dome Technology commonly installs and recommends these systems for coal handling:

- **Infrared cameras** check coal temperatures while on the belt to prevent off-spec product from entering the dome;
- **Linear heat cables** monitor for fire on the belt and examine bearings for sparks, often detecting a fire travelling along the belt before it reaches the thermal scanner. The system then stops conveyance and alerts facility management of the fire. Workers can either extinguish the fire, or an existing fire-suppression system puts out the flames.

- **Specialized admixtures** can be added to the water to aid in quicker cooling and suppression. One option is Hazard Control Technologies' F-500 Encapsulator Agent that, when proportioned into the water system, extinguishes flames and cools the system faster than water alone could, absorbing as much as 10 times more heat energy than plain water, according to the company.

Interior of dome with stacker reclaimer.

Dust collecting

Dust collection too requires its own set of precautionary measures, and Dome Technology recommends a wet scrubber that pulls dust through a water system, "and that's what pulls out the dust rather than a bag, so now the dust is wet and not nearly as combustible," Aagard said. The system pulls the dust through a duct until it can be removed from the facility or destroyed.

Regardless of the type of dust collection, an automatic system can convey dust away, whether pneumatically or on a belt, to a combustor. Another option is for dust to be collected in a bin or super sack to be hauled away.

In addition to these design measures, proper housekeeping is critical for safe operations at a coal facility.

Material handling that delivers desired throughput, monitoring systems that prevent fire and environmentally conscious dust collection — these are features that distinguish Dome Technology as a leading storage provider for coal companies.

Conveyor supports for the China Coal project in Hulusu.

www.orts-grabs.de

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Coeclerici Logistics' transshipment solutions enhance the coal market

The Bulk Celebes *floating transfer station.*

Coeclerici Logistics is at the head of the logistics division of Coeclerici Group, *writes Capt. Giordano Scotto d'Aniello, Head of Commercial Department at Coeclerici Logistics S.p.A., Milan, Italy.*

It is one of the world's leading bulk commodities transshipment companies, with a history of more than 40 years in this field of activity. Last year, the group celebrated its 120th anniversary — over a century of success in various business industries, from trading to mining, shipping and logistics.

In spite of the tough economic environment characterized by collapsing commodity prices, and the fact that the dry shipping market is at its lowest, the Coeclerici Group has been able to maintain its position in the transshipment industry, proving its ability to firmly handle the overturning of the market and maintaining its commitment to clients by offering tailor-made solutions and reliable performance.

Coeclerici has engineered and promoted the use of 'floating terminals' throughout the world. It has done so by designing, building and operating different types of floating transfer stations (FTSs) capable of lighterage/top-off operations, cargo transfer and loading/self-unloading of coal and other different dry bulk materials (in the past years, Coeclerici's vessels have also transshipped iron ore, bauxite, grain and sulphur). FTSs carry out all the same functions as a port terminal but with far smaller investments, lower management costs and less environmental impact.

Indonesia is an extremely competitive environment, due to the presence on the market of many local players with little experience in the sector. The country represents the most important for Coeclerici Logistics' business. Currently there are five FTSs operating in the Kalimantan area, receiving coal from barges and loading OGVs (ocean-going vessels) with best net loading rates of about 50,000 metric tonnes a day.

A particular example of Coeclerici operations in Indonesia is the FTS *Bulk Celebes* employed under a long-term contract with PT Berau Coal. In 2015, downward market trends in Indonesia forced the Logistics Division to redeploy the vessel from the Muara Pantai area to Samarinda area in order to carry out blending operations in the spot market.

The Bulk Limpopo *transshipment unit.*

Blending of coal is requested by some players, especially traders, in the Indonesian coal market. It makes it possible to mix low with high grade of coal, thus offering a more suitable product to end users. For this purpose, the *Bulk Celebes'* loading system, already armed with two 30t cranes of 38m outreach and a telescopic shiploader with a range of 25–40m, was improved by Coeclerici's technical department with an additional device to enable it to carry out blending operations.

Another significant example of Coeclerici's operations is given by the two 53,776dwt transshipment units (TUs) *Bulk Zambesi* and *Bulk Limpopo*. These units were specifically designed to overcome logistical constraints inherent to the Port of Beira (Mozambique), as well as to optimize — from both a commercial and environmental point of view — Vale's coal handling process from the Moatize mine to worldwide importers. Each of the sister vessels is able to reach over 5,000tph (tonnes per hour) as peak rate during loading of OGVs.

Despite the underdevelopment of the area characterized by logistical constraints and bottlenecks which heavily compromise the supply and the provision of coal, the two TUs still provide an outstanding performance with a total amount of almost 3.5 million tonnes of coal transshipped during 2015.

In 2013, the Coeclerici Group has strengthened its Shipping Division through the establishment of the company dACC Maritime Limited, in joint venture with d'Amico Group, for the purchase of four ecofuel sister vessels, last generation Supramax bulk carriers, built in Japan by Oshima Shipyard.

The first two ships, named *DACC Tirreno* and *DACC Egeo* (60,250dwt, 200m long, 32.26m wide, maximum speed of 14.5 knots) were delivered in March and September 2015, respectively, and entered the new Medi Supra Pool just launched by d'Amico Group.

The third and fourth vessels which, we can anticipate, will be named *DACC Adriatico* and *DACC Atlantico* will be delivered, respectively, in June and August 2016.

Strongly committed to environmental protection and the stringent control of sea and air pollution, both d'Amico and Coeclerici have chosen vessels designed with compartments that recover and treat residual water from cargo holds. In addition, the vessels have class notation ENVIRO, for gas limitations from the combustion, double wall fuel and oil tanks, as well as GP certifications that ensure no environmentally harmful materials were used during the construction. Furthermore, the design will include integral technological upgrades that ensure the units are highly flexible and specialized from both a technical and commercial aspect.

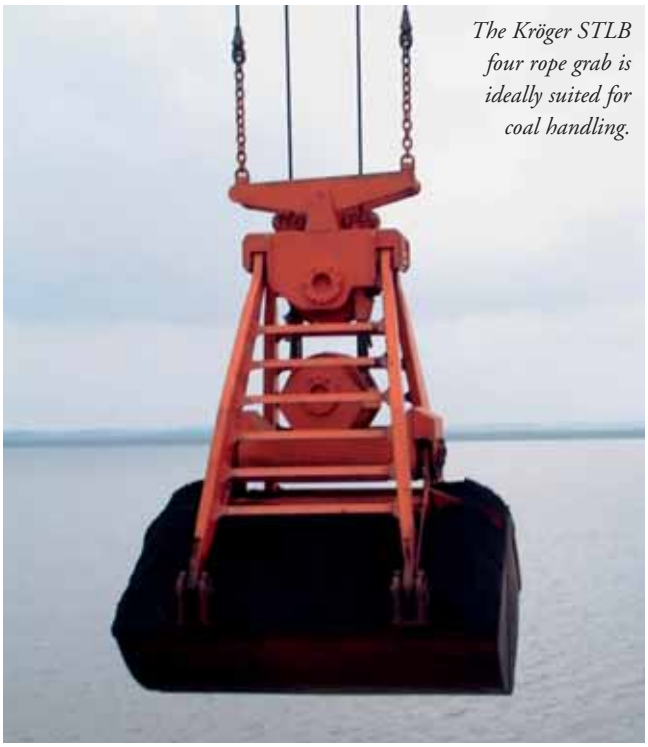
Despite a challenging 2015 economy characterized by weak prices and low global demand, the Coeclerici Group recorded a turnover of €684 million with an increase of 16% on 2014.

With a tradition for continual strengthening of its corporate structure via joint ventures and long-term partnerships and thanks to strategic investments in areas of potential growth, the Coeclerici Group has developed a structure fully capable of prospering in the most challenging global economic markets.

The DACC Egeo*, one of the first two ecofuel sister vessels which was delivered to Coeclerici in September 2015.*

KRÖGER grabs for coal handling in ports

Transshipment demands light and environmentally friendly grabs



The Kröger STLB four rope grab is ideally suited for coal handling.

KRÖGER grabs have been in operation in almost all German ports and harbours for a long time, both on the coast, e.g. in Hamburg, Brunsbüttel and Bremen, or in inland harbours such as Duisburg, Düsseldorf, Cologne, Andernach and Ludwigshafen. The company is now widening its reach, and its grabs will be available throughout Europe and worldwide due to their technical benefits.

These benefits include, above all, the weight-optimized configuration, which is achieved by means of special materials and an innovative design. This design provides an improved payload capacity of the grab in coal handling, which greatly enhances productivity. Furthermore the grabs can be equipped with the KRÖGER ZERO-maintenance bearing system, which dispenses with the need for time-consuming and annoying lubrication procedures. This further enhances the efficiency of the overall transshipment operation.

The legal requirements on port companies in terms of bulk goods handling are becoming increasingly important with regards to emissions. The fact that many handling companies are situated in the vicinity of residential areas makes it all the more imperative to avoid environmental impacts such as dust formation and ground water pollution.

With 35 years of experience in loading and shipping practices, grab expert Franz Lehnert, sales director at Kröger Greifertechnik, provides an overview of the necessary requirements on future-oriented, ecologically responsible loading grabs.

