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Part of Coeclerici's fleet operating in Indonesia. Photos: Luca Forno (Genoa – Italy) for Coeclerici S.p.A./All rights reserved.

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Coal trade provides support

Numerous signs point to rising imports of commodities into many countries over the period ahead. As a result, the solid upwards trend in global seaborne dry bulk trade seems set to remain intact. Movements of raw materials, fuels, other industrial commodities and agricultural products are all contributing.

An improved outlook for economic activity in the 'advanced' group of countries was emphasized by a recent IMF report. GDP growth in this group (mainly USA, Europe, Japan and Korea) could be almost a full percentage point higher in 2014 at 2.2%, compared with last year's 1.3%. Although not spectacular, this acceleration, if achieved, will be the best performance since four years ago. By contrast, China's growth rate is expected to slacken marginally to 7.5%.

Coal

Prospects for increasing coal trade are still focused on Asia, and particularly India and China. Table 1 shows forecasts for steam coal imports by key Asian buyers. In the much smaller coking coal category, additional volumes may be needed by these importers as well.

In the latest quarterly analysis by Australia's Bureau of Resources and Energy Economics, global steam coal trade is predicted to rise by 14mt (million tonnes) or 2% in 2014, to 1,037mt. This quantity includes land movements, but is mainly seaborne. Forecasts by some other analysts are more positive, however, suggesting potential for 4–5% expansion during the current year. But both India and China are especially difficult to forecast accurately.

Iron ore

Parts of the world market for iron ore are likely to become stronger this year. There are doubts about how brisk China's import demand will prove, but further significant growth is envisaged. An accompanying pick up in Europe could be seen also, and possibly additional volumes into Japan.

The World Steel Association's short range outlook for steel demand, published last month, provides some support for cautiously optimistic expectations.

During 2014, compared with last year, China's steel demand could be 3% higher, at 721mt. In the European Union a 3% increase to 143mt is estimated, but in Japan, calculations show a marginal 1% decrease to just below 65mt. WSA economists foresee continued volatility and uncertainty.

Grain

Signs indicating grain trade activity over the remainder of 2014 and into next year will become gradually clearer in the weeks ahead. Summer domestic grain harvests in northern hemisphere importing countries are still highly uncertain. When these can be assessed more accurately, likely import demand also probably will be clarified.

For the current 2013/14 crop year ending June, International Grains Council estimates show wheat and coarse grains trade rising by 25mt or 9%, reaching 291mt, a record high total. A doubling of China's imports, to 19mt, comprises a large part of the overall increment. The remainder is contributed by higher imports into other Asian countries, the Middle East, north and sub-Saharan Africa, and Mexico.

Minor bulks

Agricultural or related products comprise a large part of the minor bulk trades sector. Movements of sugar, oilseeds meal, and rice, as well as fertilizer raw materials and processed fertilizers are transported in sizeable volumes which are estimated to have reached around 340mt last year. Varying intensities of upwards pressure on imports are evident, suggesting that this sub-sector could see continued growth in 2014.

Bulk carrier fleet

Within the world bulk carrier fleet, the Capesize group is the largest category, representing about two-fifths of the total. As shown by table 2, Capesize deadweight capacity growth could slow further to around 4% during 2014. Newbuilding deliveries are likely to be lower than seen last year, but scrapping also could decline. This group expanded very rapidly over the past five years, more than doubling its capacity.

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

	2009	2010	2011	2012	2013	2014*
Japan	96.2	107.9	106.6	113.7	114.5	115.0
South Korea	87.0	95.2	103.2	98.9	100.1	101.0
Taiwan	49.2	53.2	56.0	55.2	57.1	58.0
China	92.1	119.0	138.4	181.5	192.0	205.0
India	58.3	74.5	92.7	123.4	145.0	150.0
Total of above	**382.8**	**449.8**	**496.9**	**572.7**	**608.7**	**629.0**

source: various & BSA estimates **forecast*

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

	2009	2010	2011	2012	2013	2014*
Newbuilding deliveries	21.0	38.6	45.6	41.9	22.1	18.5
Scrapping (sales)	1.4	2.7	10.5	11.9	8.3	7.0
Losses	0.0	0.2	0.0	0.0	0.2	0.0
Plus/minus adjustments	6.8	3.6	4.9	–0.2	0.0	0.0
Fleet at end of year	**170.2**	**209.5**	**249.5**	**279.3**	**292.9**	**304.4**
% change from previous year-end	+18.6	+23.1	+19.1	+12.0	+4.9	+3.9

source: Clarksons (historical data) & BSA 2014 forecasts **forecast*

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South America's soya exports strengthen

Exports of soya and grain from South America in 2014 could be almost as high as last year's record 140mt (million tonnes) total. This volume comprises a large part, around 30%, of annual global trade in these commodities. The shipments have a huge impact on the many ports in Brazil and Argentina which handle cereals and oilseeds, and on demand for bulk carrier shipping capacity.

Wheat, corn and sorghum exports could decrease this year, after reaching 51mt in the previous twelve months. But soyabeans and meal sales are set to grow strongly from last year's 89mt, enabling the 2014 total to remain solid.

Forecasts prepared last month, summarized in the table, provide a guide to changes. However, expectations for harvests now under way in South America may change during the harvesting period. Estimates of global import demand, and expectations for competing suppliers in other countries, are constantly being modified also. Thus figures showing an almost unchanged overall total for South American soya and grain exports are provisional.

Bumper forecast

During 2014 exports of wheat, corn and other coarse grains, plus soyabeans and meal, from Argentina and Brazil, could total 138mt. This quantity is just 2mt or 1% below the impressive 2013 total which, in turn, was 5% above the preceding year's figure.

Several separate US Dept of Agriculture forecasts, published in mid-April, have been combined to produce this overview. Slightly differing marketing year periods are used for oilseeds and cereals exports in the two main South American supplying countries. So the calculation is not as precise as it seems at first sight. Marketing periods differ mainly because of the varying timing of crop harvests.

The calculations provide an indication of what can be expected, based on current evidence. Changes clearly shown are lower wheat and corn exports from both countries (wheat is a minor element), contrasting with much higher soya shipments from both countries.

Prospects for wheat and corn

Wheat harvesting in Argentina starts South America's annual cereals and oilseeds production cycle. The Argentine wheat harvest completed in early 2014 was an estimated 13% above the preceding crop at over 10mt, because of improved crop yields. But exports in the year ending November 2014 are likely to fall by 17%, to only a small 3mt volume.

Corn and sorghum production in Argentina's 2014 crops now approaching completion is estimated to fall by over 4mt (12%) to 28mt, amid lower crop areas. In the marketing year ending February 2015, exports are forecast at 18mt including 16mt corn, a 2mt (12%) reduction.

Brazil's corn sales have become a very prominent part of the regional export picture in the past few years, exceeding those of the traditional exporter, Argentina. Corn output in Brazil, derived from two separate crops, is likely to be sharply (12%) lower in 2014 at 72mt, and USDA is expecting a 20% fall in sales to foreign markets during the year ending March 2015. From the previous year's 25mt, exports could be down to 20mt. Brazil's wheat is a relatively minor element, with output of around 5mt annually and small exports.

Soyabeans and meal outlook

Sales of South America's soyabeans and meal to markets around the world rose strongly last year to 89mt, a 21% increase. This volume is expected to be surpassed in the current year. Combined exports from Argentina and Brazil are set to rise by over 7mt (8%), reaching 96mt. The upwards trend demonstrates strong competitiveness in many markets, including China where import demand is still expanding robustly.

Although some adverse weather has been experienced (excessive rainfall in one area, following earlier extremely hot and dry conditions elsewhere), Brazil's soya production in the current harvest looks set to be about 7% higher at 87mt. Beans and meal exports in the 2014/15 marketing year ending January could be up by 2mt (3%), at 58mt, based on USDA's estimates.

An increase in Argentina's soya harvest seems likely as well, by 10% to 54mt, benefiting from an enlarged crop area and improved growing conditions. During the marketing year ending March 2015, beans and meal exports could be over 5mt (17%) higher, at 38mt.

Brisk import demand

A number of factors affect export forecasts. These are not determined solely by the producing countries' outputs and surpluses. Likely import demand in a wide range of foreign markets over the twelve months ahead is one key aspect. Also, crucially, competition from other suppliers is a prominent element. Brazil and Argentina compete with the USA and many other producers.

Global soyabeans and meal import demand is evolving positively. Signs of expanding purchases are clearly visible, especially in China but also in many other countries. Other Asian importers, the Middle East area and Europe are seen as supporting a robust increase in trade.

Wheat and coarse grains import demand currently is rebounding strongly, after a minor setback. A large jump in China's requirements is being accompanied by increases in many countries around the world. From mid-2014 onwards, progress is more difficult to foresee. Any significant changes in output from summer domestic harvests in northern hemisphere importing countries, which are not yet predictable, will have a large impact on import demand.

Several potential changes among exporters could affect South American sales in the second half of this year. New crop US grain and soyabeans availability, and Black Sea grain supplies will be very influential.

Richard Scott

SOUTH AMERICAN GRAIN AND SOYA EXPORTS (MILLION TONNES)

Argentina and Brazil — wheat, corn, sorghum, soyabeans, soyameal (varying marketing years — see text)

	2009	2010	2011	2012	2013	2014*
Wheat	7.2	6.3	12.0	14.9	5.2	3.2
Corn and sorghum	18.5	29.9	26.4	44.5	45.4	38.0
Soyabeans	31.5	42.9	44.2	38.0	50.7	53.0
Soyameal	33.5	42.5	41.9	35.8	38.4	43.5
Total	**90.7**	**121.6**	**124.5**	**133.2**	**139.7**	**137.7**
% change from previous year	–16.9	+34.0	+2.5	+7.0	+4.7	–1.4

source: US Dept of Agriculture (09 April 2014) & Bulk Shipping Analysis ** USDA forecast for 2014*

Changing the world?

Kunal Bose

Micro irrigation systems set to revolutionize drought-stricken regions

From Lester R. Brown, president of Washington-based Earth Policy Institute, centre and founder of Worldwatch Institute to India's Bhavarlal Jain, whose life is dedicated to changing the way millions of small farmers across the world grow food and non-food crops, their one common message is: as the climate remains in a state of flux, water management — particularly in the farm sector — will require thorough re-engineering. The fallout of global warming is extreme heat and drought, as was experienced by the US and some other food exporting countries in 2012, sending food prices close to record levels. And there are heavy rains and floods in many places, including China, India and Thailand from time to time, upsetting farm production. World food production fell short of consumption in as many as six of the past 12 years as the weather turned increasingly difficult for normal crop growing. Many countries were forced to run down their food inventories to bridge the gap between demand and supply. In the process, as a report says, food reserves are down to just above 70 days of consumption from a comfort-giving level of 107 days a decade ago.

On a number of occasions in the new millennium, high food prices — resulting from crop failures — sparked riots in countries in West Asia, Africa and Latin America. That close to 900 million people out of a world population of around 7 billion go to bed hungry every night is a blot on human civilization. Brown and Jain will no doubt opine had not there been policy deficit on a global scale, damages caused to farming by climate change could have been largely mitigated. The challenge is to provide food for a world population which is forecast to grow to 8.3 billion by 2030 and further to 9.1 billion by 2050. To feed the extra mouths, satisfying minimum calorie requirements, food supply in the first instance will have to be up by 50% and then by 70%. This is a daunting task no doubt, but is not unachievable.

Policymakers in the rich to the least-developed countries should have reasons to be terrified by a 2012 Oxfam report saying key staples prices are likely to double in the next 20 years. If this comes true, many more poor millions who are obliged to spend up to 80% of their income on food will go hungry. In any case, food inflation stares in the face of the world every time crops fail in major growing centres or political unrest like the continuing Ukrainian crisis causes grains export dislocation. Recent rises in world wheat prices are largely on account of supplies drying up from Ukraine and Russia. Expect the trade to rig up food prices in events of crop failures and supply dislocations due to political reasons.

The evangelist Jain believes "the time to act is now. History has examples of food scarcity and hunger undermining civilisations in the past. And history has a tendency to repeat itself." History is replete with instances of food riots, including in modern times. Mass disaffection leading to toppling of governments as was seen in Egypt had got much to do with high food prices. In the ongoing parliamentary election campaign in India, raging food prices inflation over the past three years is hogging the limelight. No wonder in the October 2013 Global Hunger Index, India was ranked among a group of countries with 'alarming' levels of hunger. A distraught prime minister

Dr Manmohan Singh made an admission in 2012 to the "national shame" of leaving half the country's children "malnourished."

In any global campaign against repeated stresses in food supply, India cannot but figure prominently. This is because the country with 1.2 billion people accounting for 17% of world population remains vulnerable to major setbacks in food production whenever the southwest monsoon running between June and September behaves badly. India is keeping its fingers crossed — after a good monsoon year in 2013, yielding bumper crops and thereby swelling food inventories, a possible *EL Niño* is clouding rains prospects this time. A chilling reality for India, as Jain points out, is that while it has only 4% of global water resource "it remains the world's largest user of fresh water. In any holistic water management programme for the country, the principal focus has to be on the farm sector, which alone uses around 85% of the available fresh water." He is concerned that a significant portion of the water used by the Indian farm sector is wasted. The villain is random use of age-old flood irrigation even for crops which will do better by way of productivity in case they are provided with highly water conserving micro irrigation system (MIS). (Drip and sprinkler irrigation constituting MIS has worked wonders for a large variety of crops in Israel, where the system was developed and perfected, the US and several other places.) While this is so, the World Health Organization finds that over 97 million people in India do not have access to safe water "second only to China."

Bhavarlal Jain.

United Nations Secretary General Ban Ki-moon says feeding a growing global population and ensuring food and nutrition security for all in the coming decades call for increasing food production at a rate faster than in the past. "This, in turn, will mean ensuring sustainable use of our most critical finite resource water." That water is the key to food security is a globally shared wisdom. Irrespective of how efficiently crops are grown in a country, agriculture will continue to remain the biggest user of water. Irrigation at this juncture claims close to 70% of all freshwater appropriated for human use. The percentage of groundwater exploitation for farming is distressingly high in India. But in places where farming represents an ideal combination of "technology, irrigating plants at points where these are precisely needed and in exactly required quantities and agriculturists are imbued with a philosophy of frugality in use of resources like water and energy, water conservation is relatively high," says Jain.

A country is considered water stressed if its *per capita* water ownership is less than 1,700m^3. By this globally accepted threshold, India with *per capita* holding of 1,000m^3 or less is much in water deficit. India can continue to indulge in farm sector water profligacy only at its own peril. Farmers in India or for that matter in most places are a conservative lot and their field practices are passed on from one generation to the next. So when in the 1980s Jain undertook the mission to introduce MIS for food and commercial crops in India, he had to contend with two principal challenges.

First, MIS was already working well in Israel and the US but in very large farms. The Indian reality on the other hand is one of highly fragmented land ownership with an average farm size of less than two hectares. "My challenge then was to make micro irrigation work efficiently in farm land parcels as small as one to two acres. Unlike age old flood irrigation, MIS is highly complex requiring the use of any number of components. This, however, was less taxing than the other challenge of engaging with farmers to convince them to invest in MIS and the government to promote the system by liberally subsidizing drip and sprinkler irrigation. Farmers will embrace new practices if only they are shown on ground the benefits accruing from their application. So any number of MIS field trials was done to create enthusiasm among farmers," says Jain. In the beginning, banks needed lots of persuasion to come on board to finance MIS schemes in small farms.

The revolution in irrigation that he wanted to unleash became possible as Jain created a company, eponymously named Jain Irrigation, to make everything from plastic pipes to hundreds of MIS components. Jain was also early to realize, that his work should cover in MIS upstream tissue culture and in the downstream a procurer of farm produce to support Jain Group's fast-growing food processing business. Jain Irrigation's success is also underscored by it closely working with International Rice Research Institute, International Maize and Wheat Improvement Centre and International Crops Research Institute for semi-Arid Tropics.

Of India's net cultivated area of 140m hectares, around 60m hectares are irrigated. Growing crops in the rest of the land is rains-dependent. The share of MIS in the total irrigated area is around 6.50 million hectares. Progress of MIS in India is still modest and the campaign has to date been concentrated in a few states like Rajasthan, Maharashtra, Andhra Pradesh and Karnataka. But now that MIS-covered plots stand as shining examples of farmers achieving high productivity at minimum water use, the progress henceforth will hopefully be rapid. The tipping point has been reached. The government is also finding that money spent on subsidising MIS is more than compensated by savings on account of reduced use of fertilizers and electricity, both highly subsidized, in micro irrigated lands.

Loss of water by way of evaporation, seepage and deep percolation in the case of drip irrigation is minimum and therefore, its water efficiency level is as high as 90% compared with 75% for sprinkler system and 35% to 40% for flood irrigation. Jain claims employment of MIS could lift sugarcane productivity to 142 tonnes an acre from 40 tonnes an acre in the case of flood irrigation. Drip irrigation gives an incremental per acre yield of 500kg for wheat and 1.5 tonnes for winter rice crop. Indian experience in MIS has given Jain Irrigation confidence to spread its wings globally by acquiring irrigation companies in the US, Israel and Turkey. African irrigation scene now is what obtained in India a few decades ago. Much of Africa is semi-arid or arid where crops must be grown with as little water as possible. An ideal centre for Jain then to introduce MIS in a big way. DCi

Global cement trades

Impact of anticipated Holcim–Lafarge merger on Indian cement market

The overriding considerations for a merger of two giant-sized corporate entities are to cut costs, improve operational efficiencies by creating a common pool of best practices drawn from the merging groups and increase the market share of merged body than that of the separate two constituents, *writes Kunal Bose*. When in April's first week Switzerland's Holcim announced an all-share deal to acquire France's Lafarge to create the world's biggest cement group with combined sales of 32bn euros ($44bn), boards of two companies acknowledged that as weak demand persists for all construction materials from cement to steel, cement behemoths under one umbrella would be advantageously placed to fight off market miseries.

The Holcim–Lafarge merger likely to be consummated by the first half of 2015 will have major implications for India, the world's second-largest producer and consumer of the bonding material, where both the groups have major presence. Going beyond, the two stock exchange listed Holcim subsidiaries in India, namely, ACC and Ambuja Cements and the unlisted Lafarge India are making large investments to grow capacity. ACC's capacity is to expand to 35mt (million tonnes) in about a year from 30mt. The close to 25mt-capacity Ambuja Cements is to build 5mt greenfield capacity in Rajasthan. Lafarge India with capacity of 11mt, built largely by way of acquisitions, remains on the prowl to buy more operating units as it stays active in brownfield expansion.

The new group LafargeHolcim emerging from the merger "will offer higher growth and low risk, thus creating more value." The union is to effect annual savings of €1.4bn. The global economic crisis resulting from the ruinous 2007/08 recession meant low demand and prices for the cement industry as it had to contend with high energy bill accounting for at least 25% of total production costs. In this global crisis lay the trigger for the world's two largest cement groups deciding to merge their operations. The deal being of unparalleled scale in the industry, it has major implications for the market covering Europe, the US, Canada, Brazil and wherever else Holcim and Lafarge have significant presence. Incidentally, the two have operations in 90-odd countries. Therefore, the initiative will be subject to scrutiny by competition watchdogs in more than one country. In some places, antitrust laws may be invoked against Holcim and Lafarge joining hands. Anticipating such probes, the merging groups have decided to disengage themselves from some businesses worth 10% to 15% of their combined global earnings before interest, tax, depreciation and amortization (Ebitda), which are €6.5bn.

Nearly a year ahead of the path-breaking global union, Holcim

started taking steps to merge ACC and Ambuja to eliminate overlapping costs in terms of brands, marketing, distribution, people and factory operations. Industry observers are wondering how Competition Commission of India will react if following the global merger of Holcim and Lafarge, their operations here too are combined under one umbrella. The two Holcim subsidiaries as they are and Lafarge India could raise concerns about their assets in India's eastern states but not in western and northern parts of the country. Therefore, to address likely concerns of CCI, some of their eastern Indian assets will be divested. The current and potential sizes of Indian cement market remain a big attraction for major foreign groups to be here. Besides Holcim and Lafarge, Italcementi and Heidelberg Cement are steadily increasing their footprints in India. "Thanks to efforts principally by Aditya Birla Group and Holcim the Indian cement industry saw some major capacity consolidation. This, however, is a continuous process. Last month, Jaiprakash sold its 74% ownership of Bokaro Jaypee Cement (the other 24% belongs to Steel Authority of India Limited) to Dalmia Cement to pare its debts. Its other JV with SAIL Bhilai Jaypee Cement will also be on the block. India Ratings says over-leveraged conglomerates for which cement is not among foremost businesses will be found dropping the portfolio for cash. The churning that the 350mt-capacity industry in India is going through will finally leave a few national players like LafargeHolcim and Ultratech, part of Aditya Birla Group and a number of strong regional groups. At the same time, days of mini cement plants with high production costs and logistics issues are numbered. "Mini plants had their usefulness up to a point of the country's economic development. Their production costs are high and quality not up to the mark. They are found to be polluters. In the market, they are in no position to compete with branded products from large mills. Of the country's total cement capacity, the share of mini plants is only 11.1mt distributed among 365 units. Capacity use in the mini sector is hardly 50% and it continues to fall," says sector expert Arun Verma.

In the past few years, the Indian cement industry grew capacity by around 90mt. But as it would happen, inordinate delays in launch of infrastructure projects in spite of the government making allocation of $1 trillion for infra development during the current plan period (2012–17), slow house starts and marked fall in GDP growth rate saw slow progress in cement use. An Ambuja Cements report says during 2011 to 2013 cement consumption in India grew at an annual average rate of "4% compared to the golden period of 2008–10 when consumption grew at a CAGR of 8%. The multiplier of cement demand growth to GDP growth not only declined below one in 2011/13 but also lost its relevance." Industry officials say the industry's working in coming days will depend on how quickly the new government to be installed in Delhi in mid-May will end the "policy paralysis enveloping infrastructure and construction sectors."

Housing alone accounts for 67% of cement use in India followed by infrastructure (13%), commercial construction (11%) and industrial construction (9%). The country's per capita cement use of 200kg will start rising rapidly once GDP growth rate returns to the earlier impressive level of 8% to 10% from less than 5% in 2013/14. After all, the world *per capita* cement use is 500kg and that in China is over 1,000kg.

Brazil's monopoly commission comes down hard on cement 'cartel'

An investigation by Brazil's monopoly commission, CADE, has found that five cement companies have formed a cartel, *writes Patrick Knight*. CADE wants the companies concerned to dispose of 20mt (million tonnes) of capacity.

Brazil's monopoly commission, the Council for Economic Defence, CADE, has found that five cement companies, between them responsible for more than 80% of the 71.6mt made in Brazil last year, formed a cartel aimed at keeping prices high, allocating market shares to members and discouraging new players from entering the industry.

CADE has said that the five companies, Votorantim, Camargo Correa, Holcim, Itambe and Itabira, which between them own more than 50 of the 124 cement factories dotted about Brazil, will have to dispose of an average 24% of their capacity, and pay an as yet undetermined fine.

The companies intend to appeal against the ruling, which refers to behaviour which CADE says peaked between 2006 and 2007, but which some analysts suggest has been in existence since 1987. The cartel meant that companies belonging to it earned at least $12 billion more than they should have done had there been no agreement and has cost consumers at least $400 millions each year.

Analysts suggest it will be extremely difficult for the companies accused of forming a cartel to dispose of such a large number of assets without greatly prejudicing the industry.

Such a drastic change would result in service and quality deteriorating, as alternative companies able to take control of plants responsible for making about 20mt of cement a year, the total CADE wants to be disposed of, do not exist.

The industry had expected to sell about 3.5–4.0% more cement in Brazil last year than the 68.8mt of 2012. But in the event just 2.4% more was sold last year. The increase was nevertheless greater than Brazil's average growth rate, however, which was about 2%.

About 75% of the cement sold in Brazil in the past few years, has been used by the construction industry, both for building new homes or improving existing ones.

Most of the rest was used at infrastructure works. Last year saw preparations for the World Cup football competition, to be held in Brazil in June and July this year, at full swing. Three brand-new 40,000-capacity stadiums were built from scratch and another nine were upgraded. New runways and parking places for aircraft, as well as terminal buildings have been built or upgraded at most of the 13 airports which will ferry an estimated 1.6 million supporters, 600.000 of them from abroad, to and from the 12 cities where 64 matches will be held during a four-week period. Dozens of new hotels have been built in the host cities.