"Open the grab jaws. Grab the bulk goods. Transship. Things are no longer as simple in harbours and ports," says Lehnert. "Today it implies: Grab the bulk goods. Do not lose any of it. Protect the environment." What mainly applies to free-flowing bulk goods is required more and more in coal and slack handling, too. While open grabs were absolutely normal earlier, today increasingly closed loading grab types are found in Europe. Winds occurring on water and in the harbours compel handling companies to appropriately protect their conical piles.

Kröger STLBG enclosed grab for dust-free coal handling.

As a matter of fact, there are mainly three areas in a grab that need to work in an eco-friendly manner: the specifically raised grab jaws; the grab edges; and the hinge bearings. Let us first consider the eco-friendly grab jaws. The grab jaws are raised above the angle of repose so that the often strong winds in harbours and ports are left with no chance to affect the conical piles and, consequently, the light, dust-forming bulk goods. An ideal solution to the problem of blowing-off of coal dust.

Matters become more complicated during tight closing of the grab edges. This requires greater effort in terms of structure and design so that the grab jaws are able to operate tight even under extreme loads and continuous, long-term usage. In 90% of handling cargoes — such as coal — tight closing of grab jaws can be achieved by means of double Pantanax round-bar steels both on the bottom scrapers as well as the side blades. The jaws close tightly through the bedding in of both the linked round-bar steels until a watertight closure is achieved.

Also becoming increasingly important is the need to protect the environment from oils, greases and lubricants, which could squeeze out of the hinge bearings and fall of to ground or water. This is totally avoided by the use of the above-mentioned KRÖGER ZERO maintenance technology and therefore undesirable follow-up costs are eliminated.

"So," Lehnert sums up, "KRÖGER shows that grabs can meet both, economic and ecological requirements in coal handling operation."

Kröger Greifertechnik GmbH & Co. KG is a manufacturer of grabs based in Sonsbeck/Niederrhein in Germany. Its core products include rope, motor-hydraulics and hydraulic grabs. The target markets are, in particular, 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.

CHÍA – providing solutions to industry for half a century

Spanish company CHÍA, based in Seville, has become a renowned supplier of bespoke machinery to a wide range of companies.

CHÍA is especially active in the coal, port and olive oil sectors, and it is in these areas that most of its work takes place.

Espirales y Maquinaria de Transporte SL — better known as CHÍA — boasts almost half a century of experience. Since it began operating, its values have been a constant spirit of achievement as well as a great satisfaction for a well done job.

CHÍA focuses its efforts on providing tailor-made solutions for port, coal and olive oil industries. Specialized equipment for industry — hoppers, ship unloaders conveyor belts, lifts, port terminals, solid bulk storehouses, ecological loading and unloading systems — are only some of the services offered by this enterprise.

Currently, coal is one of the most in-demand materials, which is why its transportation requires sustained efforts. In this regard, CHÍA has worked and provided equipment for its unloading, stockpiling, transport and machining.

To maintain the customer's expectations, CHÍA does not subcontract any work; carrying out all the works inside its facilities. This is possible thanks to more than 80 employees daily, the vast majority with many years of experience in this sector, and its own engineering and design departments which allow it to maintain strict high-quality standards.

Concerning its facilities, the enterprise has several industrial units, 2,000m^2 each, with the capacity and equipment to move pieces up to 55 tonnes and with oxicutting systems. In addition to this, it has laser cutting systems, 14m-long folding machine up to a thickness of 25mm, its own machining centre, a large-dimension tunnel for abrasive blasting and paint finish for marine environments. All of this allows CHÍA to handle huge projects simultaneously without affecting its production and maintaining the important levels of quality and delivery periods in this sector.

Client confidence

All along, CHÍA has relied on the companies with which it works. This has allowed it to expand its high-quality client portfolio through which its has consolidated its projects. Some of the most prominent companies which it has worked with include: CASA ALTA, ERSHIP, GRUPO PPNOR, COBASA, BERGE MARÍTIMA, PÉREZ TORRES MARÍTIMA, SACYR, OHL, SAPEC, TERMINAL MARÍTIMA DE HUELVA, GRUPO NOGAR, TERMINAL MARÍTIMA DE GALICIA or ALGEPOSA.

This joint work over the years has placed Espirales y Maquinaria de Transportes SL at the level of leading competitors such as Bühler, TAIM and SILVA. Breakthroughs in its dust suppression systems have helped it to achieve this level of expertise. These systems are key in loading and unloading of solid bulk, and in improving equipment and maintaining structures. DCi

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Tom Noble, Department Supervisor, Powersouth Energy

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"WHITE is the New Green"

New barge-mounted E-Crane at Mulzer Crushed Stone

In early 2016, Mulzer Crushed Stone ordered a Series 1500B/ Model 11264 E-Crane which will be mounted on a deck barge. The E-Crane has a maximum duty cycle capacity of 16.5 metric tonnes (18.2 US tons) and a maximum outreach of 26.4 metres (86.5 feet). This is a flexible mobile floating offloading platform that allows barge unloading to a shore-mounted hopper, floating hopper or direct to trucks depending on the product and location. The floating rig incorporates the latest design for spud operation, barge haul winches and power distribution.

This is the third E-Crane purchased by Mulzer since 2011. The first E-Crane was also a barge mounted 1500 Series/Model 11264 for handling aggregate. The company was very pleased with the installation and successful performance of this E-Crane.

"I work with a lot of contractors that talk a good talk but cannot perform in the field. We have been very impressed with the E-Crane service technicians. They are very organized, communicate well, have a sense of urgency, and know their job. It's nice to work with a company whose service has been excellent from beginning to end," says Kevin Fulkerson, Equipment Superintendent at Mulzer.

In 2014, Mulzer ordered a second machine, a smaller EH900 Series E-Crane/Model 8248. This machine has a capacity of metric tonnes (15.0 US tons) and a maximum outreach of 24.8 metres (81.5 feet). This is also for moving aggregate from barge to hopper. This machine has also been performing well since installation in 2015.

Mulzer has realized the benefits of the E-Crane floating solution, and E-Crane is happy to have them as a repeat customer.

Benefits of barge mounting

The E-Crane balanced design makes it ideal for barge mounting. The E-Crane design is based on a parallelogram-style boom which provides a direct mechanical connection between the counterweight and the load. This unique four-bar mechanism ensures that the E-Crane remains in a near perfectly balanced state throughout its entire working range. While conventional cranes use as much as 80% of their available energy just to move the boom, stick, and grab, the E-Crane allows gravity to work for you instead of against you, reducing horsepower requirements and power consumption by up to 50% and significantly reducing maintenance and operating costs.

Along with the significant energy savings that a balanced design provides, it makes the E-Crane ideal for mounting on a floating barge. Because the crane is balanced, the movement of the E-Crane causes very minimal listing and movement of the barge.

A barge-mounted crane is also beneficial because it floats up and down along with the material barges when the water elevation changes. This means that the cycle of picking material out of the barge is never affected by water fluctuation.

About E-Crane

E-Crane Worldwide is a modern, state-of-the-art engineering and heavy equipment construction company, based in Adegem, Belgium and with subsidiary companies for sales management, technical support and service in The Netherlands (E-Crane International Europe) and Ohio, USA (E-Crane International USA). E-Crane Worldwide develops turnkey material handling solutions with engineering services, equipment manufacturing, erection, operator/maintenance training and custom tailored ongoing service programs for our clients.

About Mulzer Crushed Stone

Mulzer Crushed Stone is a leading supplier of crushed stone, rip-rap, sand , gravel and high calcium limestone for power plant desulphurization equipment. With more than 20 locations in southern Indiana, Kentucky and West Virginia, Mulzer is the Ohio Valleys largest supplier of crushed stone.

World's biggest woodchip transfer bunker

(photo: ©BTW Plant Solutions, a division of BT-Wolfgang Binder)

BTW Plant Solutions delivers mobile bunker to LIEBHERR-MCCtec.

BTW Plant Solutions, a division of Austrian company BT-Wolfgang Binder, has successfully completed a project in Sweden that has now gone into operation. An impressive bunker system from BT-Wolfgang Binder serves a state-of-the-art biomass heat and power plant in Värtan, Stockholm, where it is used to unload woodchips from ships and transfer them to the power plant.

The power plant is owned and run by Fortum Varme, a joint

venture between the city of Stockholm and Sweden's largest power generating company Fortum, which supplies district heating and cooling to industrial and residential customers.

Fortum has invested around €500 million in the new biomass CHP (combined heat and power) plant, which just went into service at the beginning of 2016. Construction of the plant began in 2013. It is one of the largest of its type in the world and will provide heating and electricity for around 190,000 households per year for 50 years.

This new plant represents a total modernization of the district heating system in Stockholm and because it will use more fuel efficiently, it is estimated to reduce harmful emissions by 126,000 tonnes per year.

World's biggest woodchip transfer bunker

The woodchip transfer bunker was designed, delivered and commissioned by BTW Plant Solutions, a division of Austrian company BT-Wolfgang Binder GmbH. Its job is to receive bulk solids — in this case woodchips — which are unloaded from ships and transported along a jetty to the power plant. At the inland end of the jetty it serves two belt conveyors, which lead to the power plant's storage bins. The bunker runs on rails and is coupled to a revolving gantry crane by connecting bars. The crane loads the material from ships into the bunker and also provides the motive force for moving the bunker along the rails when it is full and when it is empty.

STATISTICS

Bulk solids	woodchips, biomass
Bulk density	0.4t/m³
Particle sizes	L+B+H = max. 300mm
Crane bucket volume	50m³
Transport rate	3,000m³/h or 1,200tph
Rail gauge	16m
Transport dimensions	L × B × H = 17m × 20m × 20m
Weight (approx.)	400t

The bunker is designed for use in a maritime environment in temperatures of –30°C to +45°C with 97% humidity. BTW Plant Solutions delivered a fully functional, completely assembled bunker with all the necessary equipment. It was assembled in the yard of its immediate customer Liebherr MCCTec in Rostock Port in Germany.

(photo: ©BTW Plant Solutions, a division of BT-Wolfgang Binder)

From there, thanks to the direct sea connection, the 400-tonne bunker assembly was delivered by ship to its destination in Stockholm.

The rail-mounted bunker is coupled to the Liebherr gantry crane Type LPS420 and is used for transferring material to the power plant but not for storage. The system as delivered involved not only the steel construction and the outer covering of trapezoidal sheeting, but also a volumetrically controlled discharge system, which deposits the woodchips on the conveyor belts below the bunker. This system is variable and allows material to be fed to only one of the conveyor. The material is often damp in winter; this made it necessary to install a heating system for the sides of the bunker and the specially designed intake grating, to prevent woodchips freezing to the bunker.

At the other extreme, woodchips and sawdust may also be delivered in a very dry state, so that local dust extraction systems were needed at both the intake and discharge sides of the bunker. The bunker construction also has spaces for hydropress tanks, electrical equipment and controls.

"This bunker system involved a large number of engineering challenges such as the large transfer volume, the redundancy of the discharge system, difficult bulk material (e.g. particle sizes, moisture content), ambient temperatures, dust extraction, noise protection, fire safety and the dimensions of the assembly to be delivered. BTW Plant Solutions rose to all these challenges and delivered the product successfully, reports Johann Buchgraber, Head of Sales for Conveyor Technology BTW Plant Solutions, a division of BT-Wolfgang Binder GmbH from Austria. DCi

Bulk handling Stateside

US equipment in focus

Figure 1: The overland conveyor at the Adani's Dahej port in India transporting 6,000tph of coal. CDI removed transfer towers and designed an efficient lightweight structure with a maintenance trolley.

Jay Venter

Low-cost conveyor systems by Conveyor Dynamics, Inc.

With the recent drop in mineral prices, reducing the cost of bulk material handling systems is becoming increasingly critical, *writes Andrew Jennings, P.E., President, Conveyor Dynamics, Inc.*

Conveyor Dynamics, Inc. (CDI) focuses on reducing costs of building and operating belt and pipe conveying equipment and comminution machines. For 35 years, the software we developed to simulate conveyors (BeltStat and BeltFlex) has allowed us to design and commission longest, strongest and highest power conveyors in the world. We set the world record for belt conveyor length three times, most recently last year in South Africa, where we designed and commissioned a conveyor that is 27km long. In addition to conveyor design, for the past 20 years we have optimized comminution machineries using software we originally developed to simulate transfer chutes.

Reducing the cost of building a conveyor begins with route optimization. On long overland routes: terrain, existing infrastructure, and environmental considerations often force designers to choose between horizontally curving a conveyor, or splitting the system into several conveyors. BeltStat's proprietary horizontal curve algorithms allow designers to design much tighter horizontal curves than are typically found in the industry. This allows designers to eliminate transfer towers and save clients millions of dollars in CAPEX. Removing transfer towers also reduces OPEX by increasing reliability. When there are fewer chutes to plug, fewer pulleys to break, and less elevation change OPEX drops.

The overland conveyors that transport 6,000tph (tonnes per hour) of coal from the Adani's Dahej port in India to a rail loading silo are an excellent example of a system where our client saved millions of dollars by hiring us during the feasibility phase of the project and allowing us to eventually design and commission the complete system (Figure 1). We applied our horizontal trough belt technology and replaced two previously planned transfer towers with 1,100m horizontal curves. We also

Figure 2: Reclaim system at the Port of Aqaba.

design light weight elevated conveyor support structures that spanned 36m and weighed only 209kg/m. Involving CDI during the feasibility study of this project allowed us to identify these opportunities early before land acquisition and environmental permitting prevented route changes.

After optimizing the route, we can often reduce CAPEX further by designing custom lightweight structures, selecting low rolling resistance components that reduce motor and belt strength size, and by reducing the number of rotating components. On the 27km South African conveyor, we selected an idler spacing that is 3 times wider then Conveyor Equipment Manufacturers Association (CEMA) recommends. This is because the take-up tension required to avoid drive slip on a 27km conveyor is much higher than on shorter conveyors. Higher tensions lead to acceptable belt sag even when the idler spacing is wide. CEMA recommends closer idler spacing because on short belts, increasing tension to reduce sag and extend idler spacing is rarely cost effective because the costs associated with increasing belt strength do not outweigh the saving associated with increasing idler spacing. The standards were not developed with long belts, high tonnage, or high lift conveyors in mind.

To reduce operating expenses CDI works with contractors to select low rolling resistance components. In the past we helped Bridgestone and Goodyear improve their rubber compounds and splices. Last April we signed an agreement with the Chinese belt manufacturer Double Arrow to help them with their compounds and splices as well. We also help pulley manufacturers design lower cost pulleys using our pulley design software, PStress.

CDI designs more than just conveyors and conveyor equipment. A decade ago we sold our comminution group to Metso and as part of that sale we agreed to stop optimizing comminution equipment for seven years. That time has now passed and we are once again developing new liners and lifters for operators that reduce comminution OPEX.

Poorly designed chutes reduce throughput and cause many hours of unscheduled shutdowns. CDI has spent years developing software to model chutes and modifying existing chutes to stop them from plugging. We have carefully calibrated our Discrete Element Models to handle many challenging sticky materials including copper concentrate, limestone, and coal. We also have a great deal of experience designing chutes that minimize impact and liner wear with highly abrasive ores.

Control systems are another source of unscheduled shutdowns. We often find that the people developing control systems for long overland conveyors do not understand how the flexible nature of the conveyor belt affects the control system. We strongly recommend contracting a conveyor expert who is also a PLC programmer to create an overland conveyor control system. Our team has replaced numerous conveyor control systems transforming unreliable conveyors to conveyors no one remembers ever failing. Our secret is that our lead PLC programmers are also conveyor engineers who understand the dynamics of conveyor belts.

In addition to programming conveyor controllers, our PLC team automates stacking/reclaiming systems greatly reducing the man-hours involved with these operations. At Arab Potash Corp's port at Aqaba in Jordan, CDI engineers automated the entire system of plant conveyors, feeders, stackers, diverters, reclaimers, and ship loaders (Figure 2).

The stacker/reclaimers automation we created is so complete that no operators are required to stack or reclaim and the system can operate without anyone watching it (although we do not recommend doing so). In addition to reducing man-hours, the automated system is much cleaner than the manual system Aqaba previously had because the algorithms we developed to control the scraper reclaimer and ensure that it does not cause avalanches of material when it cuts into the side of the pile.

At CDI we understand the importance of combining theory with practical solutions. Our engineers combine design expertise with strong theoretical background to design the most reliable and lowest cost systems in the industry.

Advanced material handling with Dos Santos International conveyors

Dos Santos International (DSI) was founded on its extensive worldwide experience in sales, engineering, and construction of bulk materials handling systems and equipment. This has included major contributions that have expanded the range of bulk handling and transport solutions. Most notably, advances in sandwich belt high angle conveyors have led to their worldwide utilization. The expertise of DSI spans a wide range of materials handling systems and equipment including high angle conveyors, high powered, high capacity, high lift slope conveyors and long overland conveyors utilizing the very latest technology.

Products and services

Sandwich belt high angle conveyors

Origin

In 1979 Joseph A. Dos Santos undertook a major study to develop a means of moving and elevating large quantities of bulk materials, including coarse products such as rocks, aggregate, coal, etc. at the steepest possible inclines. While such concepts had been tried over the years with mixed results, Dos Santos investigated and analysed the many forces generated in this seemingly simple concept, and created the formulas which guaranteed the successful design of such equipment. The DSI Snake Sandwich Conveyor represents the ultimate achievement of this aim.

What is a sandwich belt conveyor?

A sandwich belt conveyor uses two conveyor belts, face-to-face, to gently but firmly contain the product being carried, hence making steep incline and even vertical-lift runs easily achievable.

DSI Snake sandwich conveyor profiles

Snakes are available in widely ranging profiles of C and S-Shape. In any case, a long bottom belt approach is possible to the sandwich entrance, and discharge may be on the high incline or may be after the extension of the carrying belt beyond the mouth of the sandwich.