PRODUCTION BY REGION, '000 TONNES

	2013	2012	2011	2010
North	3.800	3.600	3.582	3.288
North East	14.161	13.600	11.975	1.281
Mid West	8.153	7.800	7.036	6.268
South East	34.353	33.300	31.910	29.567
South	10.300	10.000	9.422	8.787

Source: SNIC

DOMESTIC CONSUMPTION

Year	mt
2013	71.6
2012	68.8
2011	64.1
2010	59.1
2009	51.7
2008	51.9
2007	46.4
2006	41.8
2005	37.7
2004	35.7
2003	34.9

Source: National Union of Cement Industries, SNIC

In the past ten years, priority has been given by Brazil's left-leaning government to measures aimed at rectifying Brazil's badly skewed wealth distribution. Wages and pensions have been raised by more than the rate of inflation, while borrowing has been made easier and a large house building programme for the less well off has been set up.

But this phase has now run its course and the government aims to replace it with a substantial increase in spending on infrastructure. Roads, railways, airports, ports, and waterways are all to be upgraded, with many new ones built. Brazil's infrastructure has lagged far behind the fast increase in output of various commodities, notably grains, led by soya, maize, and sugar cane as well as minerals, handicapping Brazil's competitiveness in export markets.

The second half of last year saw the auction of numerous concessions to build, or duplicate up to 10,000km of highways, as well as for concessions to operate many of the country's leading airports, now struggling to keep pace with the fast growth in passengers.

At least 30 million people have been vertically mobile in the past ten years and many have taken to the air for the first time.

Work will start on building some new roads this year, when demand for cement is expected to increase by about 5%, an extra 3mt or so. But the higher spending on infrastructure will only really get into its stride in 2015, when hundreds of kms of new rail track are to be laid, as well as thousands of kilometres of roads paved or a second carriageway laid.

At the same time, work on building several large new power stations in the north of the country will start. Demand for electricity has outstripped supply in the past couple of years, while unusually hot and dry conditions early this year have made the situation worse.

Water is in short supply as well, and new reservoirs and the pipelines needed to carry the extra water which will be needed to numerous cities, will have to be built, if water rationing, which after the dryest weather for 60 years in the past three months now threatens, is to be avoided.

There are now more than 500 large shopping centres in Brazil, with about 50 new ones completed each year. Until now, two thirds of such centres have been concentrated in the prosperous south east of the country, where 50% of the cement is used.

But numerous labour-intensive industries have moved operations to parts of the country where congestion is lower and the cost of labour less, notably the north east, north and centre west, all of which have been growing faster than the south east in the past few years, so new facilities are being built there.

How much extra cement making capacity will be needed in the next few years, is not clear. The industry now has sufficient capacity to make 85mt a year, 20mt more than existed in 2008 and about 15mt more than was consumed.

But the amount sold has doubled from 35 to more than 70mt in just the past ten years, so the present spare capacity may only be enough to last for a couple of years.

Last year, about 900,000 tonnes of cement was imported, most into the North East region, and about 100.000 tonnes was exported by road or rail to neighbouring Paraguay and Bolivia. DCi

Brazilian sugar

reluctance to invest hampering trade

Patrick Knight

Brazil's sugar and alcohol industry is suffering as a result of low prices, and investments have dried up. But the world cannot survive without more sugar from Brazil, so the situation is expected to improve soon.

With the world sugar price low for the past three years and with alcohol fuel having to compete with subsidized gasoline in Brazil, the country's sugar and alcohol industry is going through a difficult patch.

But with no competing country in a position to take Brazil's place, it is only a matter of time before the industry bounces back.

Brazil's exports of sugar, both raw and refined, increased from less than 7mt (million tonnes) in 1997, to peak at almost 28mt in 2010.

But with many mills now facing financial difficulties and with plantations suffering from adverse weather in the past three years, output has stagnated and growth will not resume for some time.

Half of the 50mt of sugar carried by sea each year, has been Brazilian in the past few years, while a quarter of the total grown worldwide has been produced there as well.

As well as sugar, about half of the cane grown in Brazil, up from about 330mt in 1997, to twice that much in the past few years, is now distilled into alcohol fuel.

Until about 30 years ago, most of the 2mt of sugar exported by Brazil each year, was grown in the north east region and exported from Recife and ports in Alagoas state.

But since then, Sao Paulo has gradually become the leading producing and exporting state.

About 80% of the sugar is now exported from Santos, most of the rest leaves from Paranagua, with about 2mt shipped from ports in the north east.

Worries that not enough oil might be available to meet fast-growing demand for motor fuel, notably in developing countries such as China, as well as concerns about pollution, encouraged a new round of investment in renewable fuels a decade ago.

Convinced that much more renewable fuel, of which alcohol made from sugar cane is the cheapest and easiest to make, would soon be needed, numerous companies set about building up to 100 large new mills, many designed to make only alcohol.

With land in Sao Paulo state now extremely expensive, most of the new mills were built to the west, north and south of Sao Paulo, further from ports and the most populous cities.

Although demand for renewable fuel has grown fairly fast, if erratically, many countries decided that they did not want to become as dependent on imports of these fuels as they were on crude oil. Most decided to use local raw materials instead of buying low-cost alcohol from Brazil.

This presented mills in Brazil with a dilemma, as huge quantities of extra alcohol were being produced, with no obvious destination.

Brazil's motor industry came to the rescue and a new generation of engines able to run on any fuel, ranging from 100% gasoline to 100% alcohol, or any blend of the two, were developed, with 'flex' cars launched in 2003.

But mills were forced to sell the alcohol cheaply to get rid of it. To be competitive, the fuel must cost not more than 70% of the price of gasoline, which has been subsidized in Brazil in the past few years in a fruitless attempt to hold down inflation.

If selling below cost got rid of surplus alcohol, it made the financial situation of companies which had built the new mills with borrowed money, extremely precarious.

The situation was eased temporarily after most of the world's large trading companies which negotiate much of Brazil's sugar decided to buy into the industry. Dreyfus was followed by Bunge, Cargill, ADM and Noble, while several large oil companies, notably Shell and BP, as well as Brazil's Petrobras, followed suit.

Unfortunately for the industry, the Brazilian government, initially a keen supporter of Brazil's ambitions to become the 'Saudi Arabia of ethanol', soon had other priorities.

Raising the living standard of the less-well-off in Brazil, by increasing wages and pensions faster than the economy grew became increasingly important, while the discovery of large

reserves of crude oil encouraged politicians to switch to supporting the oil industry.

The growing financial difficulties of the mills coincided with the sharp fall in the world price of sugar, after a period when high earnings from sugar exports had been the saving of an industry being forced to sell alcohol at a loss.

The net result of low prices of both sugar and alcohol, coupled with a sharp rise in costs, has resulted in the financial situation of all but a few mills deteriorating to the point that the industry's total debts are now larger than its annual income.

In the past five years, about 50 mills have closed down. Many more are virtually insolvent, and are expected to close their doors soon, as there are no buyers at the moment.

To reduce pollution, it was decreed a few years ago that burning ripe cane before manual workers cut it, must be phased out by next year.

The solution has been to switch to harvesting cane by machines, each machine taking the place of 80 manual cutters.

The high cost of these machines, plus that of the special vehicles needed to carry shredded cane to roadways, has cost the industry about US$8 billion in the past few years. This is money the cash strapped industry could ill afford.

EXPORTS OF SUGAR

(million tonnes)

Year	Raw	Refined	Total
2013	22.4	4.8	27.2
2012	19.5	4.9	24.4
2011	20.2	5.2	25.4
2010	20.9	7.0	27.9
2009	17.9	6.4	24.3
2008	13.6	5.8	19.4
2007	12.4	6.9	19.3
2006	12.8	6.1	18.9
2005	11.6	6.6	18.2
2004	9.6	6.2	15.8
2003	8.4	4.6	12.9
2002	7.6	5.7	13.6
2001	7.1	4.1	11.2
2000	4.3	2.2	6.5
1999	7.8	4.3	12.0
1998	4.8	3.6	8.4
1997	3.8	2.5	6.4

Source: Ministry of Trade

EXPORTS TO LEADING COUNTRIES

Country	million tonnes	% of total
China	3.5	15
United Arab Republics	1.6	7
Bangladesh	1.5	6
Algeria	1.4	6
Nigeria	1.2	5
Malaysia	1.2	5
Russia	1.1	5

Source: Ministry of Trade

The measures aimed at distributing income have allowed the living standards of at least 35 million Brazilians to increase dramatically in the past few years, giving a boost to many industries and creating millions of new jobs.

About three million new cars have been sold in each of the past few years, twice the previous number.

One result of this has been that the amount of motor fuel needed has increased by about 8% each year. Brazil used to export surplus gasoline, but billions of dollars now have to be spent on importing more of the fuel each year.

Under pressure from rising inflation, the government has refused to raise the price of gasoline to keep pace with the increase in the price of crude oil. A 16% subsidy for gasoline has placed a ceiling on the price at which alcohol can be sold, at the same time as revenues from sugar exports have stagnated.

The enthusiasm of trading companies for the sugar industry has fallen fast in the fast couple of years. Bunge is considering selling all its eight mills, while Dreyfus made an operating loss last year and is to shut at least one mill. Others may follow suit.

One of Brazil's largest companies, Odebrecht, which builds roads and power stations, and which decided to join the industry a few years ago, has accumulated debts of about US$5 billion dollars. The hard-headed bosses of this company have threatened to sell these assets if things do not improve and switch to building new roads instead.

To keep pace with anticipated growth in world demand for sugar, now increasing by about 2% a year, as well as to make sufficient alcohol to fuel half Brazil's car fleet, at least 100 large new mills need to be built and 600,000 hectares of extra cane planted each year.

But in the present difficult situation, nobody is planning to do either. Rather than 20% of existing cane being grubbed up and re-planted each year, essential if yields are to remain high, cash-strapped farmers are renewing as little cane as they can get away with, which will compromise future production.

Analysts suggest that there will be a shortfall of up to 40mt of cane just this year. This will mean that Brazil's share of what is traded, which has already slipped from more than 50%, to about 47%, will fall further from now on.

What happens next is anybody's guess. For the time being, none of the world's other players in the sugar industry, such as India, Australia or Thailand, has sufficient spare land to take Brazil's place.

EXPORTS BY REGION 2013

Asia	14.6
Africa	7.7
Americas	2.0
Europe	1.1
Others	0.1

Source: Ministry of Trade

It will be a very long time before countries in Africa are able to take up the slack, so sugar prices are expected to start rising soon, as demand exceeds supply.

In the past few years, Brazil's exports of refined sugar have stagnated, while those of raw sugar have grown fast. With abundant supplies of low cost oil or gas, numerous countries in the Middle East and North Africa can refine the product much more cheaply than Brazil can now do. Countries such as Saudi Arabia and the UAR buy the majority of the high quality raw sugar which is Brazil's speciality. It is shipped through large new terminals equipped with the latest shiploaders and carried in far larger vessels than in the past, loaded in a fraction of the time it used to take.

Although the industry is going through a difficult patch, this is not the first time this has happened, and executives point out that the industry is cyclical. They expect the world sugar price to rise again soon, while alcohol fuel may well make a come back sooner rather than later.

North P&I 'A' rating and stable outlook confirmed by S&P

Leading ratings agency Standard and Poor's (S&P) has reaffirmed North P&I club's 'A' credit rating and stable outlook for a tenth consecutive year following its recent merger with Sunderland Marine. The agency says its rating reflects the newly merged club's continuing strong business risk profile and strong financial risk profile, built on a strong competitive position and strong capital and earnings.

According to S&P analysts Tufan Basarir and Peter McClean, "We anticipate that the merger will be neutral to North's financial risk profile and provide some business diversification owing to the addition of Sunderland Marine's international hull and aquaculture business. We are therefore affirming the ratings on North as 'A'." They added that the stable outlook reflected their expectation that the club's capital adequacy will remain in the very strong 'AA' range after the merger.

Basarir and McClean also said the combined business, now known as North Group, will have a strong competitive position stemming from North's status as the second-largest club in the International Group of P&I Clubs, with 131 million GT of owned tonnage. "We believe this would be supported by Sunderland Marine's niche business and geographical diversification. North and Sunderland Marine have no competing areas of business lines and their branch office locations are complementary."

S&P said North Group's premium income was likely to be around US$500–525 million in 2014/15 after which annual growth was expected to level off at around 3–5%. "In our opinion, the combined group will have strong capital and earnings, supported by very strong capital adequacy which we anticipate will be sufficient to support its organic growth over the next three years," said the analysts.

Responding to S&P's comments, North's chairman Pratap Shirke said, "I am delighted we have retained our 'A' credit rating and stable outlook for a tenth consecutive year. It is also a testament to the sound financial logic of our merger, which has provided enhanced financial stability for members, a greater diversity of product lines, continued service excellence and a stronger competitive position. The new North Group has the ability to service the needs of the entire marine spectrum, from small fishing vessels to the largest ships."

WSS strengthens Singapore management team to manage growing AsiaPac business

Wilhelmsen Ships Service (WSS) has strengthened its Singapore-based management team to reflect increased levels of business and a focus on expanding service provision across the Asia-Pacific region.

Hege Solstad will draw on 25 years' experience in shipping and logistics as Regional Director, WSS Asia Pacific, while 14-year Wilhelmsen Group veteran Harald Lundestad has been appointed General Manager for WSS Singapore.

Both individuals bring key skillsets to the WSS Asia operations, having worked across global markets and will focus on maintaining close customer links in support of the WSS offer to owners and operators in the shipping and offshore markets.

Solstad joined Wilhelmsen in 2005, as Business Director Maritime Logistics, where her main focus was the development of new products and service offers and subsequently as Area Director Black Sea with a focus on emerging markets.

Solstad brings solid experience in both commercial and operational aspects of liner shipping and logistics, gained during roles at Atlantic Container Line, Ivarans Rederi and Seaway Shipping. Solstad has a Bachelor in Supply Chain Management and a Bachelor in Business Administration from the Norwegian School of Management, BI Oslo.

Hege Solstad said: "I'm looking forward to working in the Asia Pacific region where my focus will be on continued profitable growth and doing business the right way. The opportunities in this region include many countries which are still developing into more mature economies and WSS will continue to develop its portfolio and geographical reach to meet and exceed our customers' expectations."

Hege Solstad.

Harald Lundestad.

As General Manager, Singapore, Harald Lundestad will be responsible for operations that each year include 8,000 ships agency port calls, the delivery of 31,000 product orders and 3,000 safety service jobs.

Lundestad has held various positions during 14 years with the Wilh. Wilhelmsen group, commencing his career as an analyst in Oslo, before transferring first to Shanghai and then Taiwan.

Harald Lundestad said: "Singapore is a key location for our customers and one where we need to ensure we deliver a high quality of service that is cost competitive. In the last year we have been able to grow our market share significantly, especially for our range of marine chemicals. Our customer base in Singapore continues to grow as more shipowners move their operations here, demand which our strong sales and customer service team is well-placed to satisfy."

Lundestad has a Master of Science degree in Industrial Engineering and Technology Management from the Norwegian University of Science and Technology in Trondheim, Norway.

Port of Sept-Îles acquires the 'Hermel'

Carol Soucy, chair of the Sept-Îles Port Authority board of directors, was excited and proud to announce that the Port of Sept-Îles' offer to buy the *Hermel* has been accepted. Mylène Paquette used this oceangoing rowboat on her 129-day trip across the Atlantic in 2013, an unprecedented exploit covered by the international media.

"This achievement, which took courage, tenacity, determination, and skill, ties in perfectly with the values of the Port of Sept-Îles," said Soucy. The rowboat will be showcased at the Port of Sept-Îles' new administrative building, scheduled to be built in 2015, and will be a key attraction for residents, schools, visitors, tourists, and cruise ship passengers.

"I would like to congratulate the Port of Sept-Îles on its bold move to acquire the *Hermel*. Like its captain, the *Hermel* is already well known. It will be an invaluable point of interest for Sept-Îles and will add another quality tourist attraction to the town. I'm confident that residents will enthusiastically adopt this symbol of success and perseverance," added Sept-Îles mayor Réjean Porlier.

About the Port of Sept-Îles

Boasting a variety of state-of-the-art facilities, the Port of Sept-Îles is the leading iron ore port in North America, with an annual volume of over 30 million tonnes. Sept-Îles' port facilities play a vital and strategic role in the economy of Eastern Canada. The port's annual economic impact is estimated at nearly $1 billion, with nearly 4,000 direct and indirect jobs.

Ballast Water Management convention: implementation problems remain

The global shipping industry – represented by the International Chamber of Shipping (ICS), BIMCO, Intercargo, Intertanko, World Shipping Council (WSC), CLIA and IPTA – has voiced continuing concern about serious implementation problems associated with the IMO Ballast Water Management (BWM) Convention.

At the IMO Marine Environment Protection Committee (MEPC), held late March/early April, governments decided neither to discuss in full nor to resolve these pivotal issues on which industry had made a detailed written submission.

The industry submission addressed concerns about the lack of robustness of the current IMO type-approval process for the expensive new treatment equipment, the criteria to be used for sampling ballast water during Port State Control inspections and the need for 'grandfathering' of existing type-approved equipment that has already been fitted. However, governments decided not to address these proposals until after the Convention has entered into force (which has not yet occurred due to a lack of member State ratifications).

The industry concerns were shared by a number of flag States (including some that ratified the Convention in the early years after its adoption) but rather than agreeing to a 'road map' that would have demonstrated IMO's commitment to addressing the concerns, the MEPC instead decided to look into conducting a study of the problems raised by the industry. This proposed study will probably take at least three years to complete and the decision implies no guarantee as to what actions might finally emerge.

The industry organizations note that once the Convention enters into force, shipowners will collectively be required to invest billions of dollars in ballast water treatment equipment. The consequence of the recent decision by the MEPC is that shipowners, and society at large, will continue to lack confidence that the new treatment equipment will actually work, or that it will be found to comply with the standards that governments have set for killing unwanted marine micro-organisms.

The shipping industry maintains that the legal changes needed to make the ballast regime truly global and fit for purpose — such as making IMO Guidelines on type-approval mandatory — are relatively straightforward and could still be agreed in principle by governments quickly. In a constructive response to the IMO's decision, the industry therefore intends to make another full submission outlining concerns and proposing a possible way forward to the next IMO MEPC meeting (October 2014).

In the meantime, the shipping industry cannot recommend that further member states ratify the BWM Convention until confidence building measures on resolving implementation concerns have been set in place.

Market recovery continues across Japan for WSS

Speaking ahead of Sea Japan in early April, WSS general manager for Japan Yoshihiro Iizuka says that although the Japanese market is moving towards growth for 2014, the recovery will be stronger in the second half, with an increase in newbuilds expected towards the end of the year. Iizuka says: "Overall, the Japanese market is in recovery, with annual pay raises by the major corporates estimated at around 2–3% for 2014. However, the weakened Japanese Yen relative to the past couple of years has contributed to the widening of the trade deficit with particular reductions in export value. Added to this, consumption tax is set to rise from 5 to 8%, leaving some concerns over the potential for market growth."

Despite the challenges of a slow recovery, Iizuka states that there has been a steady increase in the number of vessels calling at Japanese ports due to a rise in import demand. He says: "The over-capacity situation of the last few years is gradually declining and we are seeing steadily increasing cargo demand. New ship orders are set to pick up as demand for energy efficient tonnage, compliant with the latest environmental regulations increases, with a short-term peak in construction levels expected in 2016."

In terms of WSS Japan activity for the coming year, Iizuka is aware of the need for customers to further reduce costs and increase efficiency across their overall operations:

"We understand the challenges that our customers are facing and we want to take ownership of some of those challenges. We recognize that safety is one of the biggest concerns for our customers and our core focus this year will be on safety services".

"WSS Japan, in collaboration with our global network, is focussing on ensuring that customers have access to our full range of safety solutions to ensure regulatory compliance. By working closely together with clients, we believe that we can help to reduce complexity and the risks involved with port to port operations in the most cost efficient and effective manner."

WSS is continuing to invest heavily on resource and expertise in Japan and across North Asia to meet the increasing demands of this growing maritime hub. Currently, it covers 180 ports in Japan with three main service centres located in Yokohama, Kobe and Moji in addition to the office in Tokyo focusing on ships' agency business.

Seagull brings competence management system to the bulker industry

Seagull has released the Bulker Industry Training Standard (BITS), a predefined competence management system for the dry bulk industry.

BITS is a computer-based evaluation tool to enhance the competency of officers onboard a ship type whose maintenance, operating and cargo handling practices can be unique. As well as providing a benchmark for industry competence, BITS can be adapted to reflect advanced training standards developed by individual operators.

Seagull has worked with leading shipping organizations on harmonized competence standards, developing electronic versions of the Intertanko TOTS (Tanker Officer Training Standards) scheme and SIGTTO (Society of International Gas Tanker and Terminal Operators) competence guidelines. It has also devised electronic versions of the cadets/ratings Training Record Books published by the International Shipping Federation.

BITS is Seagull's first competence management system tool for a non-tanker application. It includes coverage of cargo specific competencies for coal, grain and iron ore, with additional cargo types to be incorporated in the next version.

"We believe building a competent crew through continuous training, gap identification and assessment is the key to improving ship performance," says Roger Ringstad, managing director of Seagull AS. "While there are plenty of high quality operators in the bulk industry, there is no universal standard for competence."

Roger Ringstad, managing director of Seagull AS.

In line with STCW, BITS covers competence in: Navigation; Cargo Handling; Controlling Operation; Marine engineering; Electrical; Maintenance & Repair; and Radio Communications. It links into Seagull's training modules and Competence Evaluation Standard (CES) via the Seagull Training Administrator to offer a complete training and assessment solution for officers.

"Carrying bulk cargoes requires specific attention to particular risks related to ship stability, cargo hazards and damage to the ship structure," says Ringstad. "While these topics are addressed by STCW, BITS brings more rigor and precision to expectations for competence.

"BITS will help operators ensure that their dry bulk vessels comply with mandatory requirements by taking a ship-specific approach to improving the officer's overall knowledge and competence."

BITS specifies competency profiles for junior and senior positions onboard ship, providing individual officers with a simple and effective competency development and career planning tool to identify promotional requirements and motivate progression. Managers ashore gain a full overview of the seafarer's development and competence. The Competence Manager section can be edited to reflect company-specific competence requirements. To support the new Bulker Industry Training Standard, Seagull will release six new training modules on bulk-specific topics before the end of 2014.

About Seagull

Seagull AS is a major provider of e-learning for the marine industry offering a comprehensive library of more than 200 titles for regulatory compliance and improved seafarer knowledge. Its STCW and ISM code compliant training is used by more than 350,000 seafarers every year onboard more than 8,500 ships worldwide and it has issued over 50,000 approved onboard course certificates, making it the world's largest educational institution in the maritime industry. Founded in 1996 by experienced mariners, Seagull has grown into a financially solid and dynamic company in partnership with leading shipping companies and ship managers to deliver a full range of assessment and management tools that ensure meeting and exceeding statutory requirements from IMO and other industry bodies.

First 'saltie' of 2014 expected at Duluth–Superior

On 7 May this year, after hitting milestones for the longest stretch of freezing temps, fastest/thickest ice cover, and third snowiest winter (so far), the Port of Duluth-Superior was preparing to *finally* welcome its very first oceangoing ship of the 2014 commercial shipping season that night — the first saltie to have made a full transit of the 2,342-mile Great Lakes–St. Lawrence Seaway.

The *Diana*, which flies the flag of Antigua and Barbuda, was expected to arrive at about 8pm on 7 May, having been delayed by ice transiting Lake Superior. The ship was expected to sail in beneath Duluth's Aerial Bridge then proceed directly to the CHS grain elevator in Superior.

"We witnessed the earliest arrival on record for a first saltie of the season last year: 30 March 2013. This year, we're a week into May and just hitting that milestone," said Adele Yorde, PR Manager for the Duluth Seaway Port Authority. "While this will go down as the latest on record, the ice-encrusted start to the season can't dampen enthusiasm here in the Twin Ports." Boat watchers were expected to head to the Duluth ship canal to wave and take photos as the first saltie sails in. And the maritime community was set to gather for an official, invitation-only First Ship Ceremony aboard the ship at CHS.