Advantages

DSI Snake sandwich conveyors offer the following advantages:

- unlimited conveying capacity;
- a system suitable for the most rugged mine applications, yet gentle on sensitive and friable materials;
- high availability and low operating and maintenance costs;
- smooth surfaced belts allow continuous belt cleaning by scrapers and plows. This also facilitates intermediate material discharge by belt ploughs, as appropriate, before and/or beyond the sandwiched part of the Snake profile; and
- all conventional conveyor hardware insures economy and fast delivery of replacement parts.

Dos Santos-design sandwich belt conveyors have been proven in more than 80 successful conveyor systems installed by his previous employers throughout the world over the past 18 years. Dos Santos' expertise will continue to advance the state of the art and assure the company's clients of the finest conveyor systems available today.

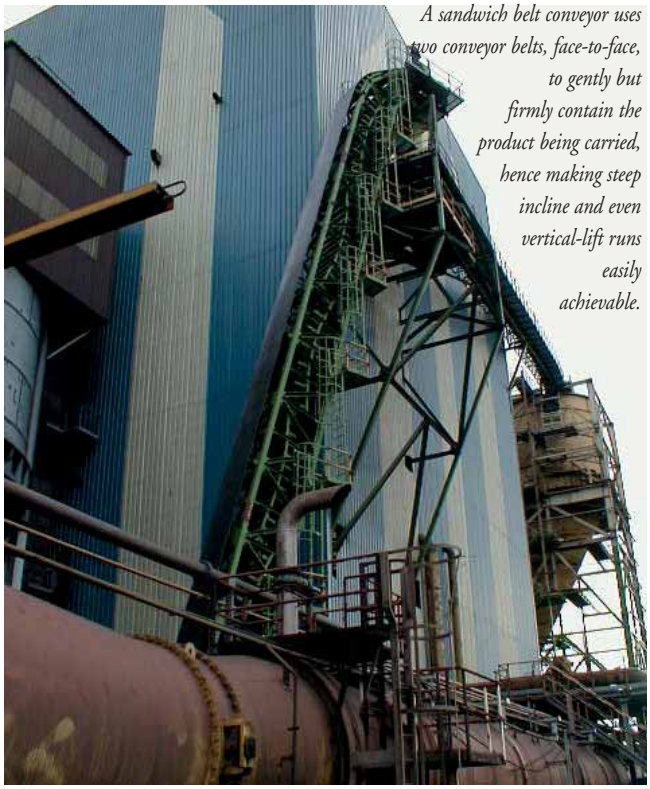
Conventional, overland & plant conveyor

Long overland conveyor, high lift & high capacity conveyors

DSI offers conventional conveyor systems of simple or complex profile to high capacities and high lifts.

The company's overland conveyor projects have featured intermediate 'booster' drives of the fixed tripper type as well as the belt on belt type. These have been effective in achieving great transport lengths with belts of only modest strength. 'Booster' drives also allow DSI to control belt tension facilitating horizontal curves with minimal belt wander.

DSI's conveyor systems will exploit the latest in equipment and technology to deliver optimal solutions.



A sandwich belt conveyor uses two conveyor belts, face-to-face, to gently but firmly contain the product being carried, hence making steep incline and even vertical-lift runs easily achievable.

Plant conveyor

DSI's experience in integrated design, co-ordinating the best in equipment with the most efficient structural systems will be exploited to produce clean, attractive plant conveyor solutions.

Heavy belt feeders

DSI offers belt feeders from the very basic through to the most rugged systems.

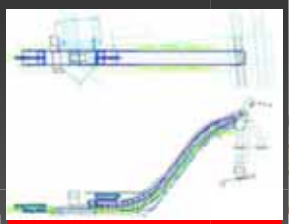
THINK THIS IS NEW TECHNOLOGY?

THINK AGAIN..

Australia - 2006
Titanium Ore – 50°
Mobile shiploader – 1000 t/h

Canada - 2006
Diamond ore – 50°
3 units – small footprint

Spain - 2012
Green Pet Coke – 90°
"S"- Shape



United States – 2014
Coal – 52°
High Capacity – 4000 t/h

DSI Snake Sandwich High Angle Conveyor elevating coal at a 75° angle for a steel plant in Northern Spain.

Dos Santos International is the world's foremost authority on high angle conveyor applications and design of sandwich belt high angle conveyors. With more than thirty years of materials handling and engineering experience, we offer the most advanced high tech conveying solutions. **BUT THE TECHNOLOGY ISN'T NEW.** DSI's high angle solutions have been proven time and time again to be the most reliable and economical solution in the industry.

The DSI Sandwich Belt High Angle Conveyor offers many advantages. It's **PROVEN** in over 100 installations worldwide. It's **RELIABLE** for rugged mining conditions, yet gentle enough for friable materials. It's **ECONOMICAL**, fitting into tight spaces and small footprints. Elevating millions of tons of material at various installations all around the world, users have agreed it's the most reliable, low cost and low maintenance conveyor system available. **Let us prove it to you.**

• THE GREATER THE LOAD •
• THE HIGHER THE LIFT •
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- belt trippers;
- fixed;
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- consulting services.

Consulting and engineering

Consulting and engineering services are offered for the various industries including:

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- power plant maintenance; and
- steel mill equipment.

Additionally, all industries may benefit from DSI's discipline-oriented engineering services, which are offered in mechanical and structural engineering. DSI's services may be used for:

- technical and economic studies and evaluations;
- new systems;
- upgrade of existing systems;
- plant modifications and field assistance; and
- conveyor system layouts.

Dos Santos International consulting and engineering projects have varied widely from market study and promotional work to detailed engineering and field assistance.

Expanded conveyor technology

Conveyor analysis and development

Dos Santos International has designed and developed hundreds of conveyors for many challenging material handling applications. Each project has its own unique challenges, but with the experience of its engineers, it has developed in-house software utilizing analysis models that allows it to predict load equivalents and stresses of new conveyor applications. Utilizing this software package allows DSI to engineer the best conveyor solution for each specific application's needs.

Special features of the DSI 'Expanded Conveyor Technology'

- each run produces a complete tension and power analysis under steady state, starting and stopping conditions. Stopping is by braking and by drifting. Starting and stopping analyses utilize rigid body dynamics;
- sequential runs, using macros, allow real time analysis and graphical display of changing load conditions including load-on, trailing-off and any discontinuity of material flow. This feature allows us to spot, quickly, the aggravations of flow discontinuities;
- virtual material loads, or 'load equivalents' are used to account for belt line resistance's associated with the curving profile or plan of the conveyor line. These (previously unaccounted for) resistance's become significant at horizontal curves where the effect is always increased resistance;
- Ky, flex and shear resistance factors differ from CEMA reflecting DSI experience and philosophy;
- in the analysis, belt tension becomes negative (compressive) when it drops below 0. This, though not realistic (as belt becomes slack), allows continued analysis indicating the tension increase required to correct the slack belt problem;
- an in-put section entitled 'Discretion by Responsible Engineer' offers the user an opportunity to affect the analysis by use of adjustment factors on the Ky and Kx values and on the terminal resistances. These factors can be used to alter the results according to known characteristics of the conveyors being analysed, to reflect the user's design philosophy or to achieve matching of field monitored data.

Rigging, reeving, and hoisting

Dos Santos International offers special expertise in wire rope rigging, reeving and hoisting systems. This expertise has been gained through extensive experience with such systems related to remote take-up systems for conveyors, hoisting systems for stackers, loaders and other large yard and dock equipment. Rigging procedures and logistics have been worked in detail for special power plant maintenance projects.

Recent case study

Hopper replacement at Shawnee Fossil Plant

DSI was approached by Power Techniques to design structural modifications to the two existing hoppers feeding Conveyor BC-9 at Shawnee Fossil Plant in Paducah, KY. The plant intended to replace the existing reciprocating feeders with new vibratory feeders and replace the existing rack-and-pinion gate with a new, heavier duty gate.

The original intent was for DSI to design the local reinforcement needed for the hopper to support the feeders and to make minor modifications to the bottom of the hopper to allow for proper mating with the new gate. However, after developing the initial layout which incorporated the new feeders and gates into the existing system, it became clear that the modifications would be extensive. Prior to DSI's involvement, Shawnee Fossil Plant had decided that the condition of the existing hoppers warranted replacement. Because of the state of the existing hoppers and the extent of the modifications required to accommodate the new system, DSI was commissioned to design two new hoppers.

The biggest challenges to the design were the tight space requirements, complex geometries associated with the feeder supports, and the heavy head loads applied by the stockpile above. The size of the new equipment required the height of the hoppers to be reduced significantly, relative to the existing hopper design. This reduction in height subsequently reduced the hopper wall slope angles. Because of the vibratory feeders below, the reduced slope was deemed acceptable by the plant. The geometry became quite complex due to the location of the new feeder suspension supports. This was overcome using Hollow Structural Sections (HSS) connected with shear plates and stiffeners to resist the moment and torsion created by the feeder loads. DSI was informed that the stockpile of coal above the hoppers could reach a height of 40 feet. According to experimental results reported in articles written by J. Ai, J.F. Chen, J.M. Rotter and J.Y. Ooi, pressure distributions beneath a stockpile can result in nearly 60% of hydrostatic pressure. Applying this to the 40 foot stockpile above the hoppers results in heavy wall pressures, requiring closely spaced reinforcing ribs at the hopper walls. The large head load created by the stockpile also exceeds what is allowed on the feeders below, necessitating DSI to design a triangular-shaped deflector to reduce the head pressure on the feeders. The deflectors include adjustable liner plates to optimize the flow of material onto the feeders.

Giant mobile dust control design delivers extended coverage

The new mobile dust suppressor delivers a range of 100 metres (328 feet), and up to 15,500m² (140,000ft²) of coverage area.

Dust Control Technology, a renowned supplier of mobile dust and odour suppression, has announced the introduction of its new and largest trailer-mounted dust control system, a powerful atomized mist design featuring a range of 100 metres and the ability to deliver 140,000ft² (15,500m²) of coverage area. The DustBoss® DB-100 Fusion™ is powered by its own 480V/150KW generator with a 6.8-litre John Deere Tier III flex diesel engine, all securely mounted on one of several roadworthy dual-axle trailer options with stabilizing jacks.

Designed for large open-air applications such as mines, coal handling plants and aggregate operations, the unit delivers effective particle control in a highly-mobile platform that can be positioned directly at the source of dust-generating activities, even on sites without an available power supply. The new design can even be specified with a high-lift pump for drawing water from a stationary source, such as a private pond.

"We had many discussions with customers who were interested in expanding their dust management coverage, after seeing our smaller DB-60 Fusion," commented Dust Control Technology President Laura Stiverson. "We engineered the new design to meet those needs, yet still remain highly mobile, able to be towed easily just about anywhere on a job site."

Thought to be the most powerful mobile system available to control dust in large open areas, the versatile DB-100 Fusion features a 150

The unit is powered by a 480 V / 150 KW generator with a 6.8-litre John Deere Tier III flex diesel engine.

gallon fuel tank, providing about 32 hours of run time without refuelling. Doors are equipped with hinges and door stops for easy access, and the generator's engine compartment is fitted with sound attenuation. Day-to-day operation can typically be managed by the remotely located on/off switch outside of the enclosure. For convenience, a 120V receptacle for auxiliary tools and a plug-in for the battery charger and block heater are also located outside.

To achieve its 100-metre throw distance, the DB-100 employs a 60HP electric fan motor coupled with 10–90PSI of inlet water pressure that's run through a booster pump to achieve pressures as high as 250PSI total. Unlike industrial sprinkler systems used for dust management, which can require as much as 500GPM [(gallons per minute] (1,893LPM [litres per minute]) of water, the DB-100 Fusion uses only about 38GPM (143.8LPM) to help avoid pooling or runoff. The unit shatters the inlet stream into millions of tiny droplets in the range of 50–200 microns — an ideal size for suppressing fugitive dust particles in most cases. The device can also be customized with alternative nozzle options for specialized applications.

The standard machine is fed by a manifold of 30 nozzles that are specifically sized and positioned for the new design. The DB-100 Fusion features simple, user-defined oscillation, along with adjustable elevation from –7° to 45°. It can also be outfitted with a dosing pump to accurately meter in surfactants or tackifiers to further enhance binding of dust particles. The unit can be set up to run potable water and can also be outfitted with a selection of filters to handle non-potable water sources. For applications in which the water source contains high amounts of sediment, additional external filters are available. For operation in cold climates, heaters for the enclosure and heat tracing for pipes are available as options, and each machine is equipped with multiple automatic drain valves to enhance freeze protection.

Users can easily set a custom oscillation range via the touch screen controls. The standard unit travels at a rate of 1° per second to provide ideal coverage, and the oscillator features a quick-release handle that allows the barrel to be repositioned in seconds, without using any tools. The touch screen on the control panel is also used to turn the fan and booster pump on and off, as well as to adjust the vertical pitch of the barrel using simple up/down arrows. When the generator is turned off, a battery backup feature automatically returns the machine to the horizontal position, which is safe for towing, before it shuts down completely.

By providing mobile power, the design requires only a water source for operation. "Our goal was to design a freestanding unit, which catered to customer needs without compromising performance, delivering easy transport and adaptability to a wide range of locations and conditions," Stiverson said.

Fire hoses and couplings are supplied and stored in easy-access tool boxes, along with a spare set of nozzles and basic tools. "We've equipped the new design as a turnkey solution," Stiverson added. "It may seem like small details, but the objective was to include everything needed for routine operation and maintenance, ultimately delivering the most positive customer experience possible."

Maintenance requirements for the new design are minimal, even though the unit carries a three-year/3,000-hour warranty on the dust suppressor and a two-year/2,000-hour warranty on the genset. If potable water is being used, nozzles typically need to be inspected just once per year. The turntable bearing on the oscillator should be greased annually or as needed for harsh service conditions and the fan's motor and high-pressure pump should be lubricated every 10,000 hours. Like any diesel engine, the genset should have regular inspections and changing of oil, coolant and filters.

Although the new design is typically supplied to run on standard 480V power, customers can specify the unit in a wide range of voltages to suit locations virtually anywhere in the world.

Dust Control Technology is an experienced supplier of dust and odour control solutions for coal, demolition, aggregate processing, slag handling, material recycling, ports and shipping and other applications. The company's primary mission is the development and manufacture of customized equipment utilizing atomized mist technology for dust and odour suppression. All of the firm's R&D, experience and expertise is centred completely around those applications, and its staff helps customers analyse particle sizes, working environments and other factors to ensure effective performance under real-world conditions. The units are far more effective and efficient than sprinklers or manual spraying, with some customers realizing payback in less than six months. Headquartered in Peoria, IL (USA), DCT's dust and odor control units are designed and manufactured in the USA and delivered to customers around the world, with its equipment sold to users in 40 different countries on six continents to date. The equipment can be purchased outright or rented from an extensive fleet.

To achieve its 100-metre throw distance, the DB-100 employs a 60HP electric fan motor fed by a high-pressure booster pump.

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!

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CONDUCTIX wampfler

DELACHAUX GROUP

Conductix-Wampfler finds success in Pacific Northwest

Conductix-Wampfler was the selected supplier for the variable-frequency drive reels

One of the largest bulk handling projects for North America in recent years is the Westshore Terminals upgrade in Vancouver, BC, Canada. Westshore is investing $275 million over the next five years to replace ageing equipment and modernize its office and shop complex. The project involves replacing the shiploader at Berth 1 and three stacker-reclaimers, with all work being carried out within the existing terminal footprint. Conductix-Wampfler was the selected supplier for the eight variable-frequency drive reels. Each machine will be fitted with a water hose reel for dust suppression purposes, along with a high voltage, control, and fibre-optic composite cable. The cable selected consists of 3 × 150mm^2, 6kV-rated, with ground conductors, and twenty four multi-mode optical fibres in a Protolon (M)-R construction made by the Prysmian Group.

One of the largest bulk handling projects for North America in recent years is the Westshore Terminals upgrade in Vancouver, BC, Canada

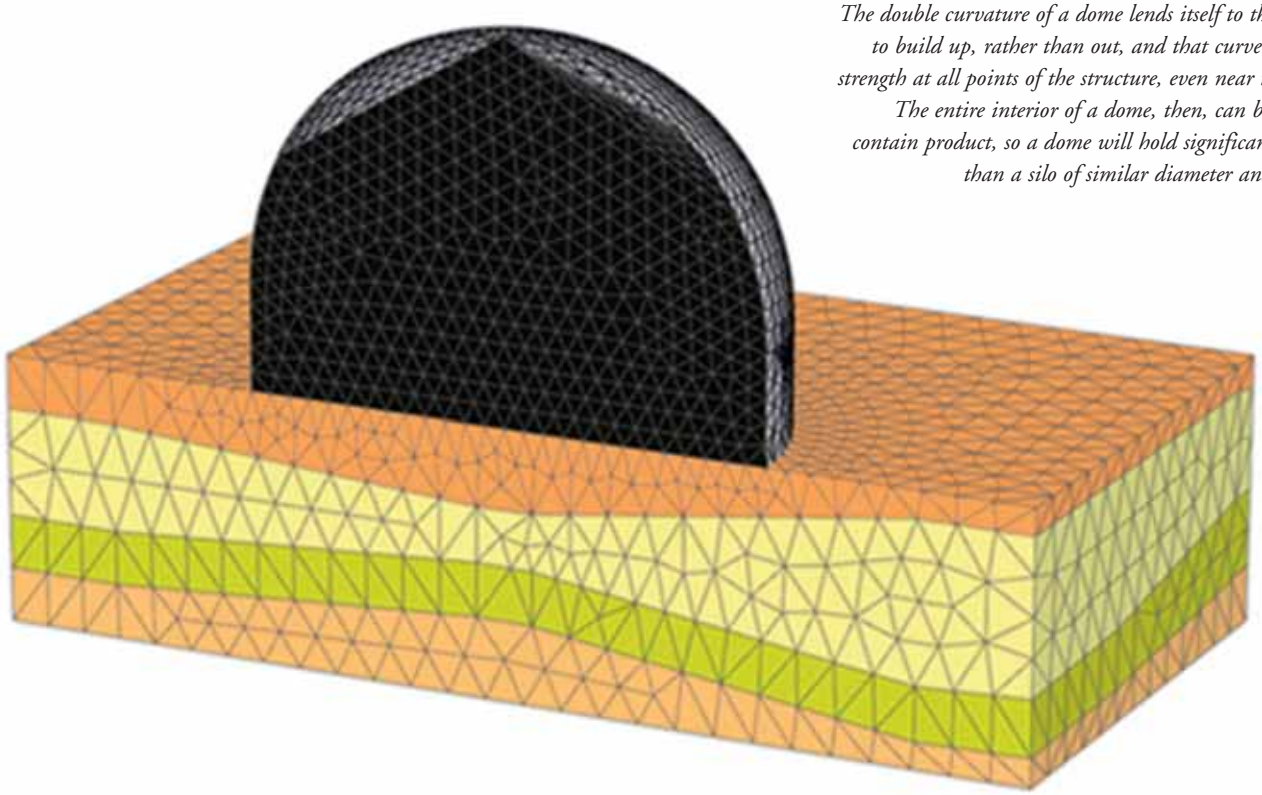
Conductix-Wampfler will be supplying its SMART Drive HD30 VFD reels, which incorporate SEW motors with integrated frequency controls. This drive has been used successfully in numerous port applications and for the electrification of rubber-tyred gantry cranes (E-RTGs). Conductix-Wampfler's Market Development Manager Americas, Mark Zuroske, states that "while the need for variable frequency drive reels is largely seen in ports applications, the bulk handling market has been transitioning to VFD reels from the more traditional drives over the last few years." As more bulk handling OEMs are moving to VFDs on their machines, Conductix-Wampfler now offer three levels of VFD packages which include standard control, advanced control, and advanced centre-point control. Zuroske went on to state "that while some applications in the bulk handling market are gradually migrating to VFDs, our proven magnetic coupler technology continues to be suitable for the majority of the bulk handling applications."