The *Diana* began her voyage by discharging cargo in Santos, Brazil, before proceeding to the Twin Ports. The 138m ship will load approximately 11,550 metric tonnes of wheat at the CHS elevator before departing for Algeria.

Built in 2007, this will be the ship's first visit to the Twin Ports. The *Diana* is under the command of Captain G. Panait. Local vessel agent is Daniel's Shipping Services; stevedoring is being handled by Ceres Terminals; tug assistance is being provided by Heritage Marine.

Now that commercial navigation is almost back to normal on the Great Lakes, there are another half-dozen salties queued up and headed to Duluth–Superior to load wheat and beet pulp pellets during the following week.

Historical Note: Until this week, the latest arrival of this port's first saltie had been 3 May, which happened in 1959 when the *Ramon de Larrinaga* arrived in Duluth — the very first saltie to have transited the St. Lawrence Seaway after it opened that year.

The Port of Duluth-Superior provides a valuable trade corridor, directly linking the heartland of North America to markets in Europe, the Mediterranean and North Africa. "This binational waterway enables farmers from the Upper Midwest — as well as shippers of coal, iron ore and project cargo – to compete globally," said Vanta Coda, Port Authority executive director. "Yet it is the grain trade that has historically made this an international seaport."

"It was a tough winter all around on the Lakes…and on the Upper Mississippi River. While the grain season is off to a late start, the international grain markets are quite dynamic and we should have a good export season," added Ron Johnson, Port Authority Trade Development Director. "We'd anticipate shipments to top last year's 1.3mt [million tonne] total."

Close to 1,000 ships visit the Port of Duluth-Superior each year, moving roughly 40mt of cargo — iron ore, coal, grain, limestone, cement, salt, plus project cargo and more. As the largest tonnage port on the Great Lakes-Seaway, cargo movements through the Port of Duluth-Superior support 11,500 jobs and contribute over $1.5 billion in business revenues to the local/regional economy.

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Adani group bids for Cochin coal terminal

India's Ministry of Shipping has approved a tender submitted by the Adani Group to establish both an eco-friendly and fully automated coal terminal at the port of Cochin. The facility, which will bring together the existing north and south coal berths at Mattancherry Wharf, will be able to handle 4.23 million tonnes annually. Its construction will cost around $32 million.

On offer is a concession to run the facility for 30 years, for which Adani was the only bidder, despite the tender bidding deadline being extended twice.

The Port Trust is to make available 14 acres of land for the project, which will be served by a single 300-metre berth. It is believed traffic will be generated by local steel and cement industries and also by those in neighbouring states, such as Tamil Nadu.

Barry Cross

Marseilles Fos Q1 bulk, box, and cruise growth eases oil trend

Traffic to the end of March at major French port Marseilles Fos saw major rises in dry bulk, container and cruise passenger volumes, but total cargo throughput fell 6% to 18.8mt (million tonnes) — down by 1.2mt on the first quarter last year — due to declining oil trades in a changing market.

General cargo improved 1% to 4.3mt, led by 2.8mt in container tonnage. In unit terms, box traffic rose 9% to 287,929 TEU, with monthly throughput hitting a landmark 100,000 TEU in both February and March. The performance was boosted by two new services, a Fos-Spain/Italy feeder and a direct line between Marseilles and Libya. These helped to stabilize container volumes at Marseilles and drive an 11% increase at the Fos terminals. Elsewhere in the general cargo sector, conventional trades dipped 1% to 0.7mt and ro-ro fell 10% to 0.8mt after industrial disputes at two operators in January.

Dry bulk traffic climbed 19% to 3.6mt, restoring pre-economic crisis levels. Backed by rising coal imports, the main increase stemmed from steel industry demand for ore imports, which grew 23% to some 2.5mt. However, agro-bulks were down 8% on 0.26mt after falling grain prices weakened barley and corn exports.

Meanwhile the oil-led liquid bulks sector slumped 14% to 10.9mt. Crude oil and petroleum products totalled 10.1mt, down by 1.8mt and 16% on the first three months last year. With refining margins collapsing at three local plants, crude imports for national refineries were 21% worse on 5.1mt, while crude volumes for South European Pipeline delivery fell 19% to 0.54mt. Refined products dropped 2% to some 2.9mt, while LNG finished 27% worse on 0.97mt and LPG was 9% down at 0.6mt. In contrast, liquid chemicals and agro-products improved 17% to 0.9mt thanks to biofuel exports and a 70% increase in caustic soda exports from the Kem One plant in Lavera, which was saved from closure last December and is now about to be modernized.

Passenger throughput rose 18% to 315,000 on the back of soaring cruise numbers. While ferry carryings fell 25% to 117,000, cruise passengers were up 79% to 198,000 – an increase of 87,000 on Q1 last year that confirms the cruise sector now commands a year-round season.

Norwegian business in the Port of Gdansk

The Port of Gdansk's growth rate and sales have piqued the interest of Norwegian businesspeople. On 4 April 2014, a large delegation from Rogaland Logistics Association, an association of representatives and customers of the North Sea Port of Risavika, arrived in Gdansk. With its strategic location, namely close proximity to the Old Continent and a sea route to the Baltic Sea, the port has become an intermodal hub for Norway. The visitors to Gdansk sought opportunities for the ports to co-operate. They were interested in, e.g. the increase in port handling operations, organization of land and sea transport in Poland, directions for the development of port services, investment prospects and co-operation between the Port and the City of Gdansk.

TMGA to move into Coruña's outer harbour

Terminales Maritimos de Galicia (TMGA) has filed a request to build a new dry bulk warehouse at Punta Langosteira, in the outer harbour of the Port of La Coruña in Spain. This facility, which could eventually reach 20,000m², is the fourth such request made by companies wishing to make use of this new part of the port. The other three companies wishing to relocate to the outer harbour are Hormigones Carral, Galigrain and Pemex.

TMGA is the largest stevedoring company in the port, handling more than 3,000,000 tonnes annually. Its initial plans envisage construction of a 5,200m² warehouse, which will be used to store various commodities. The company wants to build the warehouse as quickly as possible begin operating there by the end of this year. Investment required will be in the region of €5.5 million and a concession being sought will be for 35 years. *BC*

Who will provide capacity at Richards Bay?

Both Richards Bay Coal Terminal (RBCT) and newcomer RBT Grindrod wish to install additional coal export capacity at the port of Richards Bay. Both also seek to work with Transnet as main partner. However, Transnet is also exploring the possibility of building its own terminal in the port.

Not all planned projects could be implemented, since this would result in overcapacity.

It is believed that RBCT has certain cost advantages over rivals, since it already has berths and rail access in place, thereby ensuring that the capital cost will not be so high. Nevertheless, this will not necessarily mean that RBCT will win out, since Transnet is under pressure to provide access to the export market for emerging black mining companies, which is why RBTGrindrod believes it is well placed, too. Its senior executives argue that the proposed 19-million tonne expansion under Phrase 6 expansion of the terminal should include new entrants and, if Transnet agrees to partner it, this would become a reality.

Questions are being asked regarding Transnet's ability to transport sufficient quantities of coal to the port, given that Transnet's own plans only envisage increasing the flow of coal by rail to 81mt (million tonnes) a year by 2018 and it is not clear when this will be raised to 91mt a year, or, indeed, to 110mt a year.

Existing RBCT shareholders are said not to want to surrender any capacity at the port to smaller rivals until Transnet is able to guarantee it can move 91mt annually to the port. *BC*

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EMO is able to accommodate the world's largest dry bulk vessels, and yet we never cease to look to the future and plan ahead – now more than ever! In 2012, we have strongly increased our storage and transhipment capacity and efficiency by commissioning five new, state-of-the-art projects: the seventh stacker reclaimer, the fifth unloader, the second fully automated coal wagon loader, a brand-new sea-going vessel loader along an innovative, new quay, and a high-tech operations centre. These projects ensure that we are fully equipped to enhance our safety, efficiency and sustainability performance, and to continue to serve you as a reliable partner in dry bulk transhipment in the coming decades.

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Scandinavia

upward trend visible in Danish and Norwegian ports

Bulk terminal at the Danish Port of Grenaa.

Barry Cross

Ports and terminals in both Denmark and Norway mostly had a good 2013, while many are expanding in anticipation of further growth.

The centrally located Danish Port of Grenaa, for example, has published an ambitious expansion plan, which will be implemented in full by 2030. The need to add to existing facilities has been driven by substantial growth in traffic over the past ten years.

The plan takes advantage of the introduction of a new bypass that will take heavy traffic away from the city centre and allow the growth of an established industrial area through the addition of a further 150ha. Industries that locate here will clearly be attracted by the close proximity of the port.

Harbour infrastructure is to be expanded by 660,000m^2 thanks to the introduction of a four-stage plan. Stage I will make use of opportunities afforded by the existing breakwater to add 165,000m^2 of new quay. However, the real leap forward comes from Stage II, where infill of the sea will create 230,000m^2 of operating area, a new swing basin with a 470m-diameter and draught of 15 metres, which will allow the port to handle Panamax vessels.

Stage III aims to further extend the south harbour, adding 164,000m^2 of quay, while the ambitious Stage IV will create a further 105,000m^2 of infilled operating area.

In 2013, Grenaa handled around 705,000 tonnes of dry bulk, which represented an increase of 8% compared with 2012. This came from both from organic growth from existing customers and also be attracting new business, says key accounts manager Kresten Peder Mehlsen.

"For 2014, we expect to increase our dry bulk business even further due to the fact that we have invested in a new bulk-handling mobile harbour crane, which has a higher capacity," he says.

Grenaa mostly handles imported dry bulk, he adds, pointing out that main commodities are bio-fuels, metal for recycling and agribulk.

The largest vessels using the port tend to be in the region of 30,000dwt, although will increase substantially once the new development plan is implemented. Although Grenaa does have a rail link, currently road handles dry bulk consignments.

"Only a very small amount of our existing dry bulk could be said to be 'captive' to the port, although we are always on the look out for new commodities, which we hope will be attracted here once we begin to implement our new development plan," he says.

Grenaa Bulk Terminal (GBT) was acquired by Fredericia Shipping and Copenhagen Merchants in 2010, having been originally built to store and bag wood pellets.

The facility has a 1,000 bags per hour capacity, with an integrated bagging line being fully automated. Other bulk goods

such as fertilizer and salt can be bagged as well, in sizes from 5kg to 40kg.

"Although it is our firm intention to continue handling wood pallets in Grenaa, we have also invested in other equipment to also allow the terminal to handle other bulk commodities such as grain," says director Johnny Nielsen.

GBT has approximately 10,000m^2 of warehouses, in addition to a licensed weighbridge. The warehouses can hold approximately 35,000 tonnes of bulk and 5,000 tonnes of palletized goods.

As for the port, it can load and/or unload up to 500 tonnes per hour.

In 2013, the terminal reported traffic amounting to 140,000 tonnes, roughly a 20% increase compared to 2012, which Nielsen attributes to an increase in biomass business. For 2014, he predicts a further increase of 10–15%, although warns that this depends on the state of the market.

"There is enough capacity in place to handle future growth, since we have all necessary facilities in place — including conveyor belts and quay cranes — to accommodate more dry bulk tonnage," says Nielsen. "In total, our terminal has the capacity to store approximately 35,000 tonnes of bulk cargo directly at the port and an additional 30,000 tonnes just outside the port area."

GBT, he adds, mostly handles imported biomass products, but does also have some grain export traffic.

Vessels conveying biomass tend to be quite modest in size, being in the 4,000–8,000dwt range, although the largest visitor to the terminal last year came in at 35,000dwt, with the state of the market at any given time dictating consignment size and hence that of the vessel needed.

As for landside movements, most cargo for inland use leaves the terminal by truck, while other consignments make use of short sea vessels, Grenaa acting as a transshipment hub.

Nielsen calculates that around 90% of existing cargo flows would naturally gravitate to the terminal, but says he is open to handling any new commodities if the market need is there.

Fredericia Bulk Terminal (FBT) is one of Denmark's largest and most automated dry bulk terminals. It consists of 12 individual storage compartments with a total storage area of 14,000m^2 able to warehouse around 70,000 tonnes of grain, feedstuffs, wood pellets, fertilizer and so on.

All compartments have 6m-high pressure proof walls, while the majority also have automatic top filling and semi-automatic emptying via underground conveyors. Filling and emptying capacity is typically 300tph (tonnes per hour).

Automatic temperature control manages the airing of the products in the compartments so that the quality of the product is preserved under the best possible storage conditions.

A weigh bridge is also able to ensure optimum documentation and control takes place as consignments move in and out of the terminal.

At both Fredericia and Grenaa, which parent company Fredericia Shipping also operates, bagging lines are also in place for use with grain, fertilizer, wood pellets, salt and so forth in 5–50kg plastic bags. Capacity is in the order of 1,200 bags per hour. Additionally, the screening of wood pellets can also take place prior to delivery or before bagging via the terminal's own silo batteries.

Interestingly, Fredericia Bulk Terminal will also load 20ft oceangoing containers with grain, for which it has a capacity of about 1,000 tonnes per day. Additionally, the screening of wood

Loading operations at the Port of Fredericia.

pellets can also take place prior to delivery or before bagging via the terminal's own silo batteries.

Vessel loading and discharging is performed using the company's ship loader or by crane grab with a capacity up to 600tph directly to and from the storage compartments.

In 2013, FBT handled about 650,000 tonnes of dry bulk cargo, compared to 800,000 tonnes in 2012. According to terminal director Johnny Nielsen, the decline was primarily due to a downturn in the export of grain caused by a combination of factors: a poorer than expected harvest and the world market price for grain.

"For the current year, we expect to see little change in the tonnage handled, although this, once again, depends on the world price for grain products," he says.

In addition, winter temperatures also have an influence on the turnover of dry bulks such as biomass, which is one of FBT's major commodities. In general, the colder the winter, the higher the demand.

As for capacity, the investment made in automation and the concomitant increase in capacity, means that FBT is fully ready to handle any future growth, says Nielsen.

Kalundborg bulk terminal.

"We are both an import and export terminal. We import mostly soya and export grain, using up to Panamax-size vessels."

In general, the largest vessels calling at FBT are around 90,000dwt, although the normal range can be anything between 3,000dwt and 65,000dwt, the size of the vessel deployed being dictated by the market.

Because of infrastructure limitations, the vast majority arriving or leaving the port does so by road.

"About 90% of the dry bulk that we currently handle could be said to be 'captive' to the terminal," says Nielsen. "We always try to follow the situation of the market and look for new commodities to accommodate the needs of our customers."

Kalundborg is one of the major grain exporting ports in Denmark. Kalundborg Bulk Terminal (KBT) handles about 500,000 tonnes a year of mainly export wheat and barley, although other bulk products passing through the terminal also include imported biomass for fuel, gypsum and fertilizer, while furnace ash is also exported.

The main focus of the port's traffic is the island of Sjaelland, from where consignments are moved exclusively by the road haulage industry.

According to KBT spokesperson, Gustav Jakobsen, the terminal is also seeing an increasing number of bulk containers, which are being used to transport export grains. He believes this extended uses of boxes may come from a desire to undertake door-to-door deliveries of either small quantities or special consignments of high quality products.

For export, bulk grain is loaded into containers at KBT then trucked using a tugmaster to Kalundborg Container Terminal for onward shipment, which is in the form of a weekly feeder vessel to the continent (usually Hamburg or Bremerhaven). Imported biomass is handled in the same way, although emptied at KBT into bulk storage or sent to the bagging plant.

KBT is part of Schultz Shipping, which also operates Kalundborg Container Terminal (KCT), hence the company has the necessary know how to accommodate more containerized bulks in the future.

"In terms of how much tonnage we ship, the quantity that we handle is determined by the annual harvest, which can vary from one year to the next in terms of quality, quantity and associated trade patterns," says Jakobsen.

KBT is also able to add value to the basic commodities handled, he stresses, pointing out that the terminal also operates a fully automatic bagging plant capable of placing grain, salt and fertilizer into big bags, small bags and sales packaging.

In addition, there are also several dryer systems in operation, which can process above 100 tonnes of product per hour.

Associated Danish Ports (ADP), which has operations in the ports in Fredericia, Nyborg and Middelfart, handled 1.3mt (million tonnes) of dry bulk in 2013, which is identical to the volume reported for 2012. Indeed, for 2014, sales and marketing manager Ole Haugsted Jørgensen predicts similar throughput to last year.

The Orient Tiger carried 30,800 tonnes of wood pellets from the USA to be handled at the Port of Fredericia. (photo: ADP)

"At the moment, we have sufficient capacity to handle any further growth in dry bulk. In the meanwhile, to cater for longer-term growth, we are working on a strategy, which includes an overall masterplan for all our ports," says Jørgensen.

ADP mostly handles imported dry bulk, these being agribulk (feedstock/grain), biofuel (wood pellets and chips), aggregates and salt. Grain is the company's largest export commodity.

In terms of vessel size, those conveying salt inbound from Australia tend to load consignments of up to 72,000 tonnes and having a DWT of 78,000 tonnes.

"The different commodities make use of a range of vessel sizes. We used to receive wood pellets from the Baltic and Scandinavia in smaller vessels, but due to growing demand, we are now sourcing these from the US, thereby using larger vessels. For example, we recently discharged two vessels each carrying consignments of approximately 30,000 tonnes of wood pellets," says Jørgensen.

ADP offers a water depth of 15 metres, allowing most vessels deployed in its region to call there. Quayside lift consists of six portal cranes and six mobile harbour cranes, so several cranes can be deployed on individual vessels.

Most dry bulk cargo leaves by truck, but some transshipment of cargo to smaller vessels is undertaken, too, especially involving wood pellets.

Quizzed as to how much of its existing traffic is effectively 'captive' to the port, Jørgensen points out that Fredericia is a regional port with a large hinterland, being the only facility to serve this area offering draught of up to 15 metres. This means that most overseas cargo to/from this part of Denmark is naturally handled via Fredericia.

The Danish port of Aabenraa handled 1.2mt of dry bulk in 2013, compared to just 877,000 tonnes in 2012. Port director, Henrik Thykjær, predicts that for 2014 this figure will increase to 1.3–1.4mt, based on an increase in construction materials.

"We are operating at the limit of our capacity, which is why we are planning to expand the port by about 40,000m^2," he says.

Ninety percent of the dry bulk handled at Aabenraa is imported, with the average size of vessel being a modest 12,000dwt, although the largest can be anything up to 34,000dwt.

"The size of vessel deployed depends both on draught and market demand. We have up to 11 metres of draught available, which suggests that the use of some vessels is market-driven."

Dry bulk consignments exit the port by road.

In 2013, the Norwegian Port of Oslo reported dry bulk traffic amounting to 1.455mt, compared with the 1.312mt it handled the previous year

"The main explanation for the increase is shipments of hazardous waste and contaminated soil en route for treatment and deposit," says the port's terminal adviser, Carl Johan Hatteland.

For the current year, he estimates that volumes will be broadly similar, although various construction projects in the pipeline may strongly influence traffic in the next few years. There is, however, capacity to handle further growth, in particular as the cargo port is to be restructured in the coming years.

"Oslo is mostly an import/unloading port. The majority of dry bulk being unloaded is also domestic in nature, for example, being sand for concrete or tarmac/asphalt and hazardous waste/contaminated soil. The main other dry bulk commodities are salt, grain, fertilizer, scrap and cement," he says.

The largest dry bulk vessel calling at the Port of Oslo in 2012 was the 9,822dwt *FINEX*, although the average for the year was in the region of 4,300dwt. Different commodities, notes Hatteland, require different sizes of vessels.

"Although, in the main, vessel size is dictated by markets, there is also a sub-sea ridge in the Oslofjord that effectively limits draught to around 11 metres," he adds.

Neither rail nor inland waterway are a factor in dry bulk transfer at the port, with all landside movement of consignments undertaken by the road haulage industry.

Quizzed as to what percentage of existing dry bulk traffic is 'captive' to the Port of Oslo, Hatteland notes that there are many ports in the Oslofjord, while few dry bulk products could therefore said to be 'captive'.

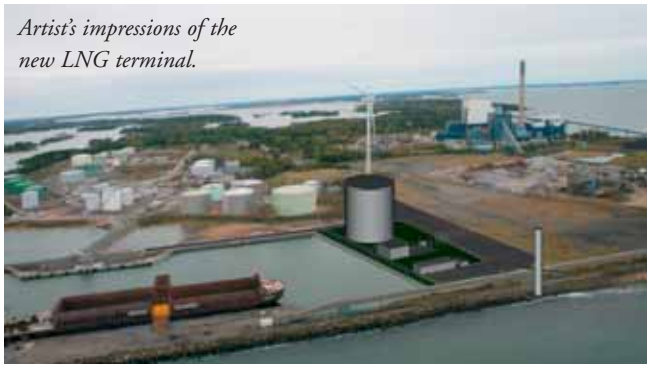
Finally, asked to comment on potential new commodities, he concedes that several relevant commodities are at different stages of consideration.

Port of Pori moves to pole position in LNG, and maintains excellent bulk facilities

The first LNG (liquefied natural gas) import terminal in Finland will be built at the Port of Pori. LNG gives more options to shipping companies, but it is also an optional energy source to heavy industry. The operational conditions of heavy industry using the Port of Pori for their dry cargo transport will be strengthened as a whole. The company Gasum Oy has decided to start a project aiming to build a LNG import terminal to Tahkoluoto harbour. The capacity is planned to be 30,000m³. The terminal will serve bunkering of vessels on the coastline between Hanko and Kokkola, as well as industry in the hinterland of the Port of Pori. The terminal is planned to be completed in autumn 2016.

Gasum Oy has submitted an application to the Ministry of Employment and the Economy for investment funds for the LNG terminal. Therefore, no final investment decision has been made on the construction of the Pori import terminal. Gasum has nevertheless begun initial earthwork at the site of Tahkoluoto oil and chemical harbor. Gasum Oy is a Finnish company which deals with energy trade, transmission of energy and energy services. Gasum will acquire the majority of Norwegian Skangass's distribution operations from the Lyse Corporation. Corporate acquisition makes Gasum largest Nordic LNG operator.

The new emission regulations for sulphur dioxide coming into effect in 2015 will increase the need for cleaner fuels in marine traffic in the SECA (sulphur emission control area). SECA includes the Baltic Sea, the North Sea and the English Channel. Improving the availability of LNG will serve not only marine traffic but also the increasing needs of industrial clients outside the natural gas grids and future needs of heavy duty traffic.



Artist's impressions of the new LNG terminal.

Gasum Oy and chemical company Sachtleben have made a deal on the delivery of LNG to the Sachtleben's plant situated 12km inland from Tahkoluoto harbour. The gas will be delivered from Tahkoluoto to the plant by using a gas pipeline. When the

Mäntyluoto harbour at the Port of Pori

Mäntyluoto harbour specializes in high and heavy project cargo. New technologies are always being investigated to enable the harbour to move products quickly and flexibly to and from ships.

Heavy lift capacity is exceptionally good; the strongest harbour crane at the Port of Pori has a capacity of 200 tonnes. The port's new Liebherr LHM 550 mobile crane gives customers more options.

There is also plenty of storage and handling capacity for containers, and the unloading capacity is approximately 25 containers per hour.

As well as containers, Mäntyluoto harbour also handles bulk cargoes such as concentrates, as well as sawn goods. Four multipurpose cranes are used to handle a variety of products.