Conductix-Wampfler was also successful in the recent supply of a magnetic coupler reel and two specially designed stainless steel festoon systems at nearby Neptune Bulk Terminals. The cable reel was provided for a refurbishment of an existing stacker/reclaimer, where a level wind reel was replaced with a mono-spiral wrap reel. The festoons were placed on the new stacker/reclaimer that was installed in 2014.

In addition, Conductix-Wampfler also shipped two magnetic coupler driven reels for the new ship loaders going to the Pacific Coast Terminal at Port Moody BC. These reels include CSA-approved cables manufactured by the Prysmian Group's facility in North Dighton, MA, USA.

Conductix-Wampfler also supplied the cable reel for the new shiploader installed at Canpotex's Portland, OR (USA) facility, and are under contract to supply the new reel for the potash tripper. Both of the Canpotex projects, along with the Westshore project, involved the use of special Prysmian composite cables. Ernesto Heller, Prysmian's Manager Industrial Markets noted that "we have witnessed a significant increase in the demand for composite cables, which consist of power conductors, control conductors, and multi-mode fibre optics in a single jacketed cable suitable for reeling applications." In the case of the Westshore Terminals, the cables selected were the mining and reeling type (M)-R, which has a reduced weight and outer diameter. This was necessary to place these large mono-spiral spools into some very tight quarters. Heller went on to state that "over the years the Prysmian Group and Conductix-Wampfler have developed a close working relationship that has benefited both groups globally." This is coupled with the realization that OEM customers and end users prefer to deal with a single company able to take responsibility for the complete project. Also contributing to Conductix-Wampfler's recent success has been the addition of Precision Crane Industries as its agent in British Columbia. Parent company Portal Crane Parts, Ltd has a strong presence in the BC material handling segment. Part owner Bret Bromhead has many years of experience selling and servicing components for material handling cranes such as cable reels, festoon systems, and crane braking systems. Bromhead stated that "Having competed in this market for 20+ years, I was very familiar with Conductix-Wampfler's reputation for supplying quality products. Several of the major ports will only use Conductix-Wampfler festoon systems on their ship-to-shore cranes."

Iain Barton, Conductix-Wampfler's Global Market Manager for Mining & Bulk Materials Handling, co-ordinated several of these important projects between Conductix-Wampfler's global entities. He added that "In today's bulk markets, companies that can provide global coordination as well as local service are much more suited to executing bulk projects of a large scope."



The double curvature of a dome lends itself to the ability to build up, rather than out, and that curve provides strength at all points of the structure, even near the apex. The entire interior of a dome, then, can be used to contain product, so a dome will hold significantly more than a silo of similar diameter and height.

Dome Technology's value engineering

Dome Technology does more than build a storage structure. The team helps customers grow businesses by implementing advanced ideas to store and move products within a required timeframe. Each project receives individual attention from engineers, and engineers develop design to meet specific customer needs.

With front-end engineering design (FEED), the company's design-build team quickly provides preliminary engineering and identifies equipment within an acceptable plus-or-minus margin so customers can determine if a project's scope fits within budget.

This type of FEED study happens before a project is engineered or constructed. "With front-end engineering design, you're trying to identify everything upfront, determine cost and work with a customer and a lot of time the contractor," said engineer for Dome Technology Adam Aagard, adding that with a FEED study, companies save on very detailed engineering costs.

Many construction companies will complete a FEED study for a potential customer, but Dome Technology takes it a step further with value engineering, a refined process that follows initial engineering for a project. While working closely with the customer to understand needs and concerns, Dome Technology's engineers analyse the project to propose innovative, cost-saving ways to accomplish tasks.

For instance, if a company were storing fly ash, engineers would refine a plan to include specialized material handling that prevents poor flow, bridging and rat-holing; they would also recommend monitoring systems that help ensure a dry, stable interior climate. Dome Technology's team may even provide solutions and innovations new to the customer.

The team also capitalizes on infrastructure and considers possible expansion. That might mean conveyor supports sharing a foundation with the dome, yielding greater stability and support plus substantial construction savings. Or it might mean building a ramp that will work for today's dome but is also designed to function with a future adjacent dome. By seeing the potential, engineers incorporate anticipated growth into today's design.

Often this saves on costs. "Value engineering is where you take something that's already been engineered and you scrutinize it and you work with the customer or the contractor to determine if there's an equivalent substitute for a lower cost," Aagard said. "You can do that with components, you can do that with structures, you can do that with pretty much any of the parts and pieces."

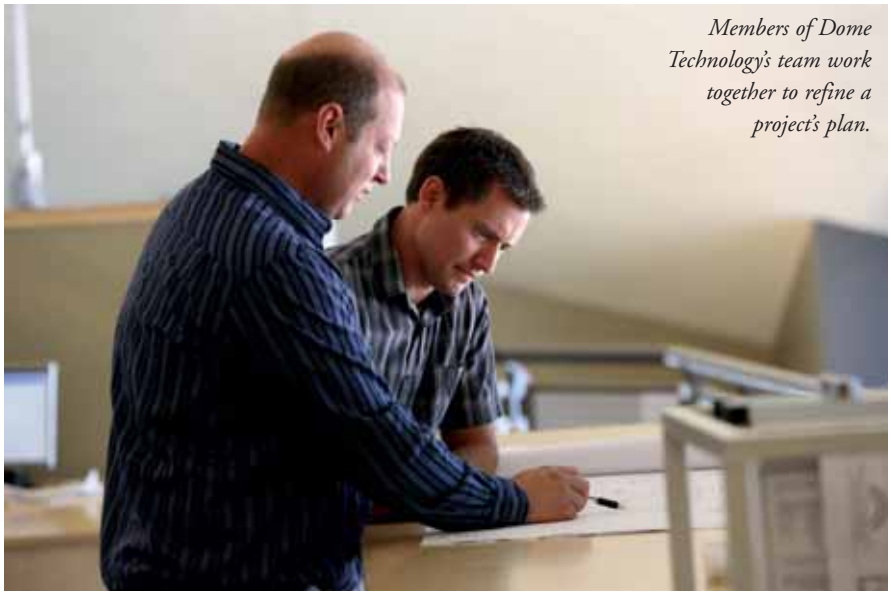
Providing customers with engineering and construction service together brings value to the project by delivering solution-oriented problem solving. Other means of analysis and engineering that work together now and into the future are listed below:

Geotechnical analysis: Making the selected site work best for a customer is one of the first considerations for a project's success. Since every location around the world is unique, every dome needs to be supported in a unique way. And since each dome holds different materials in different quantities, the product and soil profile determine the necessary support beneath it. Geotechnical analysis considers the soil stratification and site history, and the findings identify risk tolerance and settlement tolerance. The most complementary foundation is then selected for the project.

Engineering for material-handling systems: The way a dome system works depends on the product. Whether companies need bucket elevators, traditional conveyors, drag-chain conveyors or pipes that transport product pneumatically, Dome

Technology engineers use their material-handling know-how to customize a system. The design-build team creates systems working within the dome and those working outside to move stored products into and out of the structure and all the way to the train, boat or truck.

How companies receive product from origin, how they transport it from place to place and how equipment ought to be monitored determine the dome mechanics. Attention to the details of stored products — wood pellets requiring a certain moisture content or coal kept cool enough to safely store, for example — informs the process of selecting equipment for material handling.