FACTS AND FIGURES

Quay length:	2,000m
Max draught:	12m
Cranes:	200t, 140t, 2 × 10t, 4 × 40t, 60t, 53t, 50t
Warehousing area:	101,000m²
Chemical cisterns:	9,933m³
Concrete silos:	5,462m³
Ro/ro facilities	
Maximum vessel length:	200m
Ro/ro berths:	two
Plenty of free space available	

The port serving vessels of all sizes

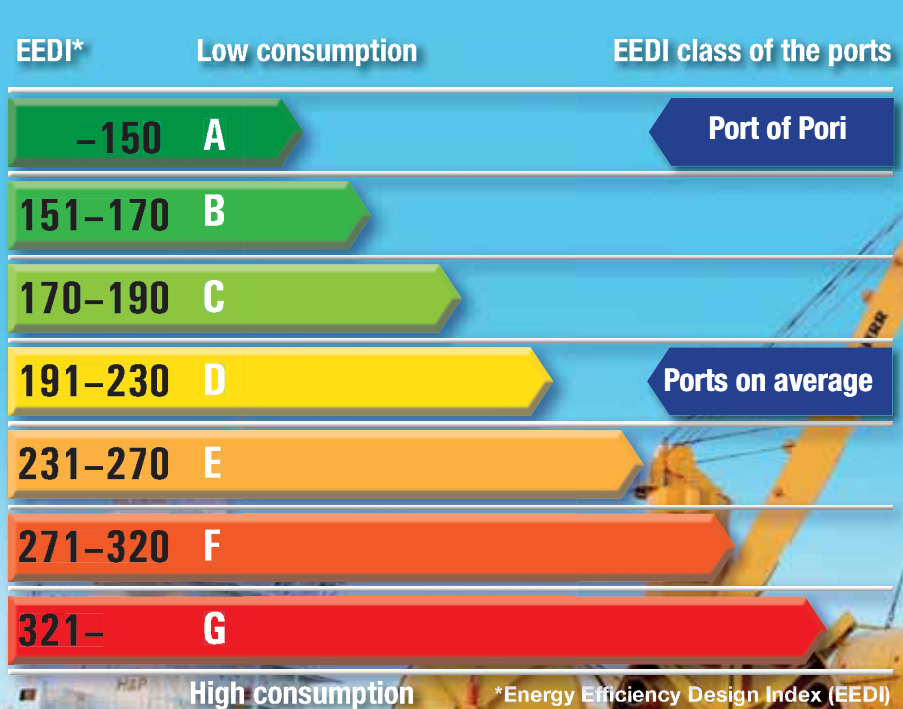
PORT OF PORI

Mäntyluoto
- High&Heavy services
- Container traffic
- Sawn goods • Dry bulk
- Recycled metals
- Ro-Ro facilities

LNG available 2016

Tahkoluoto
- Dry bulk • Liquid chemicals
- Major bulk hub
- Recycled metals

- A general port handling all kinds of cargo
- Deepest fairway (15.3 m) in the Gulf of Bothnia, the sea area between Finland and Sweden
- Fairways: Tahkoluoto Deep Harbour 15.3 m, Takoluoto Oil and Chemical Harbour 10.0 m and Mäntyluoto Harbour several fairways up to 12.0 m
- The best ice conditions in Finland. Easy to navigate = No archipelago
- Uncongested hinterland connections, the same railway gauge as in Russia
- Suitable for large volumes
- Room to expand. Free areas available for industry, logistics and value-added services
- 20 advantages of M20 Industrial Park. See www.m20.fi/en
- Located far away from permanent settlements
- Dust-minimized loading and unloading systems
- Environmental and work safety are top priorities



Check before 01.01.2015*

*Check before 01.01.2015 when the new SECA sulphur regulations will come into force.

Check your port's EEDI-class before making the logistical decisions of the future

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Tahkoluoto harbour at the Port of Pori

The harbour's 15.3m draught enables access for Capesize vessels. The loading capacity is 1,200tph (tonnes per hour), and unloading is approximately 2,000tph, depending on the commodity being handled. Reshipping is also possible.

The oil and chemical harbour operates in a separate area in Tahkoluoto. The annual traffic turnover is about 800,000 tonnes.

Freight traffic consists of different oil products and chemicals. The area accommodates cisterns owned by private oil and chemical companies.

A new quay was opened in the oil and chemical harbour in October 2008. The quay makes it possible to separate flammable and non-flammable products, increasing loading and unloading capacity, as well as safety at the port.

FACTS AND FIGURES

DEEP HARBOUR	
Quay length:	450m
Max draught:	15.3m
Cranes:	40t, 32t and loader 1,500tph
Stacker:	2,200tph
Warehousing areas:	9,500m²
5km land conveyor:	2,200tph
OLD BULK HARBOUR	
Quay length:	145m
Max draught:	10m
OIL & CHEMICAL HARBOUR	
Quays:	Two, both petrochemical and chemical products
Max draught:	10m
Maximum vessel length:	220m
Oil cisterns:	613,700m³
Plenty of free space available	

pipeline is built, other industrial users along the pipeline will also be able to use LNG. The City of Pori, business development company Prizztech Oy and Gasum Oy have started co-operation to acquire new industrial users of LNG along the pipeline.

The LNG pipeline will go via the M20 Industrial Park which is situated in the Port of Pori and in the immediate vicinity of the port. M20 Industrial Park is divided into three different functional areas: to industrial, logistics and value-added areas of Mäntyluoto and Tahkoluoto and to the recycling park of Peittoo. The M20 area is one of the few industrial and logistics areas in Baltic Sea Region that still offers space for growth to both small and large companies right next to a general port handling all kind of cargoes. There are over 200 hectares of vacant land for business sites and most of the sites are shovel-ready i.e. ready for construction. Sites are a good distance away from residential areas yet close enough to Pori, a city of 120,000 inhabitants.

The Pori region is well known for its heavy industry. Energy and metal clusters are the main industrial clusters of the Pori-region. Nowadays about 1mt (million tonnes) of concentrates come from overseas each year, and are unloaded in the Port of Pori for the use of primary metal industry. The Port of Pori has a strong focus on mining and metallurgy in its strategy. Tahkoluoto harbour could be an ideal site for refinery of ores coming from the mines situated in the northern parts of Finland and Sweden and the refinery could use LNG in its processes, summarizes port director Jaakko Nirhamo.

The M20 Industrial Park is being developed into a junction with excellent traffic connections to all over Finland as well to Russia, Scandinavia and continental Europe. Finnish heavy industry is mainly located in the belt which starts from the west coast and reaching the Russian border in the east. The Port of Pori is the westernmost point of this iron and timber belt. In this belt are located the most industrialized cities in Finland. The Helsinki Metropolitan region is the home base for the headquarters of industrial companies, but production is not done there. It is done mostly in the iron and timber belt of Finland.

Main Finnish industrial areas and the largest cities can be reached within three hours by road. From the Port of Pori, there is also a railway connection to Russia. Finland has the same railway gauge as Russia. Rail wagons only need to be loaded or unloaded once. Extra lifting costs are not incurred. The Port of Pori is active to develop the transport connections in EU projects. The availability of LNG would give also new perspective to developing projects. The port is seeking companies to pilot greener heavy traffic on roads and railroads.

The Port of Pori has the deepest fairway in the Gulf of Bothnia, which is the sea area between Finland and Sweden. The depth of the fairway to Tahkoluoto deep harbour is 15.3m. In terms of draught, all vessels that pass the Danish Straits are able to call at Tahkoluoto. In Mäntyluoto harbour, there is a new 12m berth and fairway for Panamax vessels. For example, 3,500 TEU container vessels can be handled in Mäntyluoto. Fairways are easy to navigate due to the lacking archipelago. The Port of Pori is also the best winter port in Finland. Capesize vessels call at Pori even in December. During a normal winter, icebreaking assistance is not needed.

Port of Pori's dry bulk handling infrastructure is in good shape. Much attention has been paid to the environmentally friendly handling of dry bulk. Dry bulk product creates dust, so in Tahkoluoto there is a closed loading system to prevent dust emissions. Other conveyors are also covered. Due to the economic crisis in Europe, the Port of Pori handled only 4.3mt of cargo in the year 2013. On average, the annual amount of cargo handled is over 5mt.

According to tests, the capacity of the port is 10mt with present infrastructure and cargo handling equipment. In Mäntyluoto dry bulk, scrap metal, sawn timber, project cargo and containers are handled. There are also ro-ro (roll-on/roll-off) facilities. In Tahkoluoto there is a deep harbour for dry bulk and chemical harbour for chemicals and oil products. New cargo flows are emerging. The newest breakthrough besides LNG is the handling of soya beans.

Ag Growth International announces new Catalog app

Ag Growth International (AGI) is offering its new AGI Catalog App available for iPad, iPhone and Android devices.

In autumn 2013, the AGI website was streamlined and given a fresh look, while introducing the addition of the entire collection of AGI brand products. Later in 2014, AGI announced a rebranding initiative which ensures that all divisions and brands are linked to the parent umbrella of AGI with a consistent and familiar aesthetic while maintaining the historical value that the individual brands were built upon.

The AGI Catalog app is another tool for AGI customers and stakeholders to conveniently reference in today's increasingly mobile climate. AGI's industry-leading brands include, Batco, Wheatheart, Westfield, Grain Guard, Hi Roller, Twister, Union Iron, HSI, Applegate, Mepu, Tramco, Airlanco and Rem. The app mirrors the AGI website, offering complete product lines in one centralized place where users can search any product information, photos, specs or manuals.

The user friendly interface and sleek design makes it easy to use and accessible on-the-go.

About Ag Growth International

Ag Growth International (AGI) is a major manufacturer of portable and stationary grain handling, storage and conditioning equipment, including augers, belt conveyors, grain storage bins, grain handling accessories, grain aeration equipment and grain drying systems. AGI has 11 manufacturing facilities in Canada, the United States, the United Kingdom and Finland, and distributes its products globally.

Heyl & Patterson signs licence agreement with South African company

In early April, Heyl & Patterson Inc., renowned supplier of bulk material handling systems and thermal processing equipment, announced the signing of an exclusive licence agreement with ELB Engineering Services (Pty) Ltd. (ELB), a bulk material handling provider based in Johannesburg, South Africa.

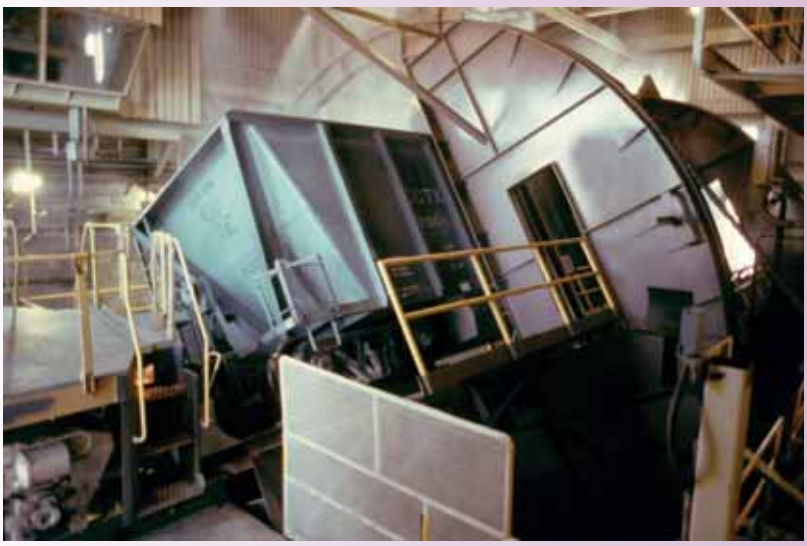
This exclusive agreement combines Heyl & Patterson's engineering skills with ELB's local execution capability and expertise. Heyl & Patterson will provide designs of rotary railcar dumpers (also called wagon tipplers) in single and tandem configuration to unload railroad cars, as well as train positioning equipment (also called side arm chargers) to move the railcars through the system. The licence agreement covers 40 countries in Sub-Saharan and Southern Africa in which ELB does business.

"This is a fantastic business opportunity and will give ELB the exclusive rights to market and sell Heyl & Patterson tipplers in Africa," said Tony Pinto, general manager of business development with ELB. "ELB will be responsible for the marketing, manufacturing, installation, erection and commissioning of railcar tipplers, both single and tandem, and the side arm chargers."

"ELB is a leader in the industry, and this move will allow Heyl & Patterson to increase its profile on the African continent," said John Edelman, president of Heyl & Patterson. "We feel this collaboration will result in great things for both companies, and the relationship will ultimately bring value to all of ELB's customers."

The agreement was made possible through the Pennsylvania Mining Export Program (PAMEX), an initiative of the state's Center for Trade Development that promotes Pennsylvania manufacturers in the Southern African market.

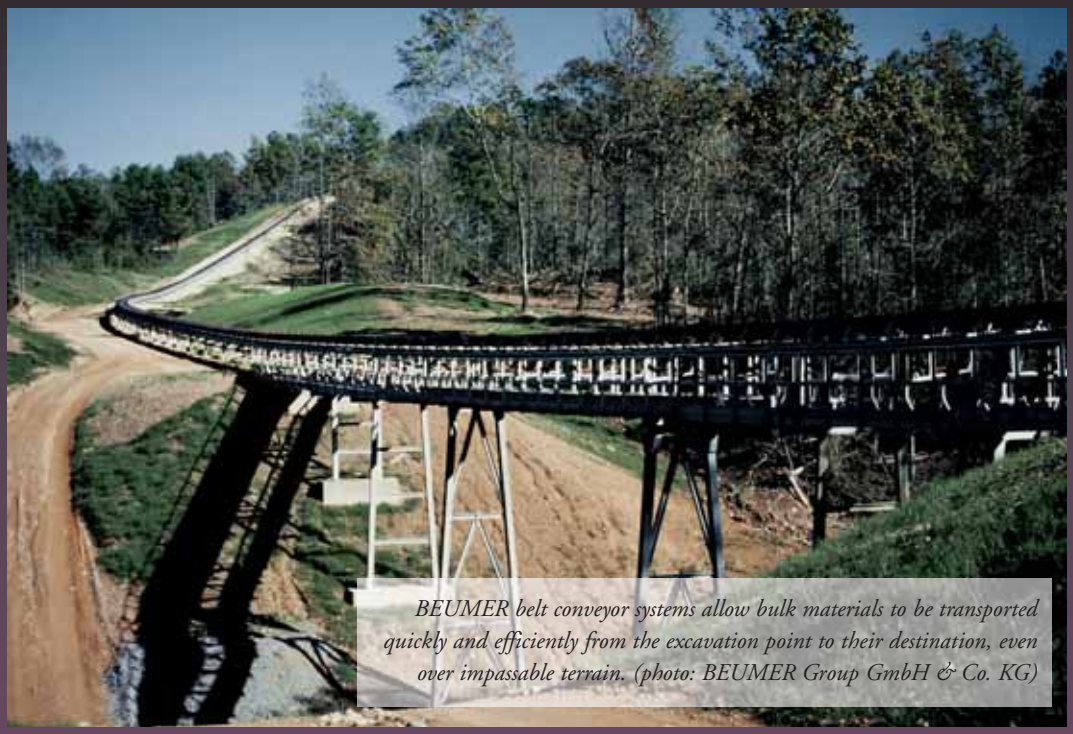
ELB was founded in 1919 by Edward L. Bateman, and provides engineered materials handling and process plants to the mining, minerals, power, port, construction and industrial sectors. The ability to provide a total logistics solution from mine to port is an integral part of its business.



About Heyl & Patterson Inc.

Founded in 1887 in Pittsburgh, PA, Heyl & Patterson Inc. provides high quality, custom engineered solutions for thermal processing and bulk material handling applications around the globe. Heyl & Patterson is the innovator the rotary railcar dumper and offers a wide range of bulk material handling equipment, including railcar & barge movers and barge unloaders. Thermal processing products and services include some of the largest high-efficiency dryers and coolers in the world, as well as calciners, bulk material processors and pilot plant laboratory testing systems.

Conveyors for low-cost transport



BEUMER belt conveyor systems allow bulk materials to be transported quickly and efficiently from the excavation point to their destination, even over impassable terrain. (photo: BEUMER Group GmbH & Co. KG)

The BEUMER Group will be presenting its sustainable and energy-saving system solutions at POWER-GEN 2014 (June 3 to 5, Cologne). In particular, the intralogistics specialist will be demonstrating the function of its economical belt conveyors with the help of a model. These systems transport materials over impassable terrain in an environmentally friendly manner. Visitors will also learn about BEUMER customer support, which ensures that all of the user's systems have a high level of availability.

The curved conveyor systems are designed as open trough belt conveyors or closed pipe conveyors. In power stations, they move large quantities of coal from storage or receiving points to the boiler and convey waste products such as ash, slag or FGD gypsum to landfills or other disposal sites. BEUMER conveyor systems are also the perfect solution for conveying substitute fuels, which are coming into increasing use. Trucks have considerable disadvantages in this regard. Road building is expensive, and the more raw materials have to be transported from the excavation point to the factory, the more journeys have to be made.

Belt conveyors are equipped with environmentally friendly electrical drives and low-energy belts. As they are usually designed with closed-loop controls, the load can be optimally distributed on the drive unit for different operating conditions. When the belt conveyor is running downhill, the system works in generating mode. The recovered electrical energy is fed back to the public electricity supply via a feedback unit.

Visitors to the trade fair will also learn about BEUMER customer support, which ensures that all of the user's systems have a high level of availability. The support team also optimizes existing machinery. Highly capable experts located all over the world provide professional repair and maintenance, deliver spare parts and carry out customer training.

BEUMER Group is an international manufacturer involved in intralogistics in the fields of conveying, loading, palletizing, packaging, sortation and distribution technology. Together with Crisplant a/s and Enexco Teknologies India Limited, the BEUMER Group employed some 3,700 people in 2013, taking orders with a value of some €770 million. With its subsidiaries and sales agencies, BEUMER Group is present in many industries worldwide.

Sixty MacGregor cranes ordered for Chinese-built bulkers

Range of MacGregor cranes from well-proven electro-hydraulic versions to highly-efficient low-energy new-generation VFD electric cranes.

MacGregor, part of Cargotec, has won a run of orders for bulk versions of its cargo handling cranes from five Chinese shipyards. The cranes are destined for 15 bulk carriers for various owners. The orders were booked in the first quarter 2014 order intake and include:

- Two 37,500dwt bulkers on order at Yangzhou Gouyo shipyard. The vessels will be used to carry logs as well as dry bulk cargoes and will each be equipped with four GLBE3026.2-2/2426.2gr variable frequency drive (VFD)-type marine cranes. The cranes are scheduled for delivery by the end of 2014.
- A repeat contract for two 63,000dwt bulk carriers on order at the Dayang shipyard for Greek owner whose two new vessels will each be equipped with four GLB3629-2/28.829 electro-hydraulic type marine cranes. Deliveries are scheduled for the end of 2014.
- A Greek customer has ordered two 61,000dwt bulkers from NACKS shipyard. The contract will see MacGregor deliver four electro-hydraulic-type GLB3528-2/2828gr marine cranes for each vessel by mid-2015.
- Five 61,000dwt bulk ships under construction at the Natong Huatai shipyard for Hong Kong-based company. All vessels will be fitted with four electro-hydraulic-type GLB3026-2/2426gr marine cranes, which are scheduled for delivery from the end of 2014 until the beginning of 2016.
- Four 67,000dwt bulk and log handling vessels being built at the Zheijiang Zhenge shipyard for Chinese owners. Each ship will be equipped with four GLBE3629-2/2829gr VFD marine cranes, planned for delivery starting end 2014.

"Our cranes easily meet all the demands of the bulk handling sector, which is one of the most demanding marine environments," Mikael Hägglund, sales manager of cranes, says. "With all machinery well protected inside the housing, the cranes are well-prepared for this duty."

He adds: "Depending on an operator's specific needs and capacity, we can supply a range of options from our well-proven electro-hydraulic version, to our highly-efficient low-energy new-generation VFD electric cranes. For tougher operations [hours per year] we can offer our four-wire K4 heavy-duty grab cranes."

MacGregor provides engineering solutions and services for handling marine cargoes and offshore loads. Its products serve the maritime transportation, offshore and naval logistics markets, in ports and terminals as well as on board ships. Its cargo flow solutions integrate cargo access, stowage, care and handling functions to suit a particular ship's cargo profile. This benefits its productivity, environmental impact and profitable service lifetime.

ASGCO® introduces a complete conveyor solution for bulk

ASGCO® 'Complete Conveyor Solutions' now offers a highly advanced containment and dust control solution for conveyed bulk material products. ASGCO®'s Pro-Zone™ is a patent-pending modular conveyor belt load-zone system that optimizes the seal for air/dust tightness on the receiving conveyor belt. This 'skirt-less' fully self-contained system is comprised of the company's Slide-N-Roll™ beds with its removable 'slide-out' designed UHMW and steel side supports and easy to remove center rolls. Side guards, internal splash sealing system, dust curtains and angled hoods (aluminium or steel) completely enclose the entire system.

Product features:

- **increased productivity** – and longer conveyor belt life because the completely sealed load zone helps eliminate material turbulence and conveyor belt cover abrasion;
- **lower maintenance costs** — by having a 'skirt-less', fully contained system that needs no adjustments of metal skirt-boards or rubber skirting adjustments;
- **modular design** — can be installed in any combination of 4' (1,200mm) or 5' (1,500mm) lengths to completely cover load zone area. Quickly removable dust hoods, slide-out side sections and removable center rolls aid in the installation and maintenance of the system.
- **made in the USA** — completely engineered, designed, fabricated and stocked in the USA.

ASGCO®'s Pro-Zone™ is especially suitable for dusty conveyed products and processes, for example in the coal-fired power plants, wood chips, grain/soyabeans, minerals (potash, phosphate, nitrogen, salt, soda-ash, and sugar), and recycling industries.

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After record performance at CONEXPO, Smiley Monroe eyes US market

Smiley Monroe has recently returned from Las Vegas, where the company was exhibiting at CONEXPO-CON/AGG and discussing potential locations for its first North American conveyor belt depot.

Following a very successful EXCON India show at the end of 2013, Smiley Monroe's product specialists and experienced problem-solving engineers were showcasing their ToughFlex Series Conveyor Belts — from impact- and puncture-resistant Straight Warp belt and highly customized chevron belts with seamless V-joints, to mechanically fastened replacement belts with the easy-to-use screw type pin system. Also on display were ceramic chute liners, OEM modular belt cleaners, produced with the customer's own logo and colour, to complement their brand, synthetic screen media, polymer King Rollers and Belt Buddy, the rapid repair resin for conveyor belts and industrial rubber tyres. Visitors to Smiley Monroe's booth received a copy of its Conveyor Belt Handbook, a practical guide covering a range of topics, from storage and handling to optimizing the operational lifespan of belts.

CONEXPO was also chosen for launching a dedicated product microsite for Smiley Monroe's polymer King Roller, which brings together all online resources for this CEMA rated energy-saving conveyor idler. This new microsite uses 'responsive design' to provide an optimal viewing experience — easy reading and navigation with a minimum of resizing and scrolling — across a wide range of devices, from smart phones and tablets to desktop computers.

North America conveyor belt depot

Vaughan Monroe, Managing Director of Smiley Monroe, said: "CONEXPO is an ideal platform for not only showcasing our company, presenting our latest developments and growing our global business contacts, but for gaining an overview of the market, to accelerate decision making. Opening a belt depot in the US is our response to the growing demand for a local service from our North American customers, which fits with our successful strategy of staying close to our customers and responding quickly and effectively to their ever-changing needs. We've leveraged our competitive advantage to win business from construction equipment manufacturers in this key market, where I'm delighted to say we're close to announcing a major new belt supply contract. 2014 sales are shaping up to be even better than last year, which was record breaking for us, however, to meet the challenges that such growth presents, we're about to make our largest investment to date in the UK."

Smiley Monroe now exports to 40 different countries, with a growing distributor network spanning North and South America, Europe and Australasia. In the past 12 months, it has shipped enough hot spliced conveyor belts to reach from London to Paris, or Las Vegas to Los Angeles.

Nationwide distributors

Smiley Monroe's Marketing Manager, Tim Monroe, adds: "It was great to see such a confident mood at this first big industry exhibition of the year. CONEXPO organizer, AEM, said attendance was up on the 2011 show and visitor traffic to our booth certainly exceeded expectations, with very high inquiry levels and serious interest from both the North and South American markets. Now we're in the process of appointing nationwide distributors for both our King Roller and Belt Buddy product lines. And we've just participated in our second major trade fair of the year, EXPOMIN in Chile, the world's biggest mining show outside the US, where we were supporting our Santiago-based distributor."

Celebrating 35 years in business, Smiley Monroe is a major producer of hot spliced conveyor belts and CNC cut rubber parts for the mobile crushing, screening and recycling sector and has just been named in '1,000 of the most exciting small and medium-sized companies in the UK' by London Stock Exchange Group.

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

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DELACHAUX GROUP

ThyssenKrupp supplies eight portal reclaimers to Moroccan fertilizer plants

In 2012, ThyssenKrupp Industrial Solutions, Business Unit Resource Technologies, was contracted by OCP S.A. (Office Chérifien des Phosphates, S.A.), the leading phosphate producer of Morocco, to supply eight full portal reclaimers to be operated within the Morocco Phosphorous III & IV Complex at Jorf Lasfar, approximately 20km south of El Jadida, Morocco. As part of its strategic development plan, OCP S.A. will establish four new ODI (owner direct investment) integrated DAP granular fertilizer manufacturing plants on green-field plots. The first two machines are in the phase of final installation whereas the remaining six machines will be supplied in three subsequent lots with intervals of four months.

The DAP granular fertilizer produced in each integrated fertilizer manufacturing plant containing a sulphuric as well as a phosphoric acid unit, a turbo generator, a DAP plant and & OSBL areas will be conveyed and stored into two different storage buildings having a storage capacity of 93,000 tonnes each. Each building will be served by one full portal reclaimer to reclaim the stored product for further feed of the downstream conveying system.

The eight identical A-frame full portal reclaimers are running on a 45.50m rail gauge and are designed for a nominal reclaiming rate of 2,000tph (tonnes per hour).

Notwithstanding the overall dimensions which are within the standard range for such a machine, the challenge consisted to prove during that fiercely contested tendering ThyssenKrupp Industrial Solutions technical lead by presenting an innovative and different reclaimer design to achieve the requested high throughput. ThyssenKrupp Industrial Solutions succeeded in promoting its meanwhile proven new technology of high-speed/high-rate portal reclaimers for which the weak element — the roller chain — has been replaced by a track link chain which permits higher chain speed.

Thanks to that, the portal reclaimer itself could be designed with only two scraper booms i.e. one arrangement of one main and one auxiliary scraper boom mounted laterally to the portal structure and connected together by a knuckle arrangement instead of three scraper booms which are normally required for such a high handling rate.

Furthermore another decisive aspect in favour of track link chain is that the joints are sealed and lifetime lubricated. Therefore no additional oil dipping or spraying lubrication which may cause the DAP fertilizer to be contaminated by lubricants during reclaiming operation, is required.

ThyssenKrupp Industrial Solutions' innovative approach for the design of high-capacity portal reclaimers, backed up by the numerous references and its excellent track record, were deciding factors in the contract being awarded to ThyssenKrupp Industrial Solutions.

With this prestigious and challenging contract, the plant engineering and construction specialist will consolidate his leadership for high capacity portal reclaimers working in fertilizer plants and demonstrate once again its technological excellence.

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MANTSINEN 160
up to 1000 t/h

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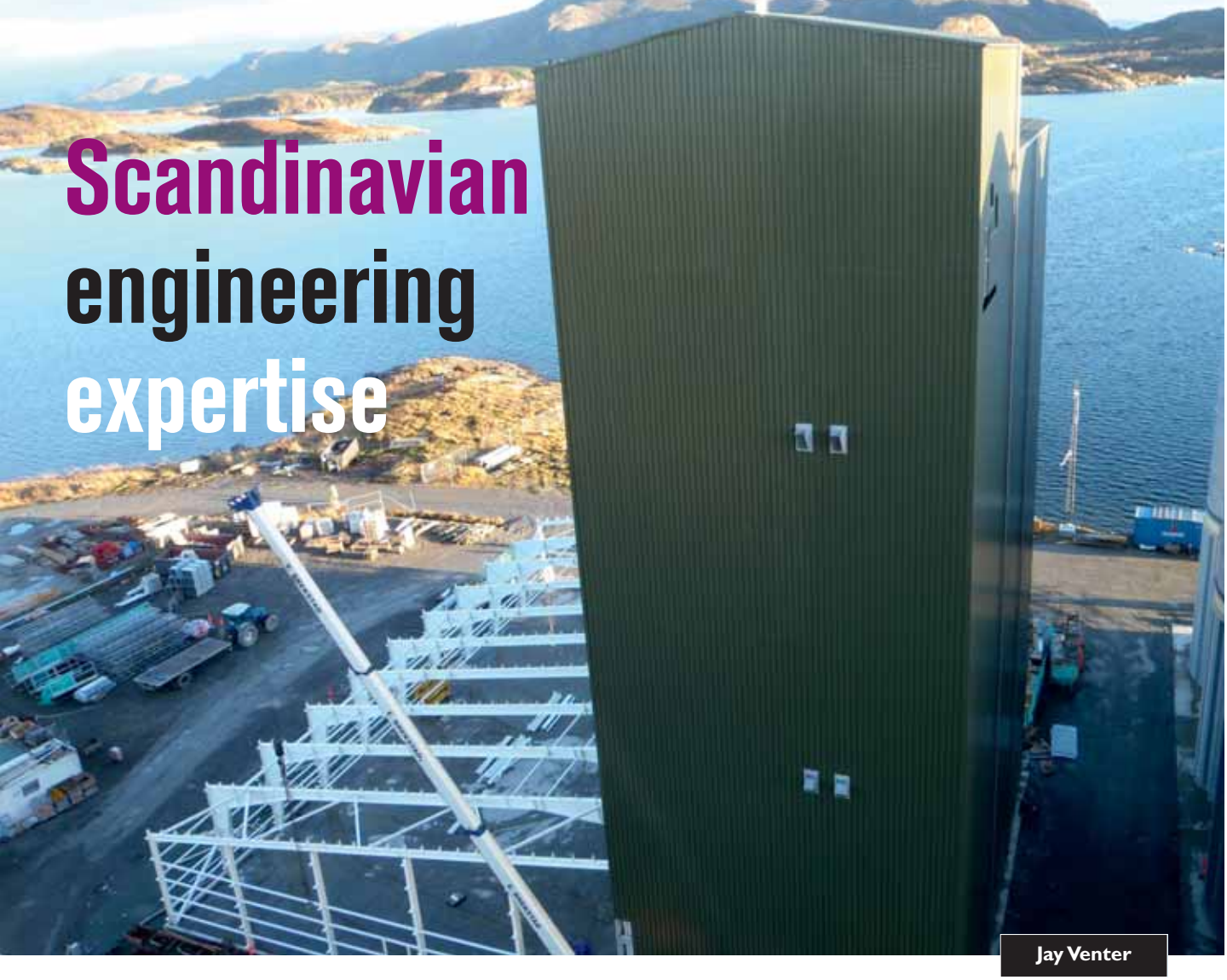

Erection of the newly built salmon factory at Marine Harvest.

Jay Venter

Cimbria supplies installations to Scandinavia to store and handle bulk materials

Cimbria is one of the world's leading suppliers of high quality processing technology primarily within grain and seeds, but also within other industries such as foodstuff, biomass treatment, animal feed, and systems for a large variety of industrial products.

The company has in-depth knowledge of the design and construction of turnkey projects and special installations for storage and conveying bulk cargoes. Its vast experience is constantly being put to use in developing new solutions which meet the demands of authorities and users for functionality, quality and environment friendly operation.

The solutions from Cimbria are always individual ones, developed in close co-operation with the clients. Their needs and demands define the overall parameters and Cimbria makes the ends come together in simple, practical and operational solutions based on in-depth experience with the business area.

When looking at solutions for the Scandinavian market, Cimbria can refer to a wide selection of solutions for different applications, including the installation of intake and silo systems and various conveying equipment.

Marine Harvest — New greenfield salmon feed factory

Marine Harvest is a world-renowned seafood company offering farmed salmon and processed seafood to customers in more than 50 markets worldwide. Marine Harvest is the biggest producer of Atlantic salmon in the world and is responsible for over 5 million salmon meals per day.

In addition to fresh and frozen salmon, Marine Harvest offers a wide range of value-added products such as coated seafood, ready-to-eat meals, delicious finger food and smoked seafood. Though salmon is the main farmed product, the company also farms white halibut.

Marine Harvest has decided to build a new fish feed factory in Norway as a greenfield project. The site is located on the west coast in Bjugn, about 100km southwest of Trondheim.

Logistically, the new plant is located immediately adjacent to the sea, and most of the deliveries for the factory will arrive by ship. Likewise, products from the factory will leave the same way.

Cimbria equipment for gentle conveying.

The planning and design of the project has been executed by Danish engineering company Graintec A/S. Cimbria was chosen for delivery of:

- Intake line from ship-unloader to raw material silos. The unloader itself will be supplied by Cimbria's German partner Neuero. The conveying line is about 300m long. It starts at the quay and has a capacity of 300tph (tonnes per hour).
- Machine tower as a complete building with decks for cleaning and weighing of incoming products. The building is 9 × 16m and 40m high.
- Conveyor system from raw material silos to dosing silos consisting of standard heavy chain conveyors and elevators designed for 150tph.
- Midi and macro dosing silos, approximately 4,500m³, as a complete building including steel structures and cladding. The silo cells are made of small wall elements and outloading is in part secured by bin-activators.
- Finished product silo, approximately 5,000m³, again as a complete building. The silo cells are made of trapezoidal wall elements and fitted with speed-reducing loading chutes in order to handle the pellets as gently as possible to avoid any damage.
- Warehouse as a complete building consisting of steel frames and cladding. Approximately 1,000m².

The deliveries for the project were co-ordinated with the other contractors on the project and were commenced in spring 2013. Consignments were shipped by vessels directly from Cimbria's manufacturing company in Thisted, Denmark, to the site.

A large number of Cimbria employees were at the site during the installation period. As no hotels were available within driving distance, a villa was erected for all the workers and administration on site, including all necessary facilities such as canteen, laundry, sleeping apartments, etc.

Gentle Conveying System

To handle special products as carefully as possible in order to avoid breakages and dust, Cimbria has further developed standard conveyor systems in order to handle products such as pellets more carefully.

Improvements to the equipment have been developed in collaboration with Danish engineering company Graintec A/S, to

which Cimbria has delivered this system for handling fish feed pellets. In such applications the importance of gentle product handling is essential because of the environment.

When designing the installation, Cimbria took a starting point in standard screw conveyors with diameters of up to 800mm. With regard to improvements, following issues were considered in particular:

- Degree of filling
- Smooth surfaces
- Small tolerances
- Stiffness of screw and shaft
- Screw speed
- High capacity — up to 300tph

The improved screws have been used in connection with the loading and unloading of vessels for transportation of fish pellets from fish feed factories to off-shore fish farms. The biggest screw conveyor has a length of 23,775mm in a single unit.

For unloading Cimbria delivered different types, whereby the screw is mounted in a heavy steel construction, including a vertical character tower which can turn through 270°. The outloading arm can either be a single unit or two linked units for unloading distances of up to 14m and 25m respectively. The unloader can be lifted and lowered 15/10°. The movements are controlled by hydraulics from the ship's control bridge.

The system is very easy to operate and suitable for delivery of feed to fish farms at sea. It is easy for operators to carry out the positioning of the unloader according to the feed barges.

The amount of feed delivered to off-shore farms is relatively high, as the fish are normally in seawater during the growth phase. The system is a substitute for the traditional way of delivering by means of big-bags, and as the capacity is high, the unloading time is short.

In addition to these very gentle conveyor screws, the plants have been fitted with open speed-reducing filling chutes in bins and containers, as gentle handling is of great importance throughout the entire product handling and storage line.

Cimbria was established in 1947 and is today an international organization with 800 employees in 15 companies throughout the world. Cimbria offers equipment and processing plants for the grain and seed industry and transport and conveying equipment for bulk handling.

AGD unloader: the jewel in Konecranes' crown

Konecranes is a renowned group of Lifting Businesses™, serving a broad range of customers, including manufacturing and process industries, shipyards, ports and terminals. Konecranes is committed to providing lifting equipment and services to satisfy any possible need.

One of the company's most notable products in its bulk handling range is its AGD (Advanced Grab Drive) Grab Unloader. This is a prime example of the continuous development work of Konecranes in all fields of crane technology. Konecranes has delivered successfully over 20 heavy duty and high capacity grab unloaders during the last ten years.

The AGD Grab Unloader, with its extremely simple rope reeving design and standardized drive machinery, provides the customer ease of maintenance and excellent operational reliability. It is the answer to modern bulk terminals' demands for consistent performance and ultimate degree of reliability.

The AGD unloader family covers all capacities and site conditions from barge unloading to the largest ocean-going bulk carriers. The unique rope reeving design and advanced AGD control system provide trouble-free operation and ease of maintenance.

Notable features include:

- **High-performance AGD Control System:** automatic unloading with many optional operating modes as standard. Better efficiency and reduced driver fatigue.
- **Konecranes electrical system:** Konecranes AC electrical system is designed for crane application. Smooth and precise movements with short response times. Konecranes Crane Management System (optional) provides a broad range of reporting, analysing and remote diagnostic features.
- **Ergonomic operator's cab:** spacious and ergonomic cab ensures productive working environment for the driver. Good visibility to all operating areas. Remote cab operation as an option.
- **AGD machinery house:** all machinery components of the four main winches are fully interchangeable. Standard Konecranes components provide reliable operation and easy maintenance. Good access to all service points.
- **Dust free material flow:** Konecranes AGD Grab Unloader can be furnished with a large variety of features to provide optimal dust free handling of practically any bulk commodity. Effective dust suppression with water mist is used for materials that occasionally cause dusting. Materials like animal feed, clinker, cement etc. require more efficient dust prevention. Dust is extracted by powerful fans from the grab discharge area in the hopper and from all conveyor loading points. Filter bags in the dust extraction units are cleaned by air after each cycle. The hopper itself is furnished with special grizzly to prevent the escape of return air from the hopper.
- **Hopper arrangement:** the discharge hopper is lined with bolted wear plates. Wind walls are standard in all deliveries. The back door is made of strong rubber sheets to withstand occasional contacts with the grab. The hopper can also be closed by hydraulic operated roof sections to prevent rain water to get in contact with material. A special spillage plate is used to prevent the fall of possible grab spillage between the unloader and the vessel.

HIGH LIFECYCLE PROFITABILITY

The Konecranes AGD Grab Unloader offers you the best lifetime value. A simple, remarkably effective rope reeving design and standard components give you high operational reliability and reduced maintenance. And your drivers will enjoy the good response time of the modern AGD control system.

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Indexator Rotator Systems planning a new product range concept

XR Rotator: Indexator's robust – high torque – slewing ring-rotator.

On the banks of the roaring Vindel river in northern Sweden lies Indexator Rotator Systems AB. This is where the company's rotators are manufactured — known for their high quality and long service lifetime.

The rotators are used in forestry, general cargo and materials handling. "Our rotators are standard fitting for the larger machine manufacturers. It requires deep knowledge of the harsh reality that the products will be used in," says Gunnar Balfors, CEO of Indexator Rotator Systems AB.

The man behind Indexator, Allan Jonsson, used to lift large timber logs onto trucks in the late 1950s, without the help of any lifting devices. Even then, he had started to think about what would become today's rotator solution. His aim was to create a 360° rotator for heavy loads. He finally achieved this after much experimentation, at the end of the 1970s.

From being a small company in the end of the 1970s Indexator today acts world-wide as a global supplier of rotator solutions. Products from Indexator Rotator Systems help machine manufacturers, contractors and operators to increase their profitability every day in over 40 markets on five continents.

Family-owned

Despite a global expansion, Indexator is still family-owned and well into its second generation now.

Since May 2012 Indexator has been divided into two technical companies; Rotator Systems and Rototilt Systems, which enables each company to focus 100% on its specific area. The common brand for both companies is still Indexator, a name and promise that customers throughout the world are aware of.

Common values, such as high quality products, guaranteed delivery and reliable aftermarket service are all part of what characterize Indexator, known as the "Indexator's philosophy", which has gained a lot of national interest in Sweden.

"We see our philosophy as a profitable investment. We have become even better at delivering high quality at the right time, with the help of our committed and involved employees." says Gunnar Balfors, CEO of Indexator Rotator Systems AB.

Rotator development partner

Successful product development is necessary to stay in a leading market position, but also requires deep knowledge of the real-life situations in which the products are used. Therefore Indexator Rotator Systems is not only a manufacturer of rotators, but also a development partner.

Collaboration in product development ensures the essential interplay between base machine-crane-rotator- unit/grapple/tool. Therefore many international equipment manufacturers visit Indexator Rotator Systems to develop new products or functions, often from a given requirement or specification.

"A development process and continuous dialogue with the manufacturer helps us to achieve synergy effects and fulfill, or in the best of all positive worlds, exceed customer expectations," says Erik Svensson, marketing manager at Indexator Rotator Systems AB.

XR Rotator — a new product range concept

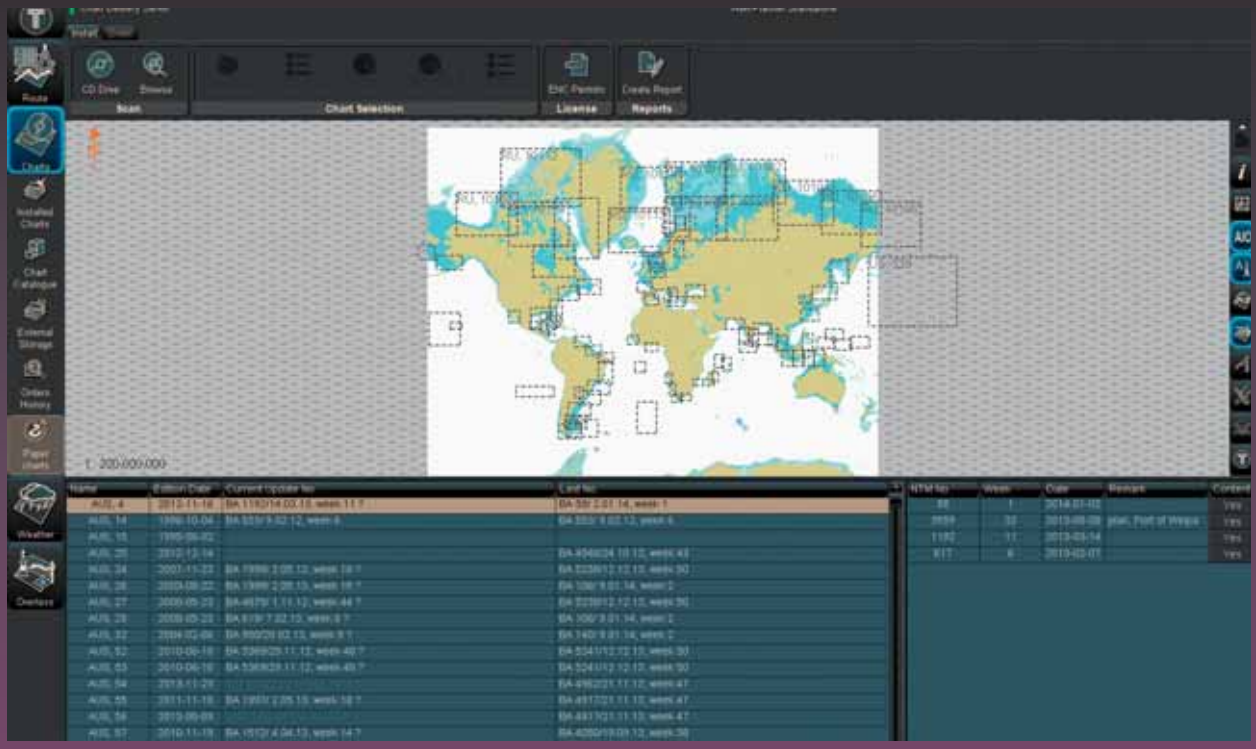
Except for a wide product range of GV/AV and G/H rotators, Indexator Rotator Systems can offer a full range programme with its well-proven industrial IR-rotators, which are primarily intended for excavators and large cranes in material handling, recycling or timber handling. Indexator Rotator Systems also plan to bring a new product range to market, to address an increased demand for large rotators.

"The XR Rotators will be robust products with durable slewing rings, high torque motors and easy maintenance. One of Indexator's largest strengths is to offer a wide range of quality products, with all functions needed — and we will keep building upon that," adds Svensson.

The idea is to offer a range of rotators which is attractive for the manufacturer and end-user, irrespectively machine size, capacity or function.

Indexator Rotator Systems remains keen to fulfill its assignment — continuing to develop high quality rotators.

Transas Navi-Planner 4000 now capable of managing paper charts



Transas Navi-Planner 4000 voyage planning software now boasts extended functionality to manage paper charts and publications.

Navi-Planner 4000 has been known for electronic charts, publications and other data management for several years. Recognizing the fact that a lot of shipping companies continue using paper charts, Transas has added a new functionality to its voyage planning software providing one tool for both, electronic and paper charts management to its customers.

Users can import complete vessel's inventory or manually select paper charts held onboard. Navi-Planner 4000 then connects directly to the Transas chart server ashore to gather all outstanding Notices to Mariners within a few seconds.

New Navi-Planner functionality provides a clear overview of paper charts status, and any paper chart used during a voyage will be automatically listed in the passage plan, thus making voyage planning easy and safe.

About Transas

Transas Group is a world-leading developer and supplier of high technology software and hardware solutions for transport, oil-and-gas industry, security, defence industry and edutainment sector. Transas Group is headquartered in St. Petersburg, Russia, where the company was founded in 1990. The number of Transas employees worldwide exceeds 2000 people.

The Group's global network includes 23 own offices and over 260 distributors worldwide, through which Transas products and solutions are successfully deployed in over 130 countries. The production process is certified according to the ISO 9001 international standard.

Transas Marine International is a Transas Group company, with headquarters located in Gothenburg, Sweden. Transas Marine offers its customers state-of-the-art navigation, simulation, vessel traffic and port management solutions, backed up by a worldwide service and support network.

Have Engine - Will Travel

Diesel-Hydraulic Grapple
Model DHSG

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Turkish construction company orders two road-mobile Siwertell 10 000 S unloaders

A Turkish construction services company, Mussa Insaat Dis Ticaret Ltd of Istanbul, has ordered two road-mobile Siwertell 10 000 S cement unloaders from Cargotec in less than three months. The trailer-based, diesel-powered units will have a rated discharge capacity of 300tph (tonnes per hour) and are scheduled for delivery in mid-May 2014 and late August 2014.

"A second order, within two months of the first, is a significant vote of confidence for the operational advantages delivered by Siwertell mobile unloaders," says Jörgen Ojeda, director for Siwertell mobile unloaders. "Our customer plans to use the Siwertell units for cement unloading operations at several sites along the Libyan coast, demonstrating the flexibility of our road mobile systems. Not only are they easy to move from one port to another but once at the new location, the unloader can be prepared for work very quickly by just one person."

Further factors contributing to the orders were the well documented reliability of Siwertell mobile unloaders, along with their high unloading capacity and low operational and maintenance costs.

Each unloader will be equipped with a double bellows system and dust filter, ensuring that they deliver consistently high levels of efficiency and environmental protection.

"As with the first order, we take great pride in being part of the re-construction of Libya, in view of the area's recent history," Ojeda adds.

From left: Mr Jörgen Ojeda, Director for Siwertell mobile unloaders, Mr Ufuk Erden, Technical Consultant, Tracim Cimento San. A.S and Mr A. Zeki Cicim, General Director, Mussa Insaat Dis Ticaret Ltd. Sti. - Contract signage in Istanbul

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 coal, cement, fertilizer, agribulk, clinker, sulphur and grain. Siwertell plant and terminal design, ship unloaders, ship loaders, mobile ship unloaders, mechanical and pneumatic conveying systems, and storage solutions are all designed to ensure environmentally-friendly and efficient cargo operations.

Siwertell is a Cargotec brand. Cargotec's sales totalled €3.2 billion in 2013 and it employs approximately 11,000 people.

Expanded capabilities wins substantial MacGregor deck equipment contract

MacGregor, part of Cargotec, has secured a deck equipment contract for a series of eight 58,500dwt bulk carriers under construction at New Times Shipbuilding in China. The vessels are being built for Lemissoler Navigation (Front Marine), based in Cyprus, with the delivery of the first two vessels scheduled to start around August 2015.

The contract will see MacGregor deliver complete equipment packages comprising electric pole-changing winches, steering gear, air compressors, hatch covers and variable frequency drive (VFD) electric cranes, four per ship.

The packages include equipment from the combined MacGregor Hatlapa portfolio. "The new contract was won as a direct result of our strengthened capability for larger delivery scope and a long standing relationship with the owner," says Jörg Tollmien, Head of Sales for the Hatlapa offering at MacGregor.

"It is also a good example of what our combined product ranges can offer customers, particularly in cases such as this where an extensive scope of deck equipment is required for multiple ships," Tollmien notes.