Members of Dome Technology's team work together to refine a project's plan.

Structural engineering: The dome's double curvature and structural engineering render it stronger than traditional structures, even when spanning as much as 330 feet. The dome consists of an outer PVC membrane, polyurethane insulation and layers of steel-reinforced concrete. The construction process produces a super-strong structure, one that can support a head-house transfer tower that a comparative structure just couldn't tolerate without tremendous extra support and cost. The self-supporting dome needs no interior beams or columns.

Electrical engineering: Dome Technology's electrical engineers can design any type of electrical system — monitoring equipment, reclaim equipment, lighting for the site, lighting for the walkways, conveyors, dust-handing systems and more. Then the team identifies the size of electrical service and creates the logic to start and operate the facility.

More and more often, engineers design systems that run on a programmable logic control, a complex computer-and-sensor system that ensures operations run in the correct sequence — Conveyor A before Conveyor B, for instance — and detects when things go awry. If there's an error, the system shuts down automatically until the operator resolves the problem and restarts the system.

This level of engineering eliminates much of the potential for human error and relieves the burden on site operators and customers alike.

Dome Technology works on project for American Crystal Sugar Company

Construction is under way on a sugar storage dome for American Crystal Sugar Company

Located in Montgomery, Illinois, tunnels are currently being formed for the dome, which will stand 134 feet tall and 183.7 feet in diameter and store 60,000 metric tonnes of sugar. American Crystal Sugar Company will own the facility; however, United Sugars Corporation will operate the facility and manage sales and distribution. The dome will be equipped with mechanical systems providing a fill rate of 200tph (metric tonnes per hour) and a reclaim rate of 150tph.

The dome will be a first for American Crystal Sugar Company, which to date has relied upon concrete silos and steel Weibull bins for storage. According to Aaron Bjerke, who oversees business development for American Crystal Sugar Company, the cost of constructing a dome versus concrete silos was equivalent per unit stored, but savings could be found in the material-handling systems. Because the company will be able to achieve its storage needs with one dome, just one handling system will be installed, as opposed to a redundant cost of one material-handling system per silo.

In addition to building the dome, Dome Technology is responsible for securing the reclaim screw, a clean-sweep model made of stainless steel to complement food-safe requirements. A food grade-quality coating will be sprayed on the entire inner dome shell; the applied VersaFlex product will be 60 millimeters thick and ensure cleanliness in storage.

The dome will also feature heat tracing in the walls, temperature and humidity control, a dust-collection system and dedicated explosion panels — the first American Crystal Sugar Company storage facility to include such panels, Bjerke said.

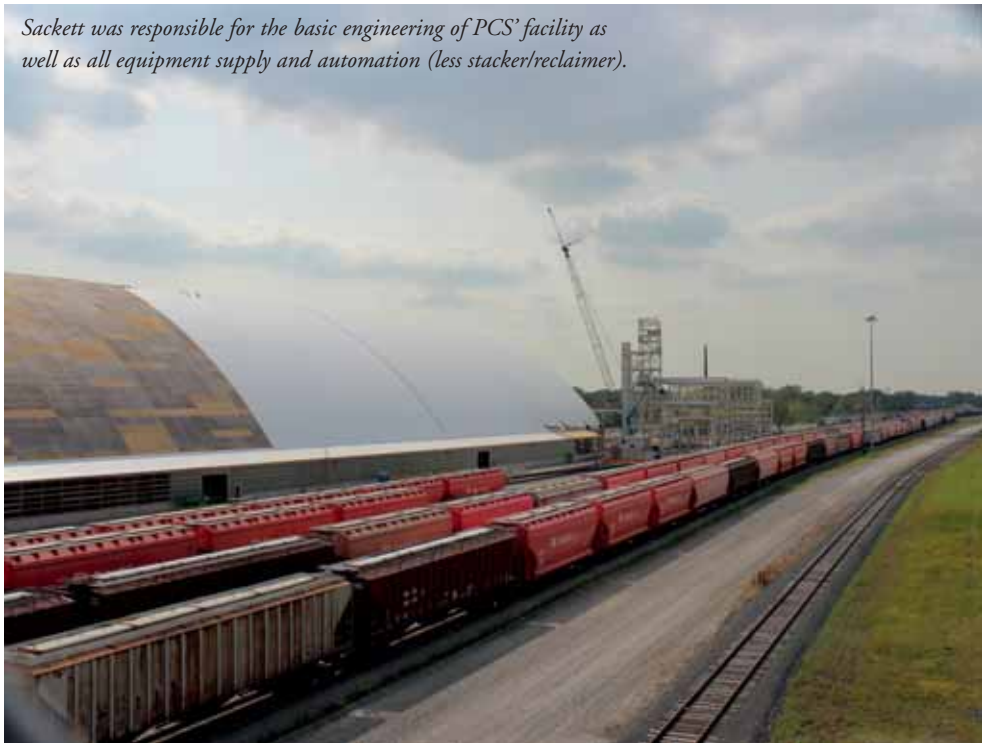
The entire site is scheduled to be operational 1 November 2016. According to an American Crystal Sugar Company press release, the dome will not be attached to a producing sugar factory, making it the largest free-standing sugar storage facility in the United States.

In recent years Dome Technology has completed multiple domes for sugar companies, and perhaps "one of the most attractive reasons is because of the amount of sugar you can fit inside the dome and the ability to store such a large amount," said Dome Technology sales manager James Stoker. "The ability to condition and keep the sugar in a stable condition is also attractive."

About Dome Technology

Dome Technology engineers and constructs thin-shell concrete domes and is based in Idaho Falls, Idaho. Founded in 1975 by Barry South, Dome Technology builds domes that can be used for industrial bulk storage such as wood pellets, gypsum, fly ash, coal, grain, fertilizer, mining ores and other bulk products. Dome Technology also builds domes for practical architectural facilities such as schools, churches or gymnasiums. Dome Technology has assembled a comprehensive experienced team of dome design, engineering, detailing, fabrication and construction resources in the world. Dome Technology has built some 550 domes in the past 35 plus years throughout the United States, Canada, South America, Europe, Middle East, Africa and Asia.

A.J. Sackett designs and fabricates PCS inland fertilizer terminal



Sackett was responsible for the basic engineering of PCS' facility as well as all equipment supply and automation (less stacker/reclaimer).

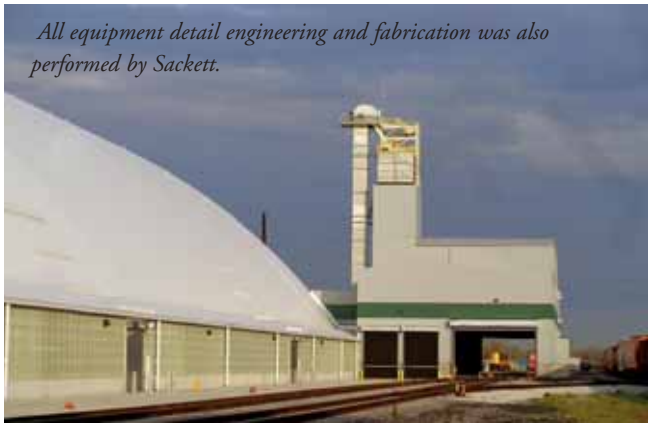
The A.J. Sackett and Sons Company recently completed the commissioning of one of the largest inland fertilizer terminals ever built in the US. This project, for Potash Corporation of Saskatchewan (PCS), is a Regional Distribution Center for potash to be railed out of Canada and stored closer to the areas of use in the US. The site incorporates storage for over 800 rail cars as well as a 120,000-tonne dry storage warehouse for the granular potash.

The warehouse is filled at a rate of 1,200tph (tonne per hour) with a unique system design where all rail car doors can be opened simultaneously. Conveyors take the potash to the warehouse and discharge onto a stacker to fill the building.

An automatic reclaim system is used to discharge the warehouse at a rate of 800tph onto a series of conveyors to take the potash out to a high speed rail loadout system. The rail loadout system allows for fully automated loading of rail cars utilizing an overhead NTEP weigh hopper under a larger surge hopper. The specialized loadout system allows rail cars to be filled while remaining stationary for additional safety of the employees.

Sackett was responsible for the basic engineering of this facility as well as all equipment supply and automation (less stacker/reclaimer). All equipment detail engineering and fabrication was also performed by Sackett.