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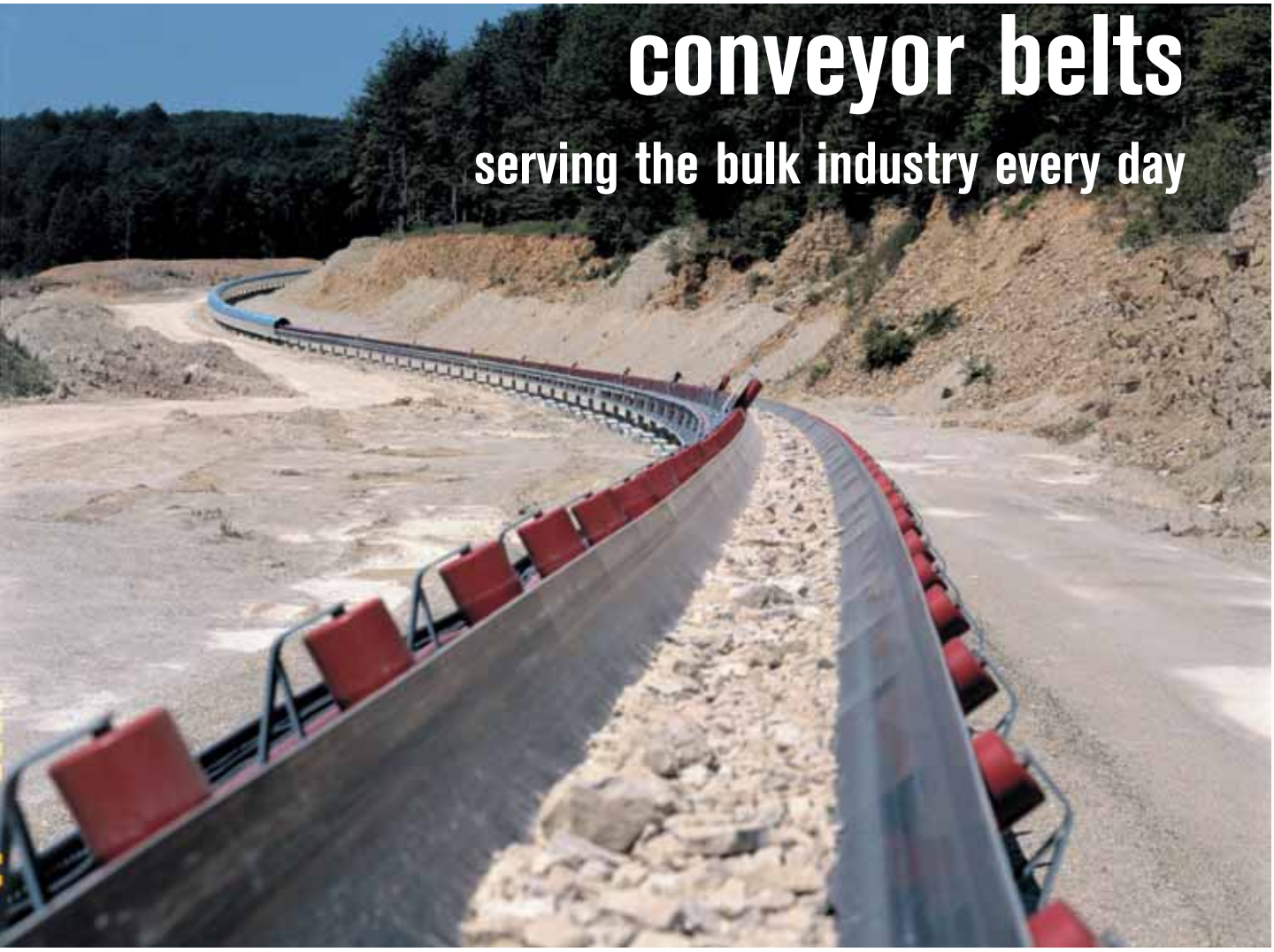


ContiTech conveyor belts meet conveying needs around the world. The company is a renowned development partner, manufacturer and system supplier of steel cord and textile conveyor belts, service materials and special products. ContiTech conveyor belts are divided into four market segments: Mining Europe, Mining World, Industry and Engineered Products. Around 4,000 employees develop and produce at 17 locations in Australia, Brazil, Chile, China, Germany, England, Finland, Greece, India, Mexico, Hungary, Serbia, Slovakia and the United States. Incorporated in the ContiTech division and thus a part of Continental AG, the Conveyor Belt Group benefits from the know-how from an extremely wide range of industries and their potential synergies.

Thanks to its international structure and consistent growth in the markets worldwide, the conveyor belt specialist has positioned itself on a firm foundation. As an internationally recognized partner, the company offers reliable and cost-efficient conveyor belt technology to customers all around the world, also including belting solutions for extreme climatic circumstances. For the mining industry, ContiTech features a comprehensive product range covering all tasks above and below ground. Intensive fundamental research and years of experience with a wide variety of conveyor belts provide the basis for successfully implementing conveyor belt systems above and below ground. In its R&D centres, the company develops conveyor belt technologies that meet the demands of today and tomorrow.

For its industry customers, the company supplies original equipment manufacturers and operators of conveyor belt systems worldwide with everything from one source, and the same original equipment quality is provided to trade partners as well. ContiTech also offers special-purpose conveyor belts and conveyor technology solutions for machine and plant engineering. These products take on a variety of tasks in various dimensions, often even simultaneously, from conveying through driving up to filtering and guarding.

Product range

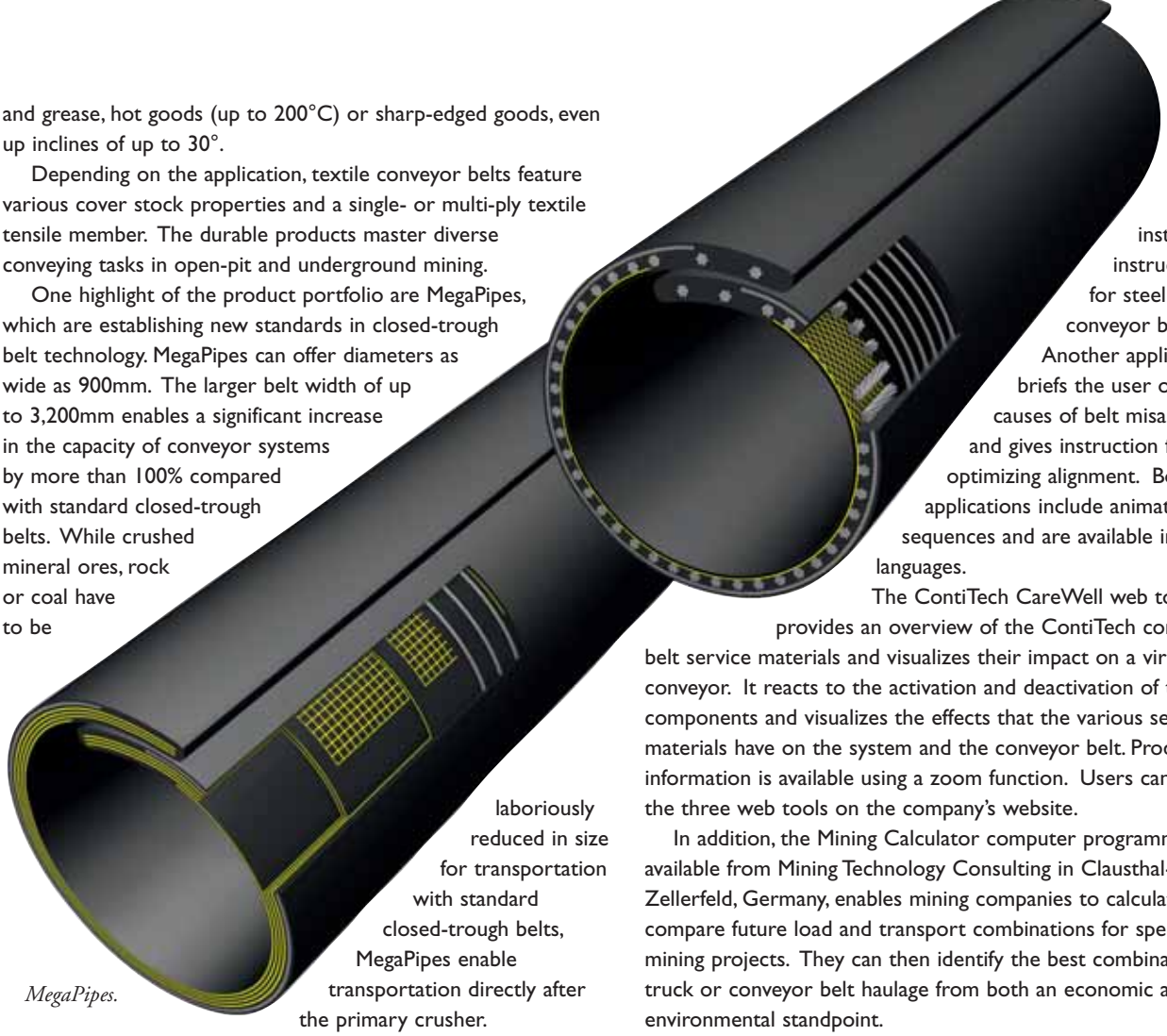
ContiTech steel-cable and fabric-reinforced conveyor belts allow for maximum conveying capacities, even under extreme climatic and topographic conditions. They are used in mining above and below ground, in loading and unloading plants, and in other industries. Their tough construction guarantees high breaking load and good impact resistance. Thanks to ContiTech's great material expertise, the conveyor belts demonstrate minimal elongation, even over long distances.

Thermally stable and resistant to wear, rot, corrosion and chemicals, steel-cable conveyor belts achieve a long service life while requiring little maintenance. Depending on the application, fabric-reinforced conveyor belts transport goods containing oil

and grease, hot goods (up to 200°C) or sharp-edged goods, even up inclines of up to 30°.

Depending on the application, textile conveyor belts feature various cover stock properties and a single- or multi-ply textile tensile member. The durable products master diverse conveying tasks in open-pit and underground mining.

One highlight of the product portfolio are MegaPipes, which are establishing new standards in closed-trough belt technology. MegaPipes can offer diameters as wide as 900mm. The larger belt width of up to 3,200mm enables a significant increase in the capacity of conveyor systems by more than 100% compared with standard closed-trough belts. While crushed mineral ores, rock or coal have to be laboriously reduced in size for transportation with standard closed-trough belts, MegaPipes enable transportation directly after the primary crusher.



MegaPipes.

Online conveyor belt advisors

ContiTech has developed an online customer advisor in the form of three web tools. The new service offerings include six-step installation instructions for steel cord conveyor belts. Another application briefs the user on nine causes of belt misalignment and gives instruction for optimizing alignment. Both applications include animated video sequences and are available in nine languages.

The ContiTech CareWell web tool provides an overview of the ContiTech conveyor belt service materials and visualizes their impact on a virtual conveyor. It reacts to the activation and deactivation of the components and visualizes the effects that the various service materials have on the system and the conveyor belt. Product information is available using a zoom function. Users can access the three web tools on the company's website.

In addition, the Mining Calculator computer programme available from Mining Technology Consulting in Clausthal-Zellerfeld, Germany, enables mining companies to calculate and compare future load and transport combinations for specific mining projects. They can then identify the best combination of truck or conveyor belt haulage from both an economic and environmental standpoint.

Strong focus on service

Service is a top priority for ContiTech: at all production and sales sites around the world, the company is working every day to improve customer-oriented processes. Therefore, the company supports its customers by providing a comprehensive service. The company accompanies every order from initial planning and consultation through start-up to after-sales service of the products in use.

The service and support philosophy of the company is carried throughout different stages. During the planning phase of each order, the company acts as a problem solver and provides extensive expertise in order to offer the right solution for individual conveying tasks.

As a result, it delivers tailor-made solutions to its customers. The company follows through on every order from initial planning and consultation through start-up to after-sales service of the products in use. DCi

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Turnkey projects

CAD rendering of the Vale iron ore regional distribution centre, Malaysia.

bulk handling from A–Z

DemcoTECH showcases materials handling expertise in port handling facilities

Lack of sufficient overland and port materials handling facilities can often be the bottleneck in the economic growth of developing nations, which are generally plagued by minimal established infrastructure, says DemcoTECH Engineering general manager, Paul van de Vyver.

Headquartered in Johannesburg, South Africa, but with an international client base, DemcoTECH has first hand knowledge of the logistical and infrastructural challenges facing companies operating from developing nations.

"We have been responsible for a number of bulk materials handling facilities for terminals such as Grindrod's Richards Bay and Maydon Wharf in South Africa, as well as having been responsible for the overall design for a multi-billion dollar iron ore import/export facility in Malaysia," says van de Vyver.

As an engineering contractor on one of the world's largest iron ore distribution centre projects to date, Vale's project in Lumut, Perak, Malaysia, DemcoTECH provided materials handling engineering and support services for the establishment of the iron ore import/export blending centre. Due to be operational in 2014, the regional distribution centre comprises a deep water jetty and an onshore stockyard to receive iron ore from Vale's mines in Brazil and distribute it to customers across the Asia Pacific region.

In addition, DemcoTECH separately provided operational readiness services, including the preparation of operational and maintenance manuals and training modules.

In South Africa, DemcoTECH supplied a mobile ship offloading and warehouse distribution system for Grindrod Terminal's fertilizer storage facility at Maydon Wharf in Durban.

"The system replaced a trucking system with a major impact on productivity of the operation," notes van de Vyver.

The system, designed and supplied by DemcoTECH through an engineering, procurement and construction management contract (EPCM), comprised four mobile (grasshopper) tyre-


Grindrod's Maydon Wharf fertilizer terminal project, South Africa.

mounted conveyors stationed on the jetty at locations to suit the ship docking arrangements. Once the ships have been offloaded, the fertilizer is conveyed to a central pivoting and retractable boom conveyor.

The existing warehouses were modified to incorporate five reversible, multi-point discharge shuttle conveyors. These conveyors feed individual bays in the warehouse.

"A very important feature to ensure optimum efficiency was the fully sequenced automatic starting and stopping of the systems, which ensures a seamless operation, with no blockages or hang-ups, and the ability to handle different types and grades of fertilizer," says van de Vyver.

Also for Grindrod Terminals, DemcoTECH was responsible, through an EPCM contract, for the materials handling portion of the expansion to its multi product terminal at the deep-water port of Richards Bay, on the east coast of South Africa. The scope of the contract covered providing the materials handling to convey various materials, but mainly rock phosphate and coal, from the three Richards Bay terminal sites: Navitrade, Kusasa and Valley.

At Navitrade, a tippler discharges material onto three belt conveyors. The second conveyor discharges either onto the third conveyor, which feeds an open stockpile at Navitrade or to a pipe conveyor. The pipe conveyor feeds the Kusasa transfer house, which distributes the material either to the existing export line or to Kusasa conveyors that feed the Kusasa warehouse. The Navitrade stockpile is equipped with front end loaders, which reclaim material via a Buffalo feeder discharging the material into a pipe conveyor.

The Kusasa materials handling system consists of two belt conveyors, which feed the existing warehouse via a travelling tripper. The material is reclaimed from the warehouse via steel hoppers to four belt feeders. These feed a belt conveyor which in turn feeds back to the Navitrade pipe conveyor for export purposes.

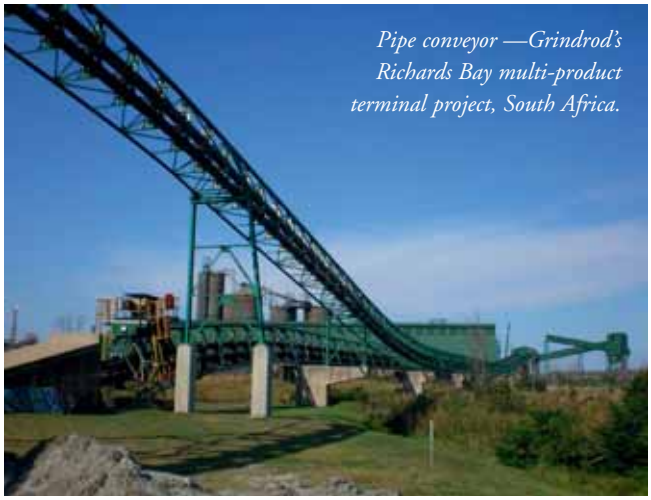
The materials handling system at the Valley terminal site was an extension to plant supplied previously by DemcoTECH, which conveyed material from terminal conveyors to feed a single warehouse. The expansion extended the lead conveyor to feed a choice of two other warehouses. This involved modifications to the existing belt conveyor to accommodate a moving head to discharge the material either onto an existing stream or onto either of two belt conveyors. These discharge onto two dedicated warehouse feed belt conveyors, which in turn feed the dedicated warehouse via a travelling tripper.

"As this was a brownfield site at a very large terminal, the interfacing of new equipment into the existing equipment had to be carried out around planned shutdowns in order to minimize disruptions to operations," noted van de Vyver.

"These projects showcased our comprehensive range of systems and technologies that we are able to design and supply for the port handling industry. This ranges from conveyors through to moving head systems, tripper systems, stackers and reclaimers, sampling plants, storage facilities and bulk material silos.

"Our experience and expertise in conveyor systems cover the full spectrum of overland and in-plant conveyors and we specialize in pipe conveyors, having supplied these systems using a triangular tubular gantry fitted with a mobile maintenance trolley."

"With regard to sampling plants, we established an iron ore sampling plant at the Saldanha iron ore terminal in South Africa


Pipe conveyor —Grindrod's Richards Bay multi-product terminal project, South Africa.

for Kumba Resources, later completing an upgrade to the facility, which allows the sampling of a wide range of iron ore products, from fine material to lump ore for export purposes."

The upgrade converted the sampling plant from a mass to a time based system, which reduces bias in the selection of material sizes for sampling purposes. The upgrade was carried out on a shutdown basis to minimize any demurrage fees.

The turnkey upgrade project covered installation of new conveyors to feed the sampling plant, addition of load cells into the weigh hopper for more accurate readings and introduction of a two-way splitter.

This automated iron ore sampling plant enables Kumba to assure quality that complies with the world's highest International Standards Organization (ISO) benchmark. During the process, samples are taken from the supply line, en route to the ships, and are introduced into a fully automated robotic laboratory where they are prepared simultaneously for physical and chemical analysis. The sampling facility has two conveyor streams, with single product loading possible using either conveyor.

The sampling facility enables exporters to have the physical and chemical qualities of iron ore products certified independently before they are loaded for export. The facility was designed to comply with ISO 3082 and facilitates a quick turn-around time.

DemcoTECH services are offered though contracting mechanisms from EPCM to Lumpsum Turnkey including studies and from concept design through to detailed feasibility studies. After-sales services include spares, maintenance, refurbishments and operational readiness packages covering procedures, systems and workplace tools required to successfully operate and maintain a new or upgraded plant.

Tenova TAKRAF wins further order from leading Italian steel producer

Tenova TAKRAF Italy has been awarded a contract by ILVA S.p.A., a leading Italian steel producer, for the design and supply of a bucket chain continuous ship-unloader for handling iron ore and coal at the ILVA steel plant in Taranto, Italy. This plant is the largest of its kind in Europe. The 18-month turnkey contract builds on a longstanding business association between Tenova TAKRAF and ILVA of 40+ years.

The new continuous ship-unloader (CSU) will have an operating capacity of 4,000tph (tonnes per hour) for iron ore or 2,240tph for coal and will be able to download vessels up to 150,000dwt. The CSU will be erected on the existing runways of the ILVA plant's Pier II to feed the entire steel plant with coal and iron ore and pellets, together with the other machines at the plant. The CSU will be almost entirely manufactured by Italian companies and is expected to be operational in late March 2015.

In addition to the long-standing and much-valued relationship with the client and competitive pricing, availability of this technology was a major factor in the award. Only a few companies in the world are able to supply this type of technology and Tenova TAKRAF offers many successful references. To date, 15 CSUs have been supplied worldwide, with relevant references to the ILVA award being excellent performances achieved by four CSUs recently supplied to Enel for Brindisi South and Torrevaldaliga North, in Italy.

Tenova TAKRAF developed its bucket chain continuous ship-unloader technology in the 1980s. Subsequent years have seen ongoing enhancement to the technology, with the most sophisticated part being the digging foot, for which Tenova TAKRAF holds the patent.

Following the devastating tornado of November 2012, ILVA initiated a plan for environmental rehabilitation of the steel industry in Taranto. The new CSU was ordered as a consequence of this. The plan involves replacement of the old grab ship-unloaders (supplied in the 1970s under the Italimpianti trademark) with modern bucket chain CSUs, which significantly reduce dust emission during the discharge cycle. The CSU's low environmental impact is a major feature, noting that the steel plant is close to the city area.

In this brownfields project, the CSU is replacing the existing old grab unloaders at Pier II. Tenova TAKRAF also supplied a CSU for Pier IV in 1999, and an additional large grab unloader for the same Pier in 2009.

"Tenova TAKRAF's involvement with this important client dates back to the 1970s, at which time Tenova TAKRAF was known as Italimpianti," says Alberto Dardano, managing director of Tenova TAKRAF Italy. "This valued relationship has been sustained not only through many repeat contracts, but also, through the quality of after sales services we have provided to ILVA on an ongoing basis."

Tenova TAKRAF is a key supplier of equipment and systems for open pit mining and underground solutions and bulk handling, having provided hundreds of complete systems, as well as individual machines to clients all over the world in all climatic conditions. Leading-edge comminution systems for milling and crushing requirements in mining and mineral processing are based on a track record in mill supply dating back to the 1920s. Globally sourced air pollution control, specialized handling equipment, and technology for the cement and fly ash industries ensure selection of optimal processing options.

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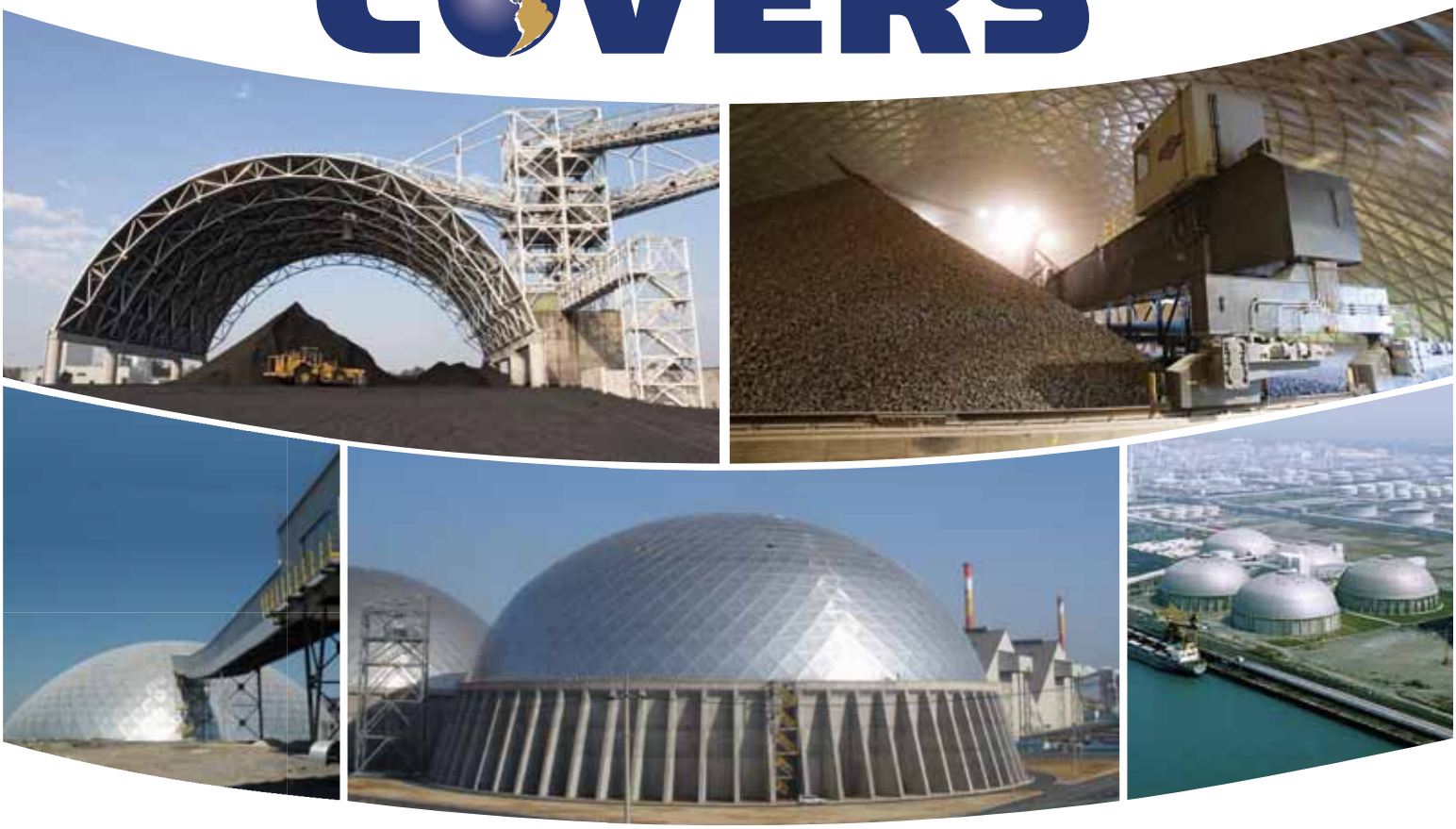

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Ausenco demonstrates significant expertise in delivery of turnkey contracts

Shiploading operations at the Antamina concentrate export terminal in Huarmey, Peru.