Sackett, headquartered in Baltimore, MD USA, is a global Process Engineering and Equipment Company specializing in the fertilizer industry for over 118 years. Sackett's unique approach of combining Basic and Process Engineering with its own equipment line and fabrication, offers a very unique and high value experience for its customers. Sackett specializes in fertilizer granulation and compaction, bulk handling (water and rail terminals, etc), bulk blending and coating. Sackett has three engineering offices (Baltimore, MD, Waconia, MN and Araxa, Brazil) and 5 equipment fabrication shops (4 in the US plus Brazil). Sackett do Brazil is a full service Company supporting the Brazilian Fertilizer Industry. DCi



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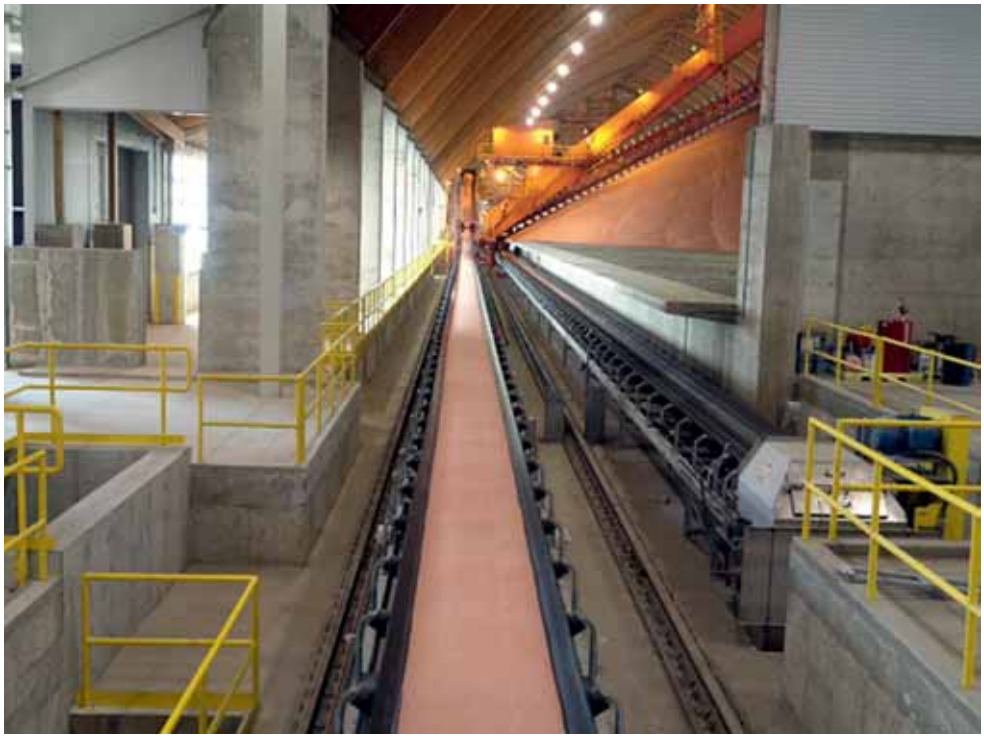

Handling and storing woodchips and pellets

Inside the silo basement at Markinch showing the underside of the Saxlund TubeFeeder silo discharge.

Biomass, especially woodchip and wood pellets, is increasingly popular in a range of power generation projects. Handling, storage and feeding biomass fuels though can be tricky. *Matt Drew, Managing Director of bulk materials handling specialist Saxlund International, discusses some of the challenges.*

Large-scale automated bulk-material-handling solutions to receive, store, convey, dose and feed wood chip biomass are increasingly important to energy from waste, gasification, Combined Heat and Power (CHP) and other low carbon energy solutions.

A typical system will involve a reception and storage solution with discharge and reclaim conveyors, and screening to remove contaminants and out-of-spec material, additionally it is usual to also include some form of weighing system. However, biomass is notoriously tricky to handle, non-free-flowing with a tendency to bridge and compact. This means the flow can easily be disrupted.

Blockages result in system shut-downs for cleaning and reassembly, both time-consuming and costly with processes idle while the issue is resolved. Poor material handling means some plants may never reach their full potential.

Understanding material behaviour is therefore crucial to system design and plant reliability. Particle size, mass flow properties, density variations, moisture content and compressibility are all important considerations. The composition of the biomass (or its source) may also change over time, and this needs to be factored into the system design to ensure a robust, enduring solution. All of this can be challenging for mechanical and process engineers unless they are working with these systems on a continuous basis.

Silos and storage bunkers

Storage, process feed silos and open to air bunkers need to be designed to provide sufficient on-site storage between deliveries, to ensure uninterrupted operation for other plant processes. Truck reception units, which allow the vehicle to discharge contents directly into the storage bunker, are the norm, but silo infeed systems can affect the consistency of the biomass, influencing silo height, so getting these calculations right is important, especially where space is restricted or at a premium.

Designed to burn 450,000 tonnes of waste wood per year the Markinch biomass power station in Fife, Scotland, operated by RWE, incorporates a critical fuel handling solution developed by Saxlund. This incorporates fuel reception and screening (to remove out of spec fuel), storage silos with TubeFeeder silo reclaimers and chain conveyors.

Saxlund TubeFeeder reclaimer in the base of the silo for the discharge of virgin and waste wood at up to 285m³ per hour.

Four above-ground container reception units, capable of handling more than nine trucks per hour are used. This arrangement enables simple switching between two conveyor streams to ensure continuity of flow. Each storage silo, there are three in total, is equipped with a Saxlund rotary TubeFeeder® to provide continuous, high-volume discharge of fuel to the combustion process. Rotary TubeFeeders were chosen as they allow large volumes of wood to be stored and reclaimed, providing a consistent homogeneous flow of fuel to the boiler.

Matt Drew, Managing Director of Saxlund International.

Design that ensures consistent delivery

Aside from a tendency to cake, sweat and compact, biomass materials can degrade over time, losing calorific value and making it essential for discharge and extraction to be based on a 'first in, first out' basis. Push floor or sliding frame technology, continuously developed by Saxlund since the 1960s, is designed to break up the material, preventing any build up or bridging, to ensure a consistent, homogenous delivery to the discharge point.

TubeFeeder® technology provides an alternative option for the continuous reclaim of bulk materials from both circular and rectangular bunkers and large-diameter silos. Designed to handle large volumes of biomass, the TubeFeeders at RWE's Markinch site consume 25% less electricity than other systems. The pitch and flight, plus the type of screw conveyor, need to be considered to limit adhesion issues. The key here is sound design and engineering to ensure no single point of failure. That means designing out pinch points and places where material can build up, such as transfer points between conveyors.

Preventing unplanned shutdown

Minimizing wear and maintenance are crucial in avoiding the high cost of unplanned shutdowns. Upfront investment in quality and wear resistant materials will always pay long-term dividends in plant productivity. Easy access, regular cleaning and preventative maintenance regimes are also important.

With a growing international reputation Saxlund has engineering teams in the UK, Germany and Sweden plus a number of key distribution partners. The company is currently collaborating for example on the design and development of critical fuel storage and handling systems for a number of UK biomass energy projects for Babcock & Wilcox Volund. These include one in Margam, South Wales, another at Templeborough, Sheffield, and a third biomass energy project in Teesside, North Yorkshire. Other projects are either in construction or operating in Northern and Eastern Europe where wood biomass is abundant.

Of course biomass combustion projects can fail to reach their full potential. Choosing an experienced bulk handling partner will limit the risks. The goal is to deliver the lowest cost of ownership for the lifetime of the plant, and to design out premature failure.

INDEX OF ADVERTISERS

Company	Page
Agrico Sales, Inc.	98
Beumer Group GmbH & Co KG	79
BLUG Credeblug S.L.	82
Bulk Logistic Landmark	103
Buttimer Engineering	71
BV Zeehavenbedrijf Dordrecht (ZHD Stevedoring)	54
Cimbria Bulk Equipment	82
Civettini Italo & c sas (CFS Handling)	104
Coaltrans Conferences Ltd	102
Conductix-Wampfler	134
Cooper/Consolidated	34
Damen Shipyards Gorinchem	Inside Back Cover
Dos Santos International, LLC	130
e-coal.com	10
E-Crane World Wide / E-Crane International USA	122
EMS-Tech Inc	18
ESI Eurosilo BV	53
European Bulk Services (EBS) BV	48
Fednav Ltd	16
FLSmidth Wadgassen GmbH	94
Gans Cargo Operations	38
Guven Grab and Machine Ltd. Co	5
Hempel A/S	25
Hitachi Construction Machinery (Europe) NV	58
Huadian Heavy Industries Co., Ltd.	114
Hudig & Veder BV	22
IBAU HAMBURG	68, 69
Igus GmbH	62
International Paint Ltd	28, 29
J & B Grabs b.v.	112
Laidig Systems Inc	72
Liebherr-MCCtec Rostock GmbH	Back Cover
Mack Manufacturing Inc	109
Maschinen und Mühlenbau Erhard Muhr GmbH	111
Negrini Srl	114
Nemag BV	111
Neuero Industrietechnik GmbH	Front Cover
ORTS GmbH Maschinenfabrik	116
RC Inspection B.V.	8
RHB Stevedoring & Warehousing	46
Rhenus Midgard GmbH & Co. KG	36
RockTree Logistics Pte. Ltd.	66
Rotterdam Bulk Terminal (R.B.T.) B.V.	52
RULMECA HOLDING S.P.A.	84
SMB International GmbH	65
TAKRAF GmbH	61
Telestack Limited	88
Terex Deutschland GmbH	90
THIELE GmbH & Co KG	87
ThyssenKrupp Industrial Solutions AG	Inside Front Cover
TMSA Tecnologia em Movimentação S/A	92
Van Aalst Bulk Handling BV	50
Verstegen Grijpers BV	45
Wuvio Chemicals International	38
Zeeland Seaports Port Authority	42

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