Ausenco has significant experience with bulk-related turnkey projects carried out over the last 25 years, as well as projects in the minerals and metals mining and processing field. The company has completed EPC (engineering, procurement and construction) projects as a prime contractor providing detailed design, procurement and full construction services; as JV (Joint Venture) partner with shared EPC project responsibilities; and as subcontractor to the prime contractor who retains overall project responsibility. In addition, the company has provided design engineering services only (the 'E' component of the EPC contract) directly for the prime contractor.

On another very successful EPC project, Ausenco participated as a full JV partner in the EPC team that worked in a strategic alliance with the owner.

Ausenco demonstrates significant expertise in delivery of turnkey contracts Ausenco believes that it is always important to complete thorough front end engineering on a project before entering into an EPC arrangement. This will lead to the project being successful and a win-win situation for both the owner and the EPC contractor.

The company considers that the most significant project improvements occur in the early planning, engineering, and construction methodology development.

Because of this, Ausenco believes that engineer-led EPC projects offer significant benefits to the owner due to the fact that it has performed all of the preliminary design and has worked extensively with the owner to develop excellent working relationships and a mutual high level of trust.

A few selected examples of Ausenco's key bulk-related turnkey projects include:

Antamina concentrate export terminal in Huarmey, Peru

Client: Bechtel International as agent for Compañia Minera Antamina
Timeframe: 1999–2002
Scope: EPC of concentrate export terminal
Services: Planning, design, procurement, and construction
Project value: $230 million (export terminal only)
Ausenco executed the EPC development of the Antamina Concentrate Export Terminal at Huarmey, Peru.

The terminal is capable of annual export of 1.8mt (million tonnes) of copper and zinc concentrates annually. Facilities include receiving tanks for the overland slurry pipeline, slurry dewatering facilities, storage shed for 150,000 tonnes of concentrate, conveyors from the filter plant to the storage building and from the storage building to the shiploader, berth for ships up to 50,000dwt and associated infrastructure.

Ausenco provided project engineering, procurement and construction management services as partner in a joint venture with SSK Montajes e Instalaciones S.A.C., a Peruvian–Chilean contractor to carry out the construction.

The project was executed under a PI (Performance Incentive) Contract where the owner and contractor share underruns and overruns. The contract was completed three months ahead of schedule with an associated budget underrun.

As well, the JV with SSK achieved the best safety record of the 40 contractors on the $2.3 billion Antamina mine/port project, having exceeded 3.5 million hours of work with only one lost time injury.

The project was successfully constructed to World Bank

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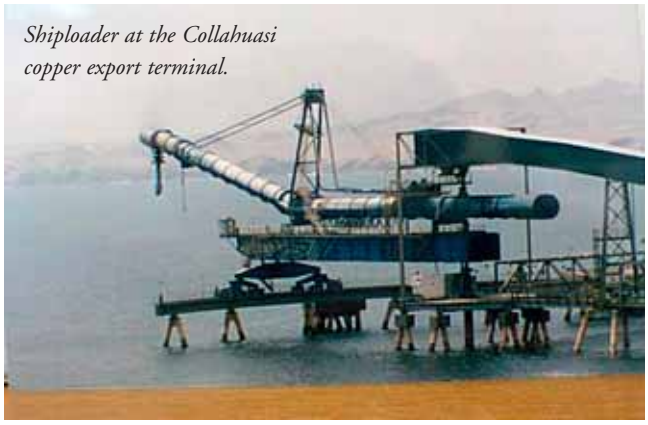
environmental management standards.

Ausenco received the Consulting Engineers of British Columbia Award of Merit for this project in 2002.

Collahuasi copper export terminal in Iquique, Chile.

Client: Compañia Minera Doña Ines de Collahuasi S.A.
Timeframe: 1996–2000
Scope: Site selection, port feasibility study, EPC development of the terminal
Services: Planning, engineering, procurement, construction
Project value: $38 million

Ausenco's earlier work on port site selection and feasibility studies led to an EPC contract for 'fast track' design challenged by difficult site conditions and limitations of locally available equipment.



Shiploader at the Collahuasi copper export terminal.

The Collahuasi Copper Mine was developed in northern Chile and at the time was anticipated to be the third largest in the world. The initial production was planned to be 1mt (million tonnes) a year of copper concentrate, which is transported by slurry pipelines to the port. The facility can accommodate vessels up to 60,000dwt.

The irregular underwater bedrock profile and the presence of large boulders made pile installation very challenging. Overcoming the lack of any substantial overburden, the required pile design capacities were innovatively achieved by anchoring pile tips into bedrock.

The seismic design of the shiploader illustrates state-of-the-art design approach permitting the shiploader to withstand a seismic event well in excess of the code requirements without significant damage.

This project features the first fully enclosed boom of a quadrant shiploader to contain dust, setting new standards for environmental design.

Hamersley Iron Dampier Port expansion

Client: Hamersley Iron Pty. Limited
Timeframe: 1999
Scope: Iron ore export terminal expansion and upgrades
Services: Feasibility study, master plan, cost estimates, simulation modelling, definitive engineering and EPC services.
Project value: $200 million.

Hamersley Iron Pty. Limited is Australia's leading iron ore exporting company with an annual throughput approaching 60mt/year. Its company-owned railroad delivers ore from five mines in the Pilbara region, some 370km, to two terminals in Port Dampier.

Dampier Port expansion.

Trains consist of 220 ore cars, each of 105 tonnes nominal capacity. The trains are rotary dumped at either East Intercourse Island or Parker Point, where the ore is conveyed to either lump or fines stockpiles for blending prior to shiploading in vessels up to 350,000dwt size.

Following a worldwide search, Hamersley selected Ausenco and Clough Engineering Group, a Perth-based contractor, to form a strategic alliance to provide engineering and construction services for future expansions.

The first task of the alliance was to develop a long-term master plan to define the future expansion possibilities in several stages to an ultimate capacity of 90mt/year (from 55mt/year). The master plan team examined many scenarios for expansion of one or both existing terminals while maintaining the growing throughput.

A key part of the master planning studies involved the analysis and simulation of operations. Extensive simulation modelling was done to test the existing and future operations. The model included the railcar loadouts at six mines, the railroads, railcar dumping, blending, stockpiling, reclaiming, screening and shiploading operations at the two terminals.

The master plan proposed expansion of the existing terminals in several incremental steps to suit the timing of new mine developments and market growth.

Next, the definitive engineering studies were completed, followed immediately by provision of EPC services for the Dampier Port Upgrade Project which also included upgrades and new facilities for both the Parker Point and East Intercourse Island iron ore export terminals.

Iron ore stockpiles at Dampier Port.

TRF's turnkey projects in ports and stockyards

Introduction to TRF

TRF Limited has been a major provider of material handling solutions for five decades. Set up in 1962, it is part of the Tata Group that operates in seven sectors and has a combined turnover of about $100,00 billion. The company designs, supplies, erects and commissions bulk material handling equipment and systems in infrastructure industries like steel, power, mining, ports and cement. It provides total engineering solutions, from the concept to commissioning, to fulfill the requirements of its customers in the core sectors. TRF has the expertise in executing turnkey projects for handling dry bulk cargo within the country and also overseas.

Level luffing cranes.

TRF's Port & Yard Equipment Division: capability and products

TRF's Port and Yard Equipment Division is a renowned supplier of port equipment and specializes in the engineering and manufacturing of bulk material handling equipment for ports, shipyards, power plants and metallurgical units. An in-house manufacturing unit located at Jamshedpur, India, supported by a highly skilled engineering team using advanced computer-aided designing tools and a strong quality assurance and inspection system are some of the key strengths of the division. An extremely efficient and dedicated team of erection and commissioning engineers ensure high level of supervision of the project equipment at site. The division also offers consultancy and maintenance services to these sectors. To enhance the performance of its state-of-the-art equipment and the benefits that accrue to its customers, they are customized to fit the requirements and unique characteristics of every location. This translates into uninterrupted higher output and a competitive advantage for its customers.

TRF's Port and Yard Equipment Division is capable of undertaking turnkey projects for delivering material at high capacity and on continuous basis for different types of industries handling bulk cargo like coal, iron ore, limestone, dolomite, coke, lignite, fertilizers, food grains and similar types of raw materials. The projects start from unloading of bulk material, conveying, processing/sizing through a series of crushers and screens, storing and reclaiming through mechanized equipment and again feeding the discharge point by a series of conveyors and appropriate unloading machinery. To ensure that the entire operation is completed efficiently TRF supplies most of associated equipment, such travelling trippers, slewing stackers, bucket wheel reclaimers, stacker cum reclaimers, barrel reclaimers, stacker/reclaimers, wagon loaders, wagon tipplers along with side-arm-chargers which are manufactured in-house at its plant in Jamshedpur. Similarly, various types of ELL (electric level luffing) cranes such as goose neck, single boom grab and hook duty etc. and shiploaders, ship/barge unloaders have been supplied to various ports and shipyards for handling dry bulk material and construction of ships respectively.

Travelling wagon loaders.

The capacity of the TRF stacking and reclaiming equipment ranges from 3,600tph (tonnes per hour) in stacking mode to 3,000tph in reclaiming mode. TRF's wagon loaders are of 3,000tph with a boom length of 7.5 metres, ship unloaders are of 2,000tph with an outreach of 38 metres and ELL cranes are of 60tph capacity with outreach of 50 metres.

Some turnkey projects in India and the international market

The company's major customers include Tata Steel Ltd, National Thermal Power Corporation,

Stacker/reclaimers.

The company has supplied a slewing stacker to Tata Steel KZN for its ferrochrome plant in Richard's Bay, a reversible stacker reclaimer to Doosan Heavy Industries and various equipment and complete electrical and automation systems to Shadeed Iron and Steel Company.

Market opportunities in India

India has a coastline of approximately 7,517km and is serviced by various major ports and other minor and intermediate ports — both in public and private sectors. These ports handle various types of cargo, out of which dry bulk cargo — mainly food grains, iron ore, coal, chemicals and fertilizers constitute about 45% of the total volume of cargo handled. Although the volume of cargo has grown considerably in the recent past, most of the ports even today still carry out their operations with primitive methods of unloading by using obsolete geared vessels and mobile harbour cranes. These operations consume valuable time and lead to huge amount of wastage during loading and unloading. Immediate augmentation of the port facilities in terms of investment in high-capacity mechanized handling facility is required.

Some ports have already taken appropriate action to augment their cargo handling capabilities. Hence TRF sees this as a huge potential market as it has the ability to excel its market peers, in the country, by providing reliable and durable turnkey solutions that are developed in-house at highly competitive prices. This is possible because TRF has the complete range of products required for the purpose of putting up a mechanized berth, from start to finish, to handle dry bulk cargo at ports.

TRF is geared to provide the following products for:

A. Incoming cargo:

- ship/barge unloaders or ELL cranes (depending on the type of dry bulk cargo) or wagon tipplers as the case may be for unloading cargo;
- transportation of the cargo after discharging from the above equipment to the stockyard through a chain of conveyors; and
- stacking of cargo at the stockyard using stacker/reclaimers or slewing stackers.

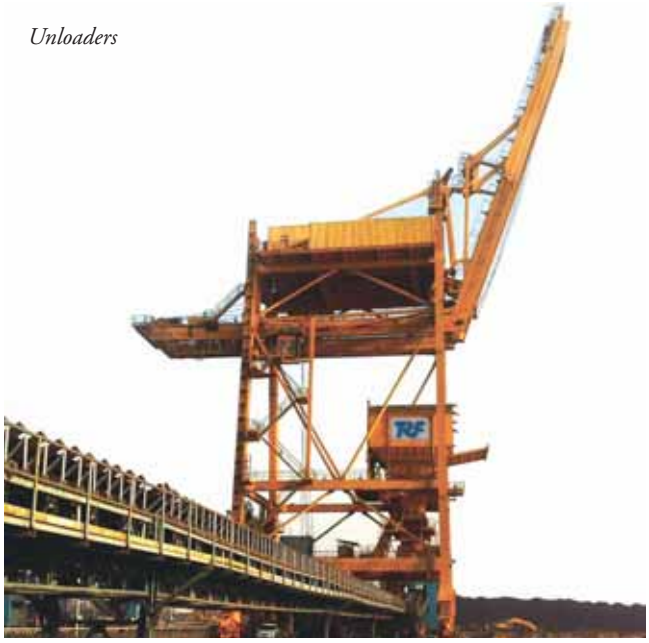
B. Outgoing cargo:

- reclaiming of cargo from stockyard using stacker/reclaimers or bucket wheel reclaimers;
- transportation of cargo to the loading point by a chain of conveyors;
- loading of cargo by wagon loaders or shiploaders as the case may be for onward dispatch.

All the above products of TRF are well established in the market with a proven track record and customers have reported a high level of satisfaction with product performance. TRF is one of the engineering companies in India which has the expertise and ability to carry out such turnkey project in-house by designing and supplying equipment manufactured by it. DCi

Steel Authority of India Ltd, Rashtriya Ispat Ngam Ltd, various state electricity boards , Bharat Heavy Engineering Ltd, Damodar Valley Corporation, Jindal Steel & Power Ltd, Essar Steel Ltd, Mideast Integrated Steels Ltd, Durgapur Projects Ltd, Bhusan Power and Steel Co Ltd, LANCO, Jindal Power Ltd, BMM Ispat Ltd, Heavy Engineering Corporation Ltd, Energo, National Aluminium Co Ltd, Calcutta Port Trust, Krishnapatnam Port Co. Ltd, NTPC Tamil Nadu Energy Co Ltd, NLC Tamil Nadu Power

Unloaders



Ltd, Paradip Port Trust, Kandla Port Trust, Mumbai Port Trust, Visakhapatnam Port Trust, Tuticorin Port Trust, Nippon Denro Ispat Limited, Oswal Chemicals & Fertilizers Ltd, Mazagon Dock Ltd, Cochin Shipyard Ltd, Birla Copper Ltd and many more in government and private sectors.

TRF has also established a presence in the international market by supplying bulk material handling equipment to various projects and customers such as Tata Steel KZN, South Africa, Doosan Heavy Industries, Korea for their Cirebon, Indonesia project and Shadeed Iron & Steel Company, Oman (now Jindal).

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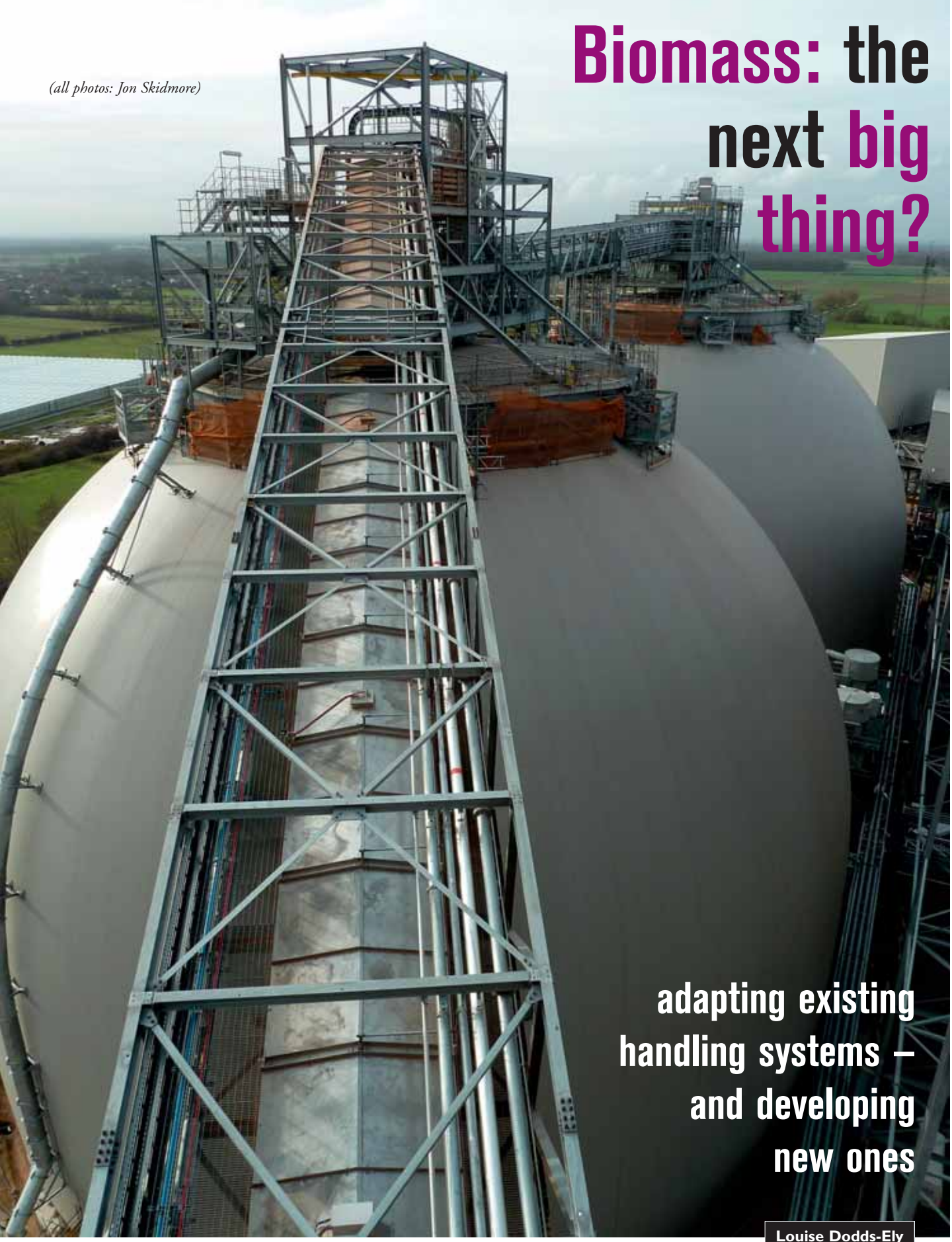

(all photos: Jon Skidmore)

adapting existing handling systems – and developing new ones

Louise Dodds-Ely

Renewable success for Robson

After successfully subcontracting to the Shepherd Group for the materials handling contract for Drax Power Station on 3 concurrent projects at Drax Selby site for its main ECO-Store, boiler distribution system and co-fire system, material handling company George Robson & Co Ltd is close to the first milestone handover.

George Robson & Co, based in Sheffield, UK, is responsible for the project, which includes a complex array of towers, buildings and conveyor systems that are mounted within open gantries up to 60m high. The gantries enable the conveyors to convey the

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biomass across the site, bridging roads and railway lines.

The high speed weather-proof trough belt conveyor systems provide inflight screening, ferrous removal weighing, sampling in accordance with OFGEM, ATEX and Board of Trade weighing system requirements.

The system receives biomass from sub-ground level via a dedicated dual rail unloading facility. The dual redundant conveyor line can deliver 2,800 tonnes of material per hour. From rail unloading through to boiler distribution, the conveyor system covers 3.5km of length.

The structures enable the conveyors to convey the biomass material from the sub-ground level up to 80 metres in height, providing chute work and diverting systems to route the material to any one of four storage domes.

Discharged by a vibrating floor, the material stored in the domes is fed to the out feed conveyor system. The conveyor system's complex design enables blending of product between silos; this ensures the product is free from degradation and self-combustion. The arrangement of divert valves also enables a direct route from rail unloading to the boiler distribution system.

The project involved the installation of 28 conveyors, totalling 3.5km in length with a total belt length of 7.9km. The conveyors will transport fuel from trains into four special domes which can hold up to 75,000 tonnes of biomass each. The domes themselves were built in a unique way — giant 'balloons' were blown up from the ground then each one was sprayed from the inside with concrete. Each one is 55 metres in diameter and 60 metres high.

The conveyor sections, designed and installed by Robson, were fitted within the gantries on the ground then lifted as a 140-tonne section using one of the largest cranes in the world. The rising height from the first conveyor below ground to the highest point is 80 metres. The conveyor system will enable 2,800 tonnes of biomass pellets to be transferred per hour.

The biomass dust is explosive. Therefore, the conveyor system has undergone a rigorous assessment to ensure they

(photo: Jon Skidmore)

meet the ATEX (Explosive Atmospheres) standards, which ensure the safety of the plant and personnel.

The biomass is derived from waste wood, grain husks, nut shells, and forestry waste and among many other natural materials and is prone to additional metal object such as tramp steel, nails and nut and bolts.

To ensure safety, the biomass must be free from foreign objects that may damage the firing process, or possibly cause heat or sparks along the conveying process. Robson utilizes a series of overband magnet separators to remove ferrous metals and disc screens to limit oversized lumps or other objects that may cause blockages in the chute work.

Robson's managing director, Kevin Mannion states, "Robson prides itself on the design of the biomass handling systems, utilizing the state-of-the-art engineering technologies coupled with the engineers' wealth of experience within the materials handling industry, to provide a robust, reliable and safe working system."

About Geo Robson & Co Ltd

The company offers expertise in many industries, including: power generation — biomass systems; airports — baggage handling systems; sugar industry; glass industry; environmental waste — sewage, ash; cement; and raw material handling.

Among its major customers are: British Airports Authority; British Sugar; Tate & Lyle; United Sugar; Alstom Power; Drax Power Station; Fiddlers Ferry Power Station — Shepherd Group.

Geo Robson & Co turns over between £12 million and £18 million a year, and has 110 employees.

The combined resources of the Robson Group have the design, engineering skills and experience to handle complex projects over a diverse range of sectors. The companies can facilitate the production of a wide range of Structural steelwork and fully integrated mechanical handling systems, including projects requiring high added value engineering content.

Proven group strengths include: consultancy; feasibility; design engineering; fabrication/manufacture/test; electrical control systems; site service and maintenance; structural steelwork and stairs access; tubular and gantry constructions; bulk handling systems; performance and value; multi-sector presence; project completion track record; health & safety record; capability and flexibility; customer-focused project managers; and financial strength.

Awards

- Sheffield Chamber of Commerce & Industry Outstanding Business of the Year Award 2010
- The Kennedy's Business Person of the Year Award
- The Wake Smith Excellence in Manufacturing Award
- The Irwin Mitchell Excellence in Customer Service Award
- Sheffield Star Business Awards
  - Excellence In Manufacturing Award
  - International Business Award

  Short-listed for:
  - Chamber of Commerce - HSBC Excellence in
  - International Trade Award
  - Yorkshire Post's Environment Awards — The Manufacturer of the Best Green Product
  - Sheffield Star Business Awards — Environmental Award
  - Sheffield Star Business Awards — Business Person of the Year Award
- Made in Sheffield Awards 2013
  Entrepreneurial Award

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Spencer Group delivers first part of £150m Humber Ports biomass investment

Specialist engineering business Spencer Group has delivered the first project as part of a £150m investment in biomass handling operations at the Humber Ports in the UK.

Spencer Group has designed and constructed an impressive facility at the Port of Hull, showcasing the company's multi-disciplinary engineering expertise in a field in which it is a UK leader.

The facility is the first to be completed to support a 15-year contract between port operator Associated British Ports (ABP) and Drax Power Limited to enable sustainable biomass to be transported to Drax Power Station near Selby, as part of an ambitious programme which will see Drax transform into a predominantly biomass-fuelled generator within a few years.

Work began in April 2013, with Spencer constructing biomass handling, storage and discharge facilities, as well as associated infrastructure.

Despite the complexities and challenges of the project, the facility became operational in time to play a part in a visit to Drax Power Station by Energy Secretary Ed Davey in December 2013 to officially open the new biomass facilities supporting the first generating unit converted to burn sustainable biomass in place of coal. The Energy Secretary saw Drax-branded rail wagons carrying biomass loaded at the Port of Hull facility arrive at the power station for delivery into the biomass converted unit.

The port facility has now been handed over by Spencer to ABP, the project having been delivered on programme and within budget.

The centrepiece of the development is a silo tower in a prominent position close to the main road from Hull's docks. At 50 metres (164 feet) high it is one of the tallest structures on the city's skyline.

The facility will handle 1mt (million tonnes) a year of biomass imported by sea from the United States and Canada in the form of wood pellets created from sustainable forestry residues and thinnings. The biomass is stored in warehouses before being delivered by truck to the new facility and unloaded into feeders which take it to a 250-metre (820ft) conveyor, carrying it to the top of the silo.

The silo is capable of storing up to 1,800 tonnes of wood pellets and is filled by 60 truckloads of biomass over a three-hour period, twice a day, loading at the rate of 600 tonnes an hour.

Sophisticated technology ensures an even load as the biomass is discharged into rail wagons which pass through the base of the structure at crawling speed. The automated system is capable of loading up to 25 rail wagons with 1,625 tonnes of material in just 45 minutes.

Gary Thornton, Chief Operating Officer of Hull-based Spencer Group said: "We are delighted to have met the expectations of our client, ABP, with the successful delivery of this complex and challenging project. It has employed our multi-disciplinary engineering expertise to best effect, with rail, civil, structural, electrical and mechanical engineers all involved.

"We are especially pleased to have worked so constructively with ABP and Drax on the first project to be delivered as part of the major investment being made in the Humber Ports to support the phased conversion of Drax to a predominantly biomass-fuelled generator.

"The Humber Ports are becoming a major gateway for biomass shipments into the UK and a strategic asset driving the growth of green energy industries along the estuary. The facility we have constructed at the Port of Hull is both a showcase for our engineering capability and a beacon for the Humber's

growing reputation as the UK's renewables region."

Philip Hudson, Drax Director of Corporate Affairs, said: "With its headquarters in Hull. Spencer Group was geographically well placed to take on the project, supported by a trusted and reliable local supply chain. Spencer also offered design and build expertise and the ability to mobilize and deliver the project rapidly to meet the requirements of Drax and ABP.

"The facility at the Port of Hull is an impressive feat of engineering, addressing successfully a number of operational challenges."

Simon Brett, Head of Projects, Humber, for ABP, said: "Spencer has delivered a design and build project to meet the requirements of both ABP and Drax Power, in the transportation of biomass from the Port of Hull to Drax's power station near Selby.

"The facility will be able to accommodate up to four trains per day, loading through a state-of-the-art system that complies with all environmental and safety standards."

The Port of Hull facility reinforces Spencer Group's reputation for pioneering projects in the green energy field. Flagship schemes have included designing and building a biomass reception, handling and storage facility at Drax Power Station in 2010 and, in the same year, a biomass rail-loading facility at the Port of Tyne, which was then the first of its kind in the world, again to serve Drax.

The port investments are generating about 100 jobs during construction, with an additional 100 jobs created once all the facilities become fully operational. The largest is an investment of around £125m in a dedicated import facility, the Immingham Renewable Fuels Terminal (IRFT), which is due to be completed later this year. IRFT will handle bulk carriers bringing up to 3mt of wood pellets a year into the port, destined for Drax Power Station.

The new facilities underline the Humber's reputation as the UK's Energy Estuary, with a quarter of the country's energy needs generated in the region, or supplied through it.

ABP is the UK's leading ports operator. ABP's Humber ports play a crucial role in delivering national energy security and are at the forefront of supporting Britain's transition to low carbon and new renewable energy generation.

Spencer Group

Spencer Group delivers innovative engineering solutions across the energy, transport, industrial and infrastructure sectors, from initial design concepts through to construction, and specializes in logistically complex schemes.

Spencer delivers world-class engineering projects through a dedicated in-house development team, which combines innovation and value engineering to drive schemes forward. As a client-focused organization, Spencer utilizes its substantial knowledge and experience to deliver effective solutions and advanced engineering technology for clients. Spencer's value proposition combines demonstrable expertise with forward-thinking systems, enabling a dedicated, collaborative relationship throughout projects.

Founded by Chief Executive Charlie Spencer in 1989, the entrepreneurial company has grown rapidly and now has a £150m turnover and workforce of more than 500. The company has its headquarters in Hull, with offices in London and Glasgow.

The company has substantial renewable energy activities and exceptional green credentials. It was named Humber Renewables Large Business of the Year in the Humber Renewables Awards 2013 and claimed the prize for Best Renewables Project for the Port of Hull biomass facility in the same awards in 2014..

Spencer Group is developing Energy Works, a £150m environment-friendly power plant in Hull. It will be the first facility of its kind in the UK, using a combination of innovative renewable energy technologies that produce the most favourable results in terms of recycling and air quality. The project has been awarded a grant of almost £20 million from the European Regional Development Fund.

Spencer Group has an outstanding track record of applying engineering expertise to the renewable energy field. Flagship projects have included designing and building a biomass reception, handling and storage facility at Drax Power Station in 2010 and, in the same year, a biomass rail-loading facility at the Port of Tyne, then the first of its kind in the world.

Spencer Group has designed and built landmark structures across the UK, including the York Millennium Footbridge, Glasgow Science Bridge, and three control centres for Network Rail.

The company has a division focused on the rail sector and is a principal infrastructure contractor for Network Rail, operating nationally. Spencer sets industry-leading safety standards and is highly trusted to deliver complex rail infrastructure projects.

Spencer Group is a world expert in high-level bridge works, having developed a gantry system to enable vital dehumidification work to prevent corrosion of cables on the Severn, Forth Road and Humber suspension bridges, as well as the Alvsborg Bridge in Sweden. It has also been appointed to carry out the largest retro-fitted bridge dehumidification project ever undertaken globally — on the East Bridge in Denmark, the third largest suspension bridge in the world.

The business is also active in the nuclear power field, working on decommissioning projects within a 10-year Magnox framework.

ABP

ABP is the UK's leading ports operator handling around one quarter of the nation's seaborne trade.

ABP's 21 ports, together with the other transport-related businesses that constitute the ABP group, form a UK-wide

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network capable of handling a vast array of cargo. ABP is backed by investment in modern facilities and equipment, and supported by experienced staff. The group's other activities include rail terminal operations (Hams Hall), dredging (UK Dredging Ltd) and marine consultancy (ABPmer).

ABP's port estate totals 5000ha, including some 900ha of development land at key strategic locations around Britain.


The Port of Hull.

ABP's assets include:

- 87km of quay;
- 1000ha of open storage; and
- 1.4m² of covered storage.

In 2012 ABP handled over 115,000 vessel movements.

Over the next five years, ABP plans to invest over £450 million in a wide range of major projects across the group.

The Port of Southampton handles more than 600k cars per annum mainly for the export market including Jaguar Land Rover, Honda and Mini and ABP is investing in the building of its fifth multi-deck car facility on the Southampton port estate.

ABP Humber

The four ports of Grimsby, Immingham, Hull and Goole handle more than 65mt of cargo between them each year.

Grimsby and Immingham form the UK's biggest ocean gateway and move around 53mt of cargo per annum.

A total of £125 million is currently being invested in a biomass handling terminal in Immingham, in a Humber-wide agreement with Drax that has seen a further £25 million invested in the biomass handling facility in Hull. The Immingham Renewable Fuels Terminal will handle sustainable biomass shipments and will create over 100 permanent jobs once complete. The construction phase also created 100 employment opportunities.

The Port of Hull handles 10mt of cargo per annum and is the is the focal point for the planned development of the UK's largest offshore wind turbine manufacturing facility at Green Port Hull, which will be located on the Port's Alexandra Dock. This new manufacturing facility represents a £200 million investment and could create up to 2,000 direct jobs.

The new Grimsby River Terminal represents an investment of £26 million and will allow large car-carrying ships to berth outside the port's lock system. This development confirms the port's position as the UK's leading automotive handling facility.

More than the equivalent of one million TEUs (twenty foot equivalent unit) of unitized trade is shipped through ABP Humber ports.

Ro/ro and container traffic represents more than 30 sailings a week to Europe, Scandinavia the Baltic and beyond.

The Humber ports handle more than 70 freight train movements per day.

Goole is situated 50 miles upriver and is the UK's premier inland port. It handles over 2mt of cargo annually.

PEINER SMAG Lifting Technologies designs grabs for the biomass market

In incinerator plants, waste is used to generate electricity and heat. PEINER SMAG Lifting Technologies has designed and refined the MMGL-4 product series of PEINER grabs for the handling of waste and renewable raw materials. This product series has proved its worth in incinerator plants worldwide and is an established fixture in the market.

The PEINER grabs boast a wide range of technical features that are major advantage when being used in incinerator plants. For example, hydraulic pipes, electrical wiring and connections are fully protected. The cylinder barrel and piston rod are additionally protected against mechanical damage. The cylinders are fitted with oil damping at the end of the travel to reduce noise and increase durability. The inside and outside shell plates are made of highly wear-resistant special steel 400 HB. The self-regulating pump, with its integrated power regulator, ensures improved energy efficiency, protecting the motor and obtains optimal closing forces.

The grabs can be supplemented with further optional accessories: oil level watch and switch, oil tank thermometer and heater, inclination sensor in the control cabinet, central lubrication, as well as thermal protection for the engine.

The MMGL-4 product series of PEINER grabs are operated in both reversing operation and continuous running operation according to DIN EN 60 034. They can be operated in fully-automatic, semi-automatic and multi-shift mode.

Combustion residue from an incinerator plant is temporarily stored in the so called ash bunker and then disposed of.

PSLT has developed the PEINER motor dual scoop grabs, MTGL-3 product series, for work in the ash bunker. This product series is characterized by a large opening width and strong closing forces thanks to its four cylinders. The inclined position of the cylinders keeps the height to a minimum. As the grabs are also used below the ash bunker, pipes, wires and connections are fitted with all around protection that prevents dirt from entering the hydraulics. The PEINER ash grabs are equipped with exchangeable teeth that tear partially hardened and crusted surface apart and guarantee optimal filling.

Hydraulic loading machines are frequently used to sort waste and feed shredders. PSLT offers the PEINER hydraulic grabs as accessory equipment for this purpose.

PSLT also delivers appropriate grabs for the handling of wood chips, wood pellets and other raw materials, e.g. PEINER motor dual scoop grabs and PEINER four-rope grabs.

High performance industrial equipment for high capacity plants and terminals


Multi-terminal in Gdansk, Poland.

From Barnual, Russia in the East to Dublin in the West, Lachenmeier Monsun has delivered solutions for inland terminals, port terminals, power plants as well as wood pellet/wood chips plants. These solutions for bulk handling and the storage of biomass fuels all offer high performance, 365 days a year, 24/7.

Sales director Christian Ørskov Pedersen explains; "To our customers, high equipment reliability is a critical pre-condition for efficient handling and high turnover rates. And, when it comes to power plants, the demand on uptime and operational safety is indeed extremely high."

Helping customers stay competitive

Lachenmeier Monsun works with three different customer categories within the biomass segment: wood pellet/wood chip plants, power plants and bulk terminals. Of course, demand differs from segment to segment, but in all three categories a certain trend prevails — i.e. increasing capacities, longer and higher conveying equipment, increased automation of processes and easy maintenance.

"When it comes to helping customers stay competitive we at Lachenmeier Monsun feel confident spreading the word on some good cases," Christian Ørskov Pedersen explains.

Lachenmeier Monsun projects

Multi-terminal in Gdansk, Poland

A completely new port terminal was opened in June last year in Gdansk, Poland. The terminal is truly a multi terminal that handles bio products as well as feed and grain products with flat storage in three sections, five silos and a dryer with pre-cleaner. Gdansk Bulk Terminal is a flexible and future-proof multi terminal with intake from ships at 200tph (tonnes per hour), shiploading at 450tph plus two intakes from trucks each offering 150tph, and truck loading at 180tph.

High capacity terminal in Latvia

In Leipaja in Latvia, the Dan Store Terminal serves as a an outlet for agricultural trade in the region and handles wood pellets for bio fuels. Since vast areas in Latvia and neighbouring countries are covered by forests, there is great potential for increased wood pellet production in that area. With ship unloading at 600tph; two railway intakes (200tph and 500tph respectively); two truck intakes, each 500tph; three flat storage facilities totalling 66,000 tonnes; six silos totalling 24,000 tonnes; conveying capacities from 170–1,000tph; shiploading at 1,000tph; and railway loading at 200tph, the terminal is set for the future.

High-volume manufacturer of wood pellets in Vyborg, Russia

In 2010 Vyborgskaya Cellulose inaugurated the world's largest wood pellet plant (see picture on p77). The massive plant was projected to produce 1mt (million tonnes) of wood pellets per year. As subcontractor to Andritz Feed & Biofuel, Lachenmeier Monsun designed and manufactured the in-feed line for raw materials such as chopped wood chips and sawdust with a capacity up to 600m³/h. It also designed and manufactured the conveying lines for pellets from cooler to storage — two lines offering 250m³/h each. For the storage and truck loading plant, Lachenmeier Monsun directly supplied a complete conveying system up to 500m³/h and a storage system with two 7,500-tonne silos, temperature monitoring system, sweep augers, bulk scale system, and loading system for trucks in 4x4m² silos.

Large volume pellet storage for bio fuels in Avedøre, Denmark

When DONG Energy in Avedøre back in 2010 expanded the wood pellet storage facility, Lachenmeier Monsun was a main supplier. The pellet silo has a capacity of 100,000m³ and a 1,000m³/h filling capacity. The installation includes 15 internal chain conveyors with integrated receipt pits and drive over grids. A belt conveyor in the centre below the silo conveys the discharged wood pellets to the boiler house via the existing belt conveying system.

Special requirements when handling wood pellets & wood residue

Bulk handling of wood pellets and wood residue differs from other bulk material. The structure of the woody material is typically coarser and more uneven, and not quite as free-flowing as e.g. grain, so particular attention must be paid during handling and storage. To ensure trouble-free operation, Lachenmeier

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THIELE - More than 75 years experience in the engineering and manufacturing of conveyor chain systems such as round link chains, bucket elevator chains, bushed conveyor chains, forged conveyor chains and cardan chains, including all attachments.

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Products:

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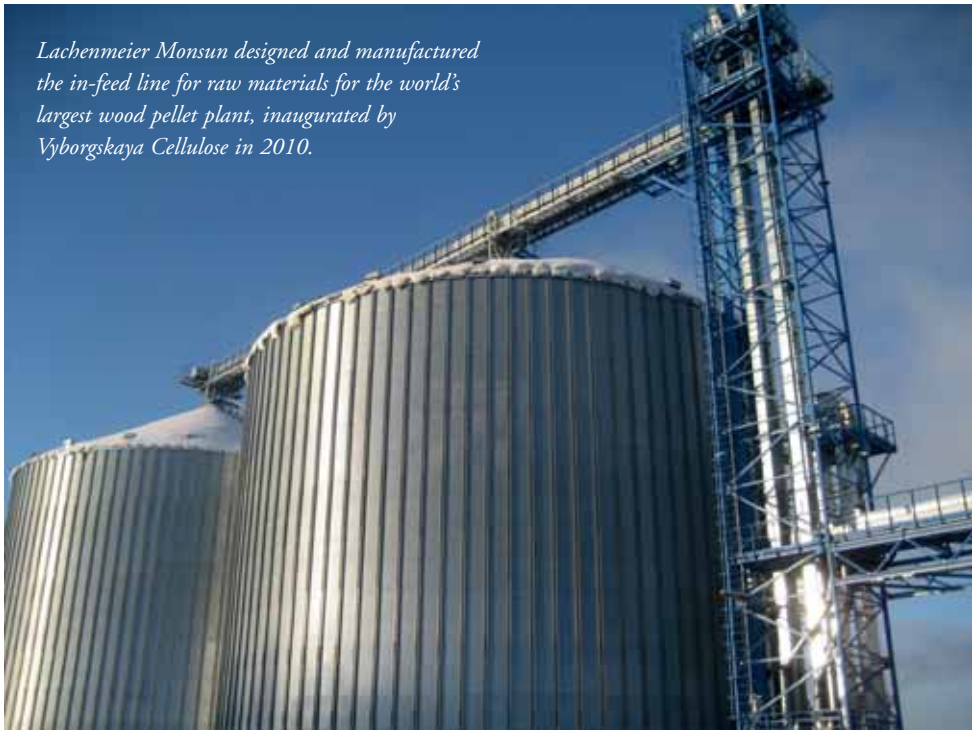

Lachenmeier Monsun designed and manufactured the in-feed line for raw materials for the world's largest wood pellet plant, inaugurated by Vyborgskaya Cellulose in 2010.

Monsun has designed special conveying equipment for uneven materials as is often the case with woody biomass products.

Explosion prevention

Another factor that calls for attention when handling and using wood pellets and wood residue is explosion prevention. At Lachenmeier Monsun, this risk is considered very seriously, and as early as possible in the design phase. Venting is a method that is easy applicable to bucket elevators to prevent a potential explosion in developing into a hazardous situation. The pressure from the potential explosion is relieved through venting panels. With a flameless venting solution, venting can even be done indoors, with no release of flames to the surroundings. A special device that extinguishes flames is bolted directly onto the explosion vent. Lachenmeier Monsun has recently delivered equipment for a new wood pellet plant to Sweden, with both venting and suppression technologies.

World Bioenergy

The World Bio Energy in Jönköping in Sweden (3–5 June) is a gathering point for the industry. Lachenmeier Monsun will demonstrate a range of technologies within high performance conveying equipment and discuss explosion relief technologies, too.

Lachenmeier Monsun A/S

With more than 50 years of expertise, Lachenmeier Monsun A/S has developed a unique expertise in customizing solutions for the industrial handling of feed, grain and biomass products.

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With more than 60 years' experience, J&B Grabs is the name you can rely on


Hydraulic High Volume Grabs


45 m³ Hydraulic Grab


High Volume Rope Grabs 31.5m³


Hydraulic Rehandling Grab


Hydraulic Cactus Grab (1.6m³)

Rope Cactus Grab (10m³)

J&B GRABS FOR ALL KINDS OF BULK HANDLING

Products:

- Cactus Rope Grabs
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- Hydraulic Cactus Grabs
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New Products:

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

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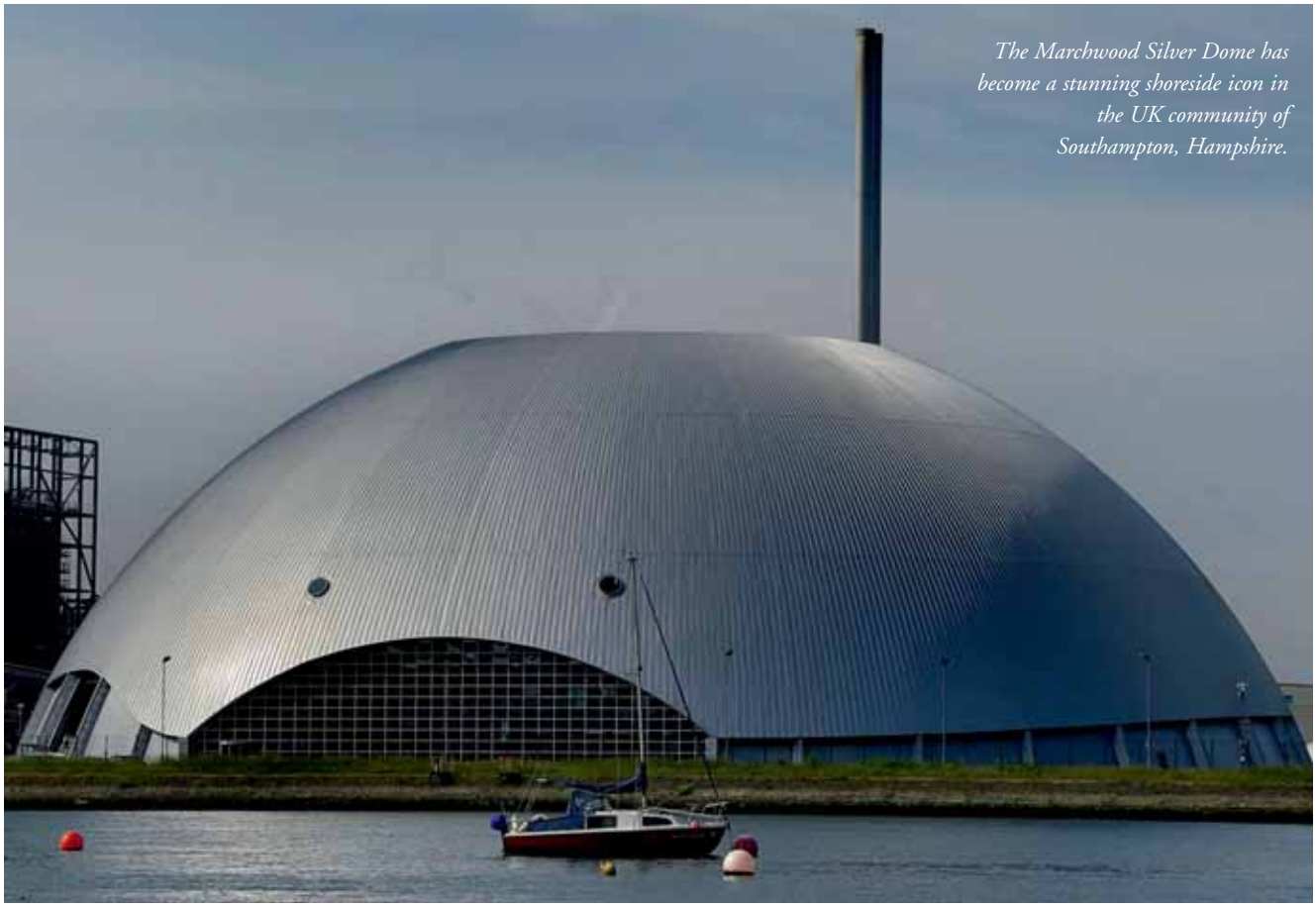
Biomass… under cover



The Marchwood Silver Dome has become a stunning shoreside icon in the UK community of Southampton, Hampshire.

Who says waste can't be a thing of beauty? Barrier-free utility and amazing aesthetics merge to create biomass storage and processing under long span domes, *writes Melanie Saxton of Geometrica*.

'Beauty' and 'waste' are seldom mentioned in the same breath—except when in the presence of a Geometrica waste management structure. Design, vision, environmental impact... all are elements necessary to develop clean, efficient biopower. Geometrica specializes in domes that make these 'green' initiatives possible in the UK, Qatar and all over the world. The importance of biomass and biopower simply can't be overemphasized.

Best-designed project in the United Kingdom

No longer a dirty word, 'waste' is processed as a renewable and clean energy source in municipalities worldwide. Nearly everyone is on-board with recycling, re-using, re-purposing and reclaiming disposable items previously doomed to landfills. Communities are making a shift to sustainable energy sources through the processing of plant and animal matter, as well.

Inspections ensure biomass quality

With the world focusing on climate change, the need for renewable energy has led to the use of many agricultural products being grown and converted into biomass for consumption by power stations in a bid to reduce emissions and their usage of coal.

Inspectorate has, for many years, been involved in the inspection of biomass products as well as the traditional coal and coke trade. In the USA, the company represents suppliers and buyers right across the North American region. Because of the increasing export of wood pellets, Inspectorate is actively expanding its inspection network across the Gulf, East Coast and Canadian ports.

To complement its inspection operations, Inspectorate is installing a new sample preparation facility in Port Arthur, Texas and a new solid fuels laboratory in La Place, Louisiana. It is Inspectorate's aim to cover all wood pellet production and load-port locations which currently includes Vancouver and Prince Rupert on the West Coast of Canada; Belledune, Quebec (new office) and Montreal (new office) on the East Coast of Canada; Port Arthur, New Orleans, Mobile and Panama City in the Gulf Region; and Brunswick, Savannah and Chesapeake on the East Coast of the US.

Inspectorate also provides discharge inspection and testing services at the major European Ports in UK, Belgium, Holland Germany, Italy and Denmark.

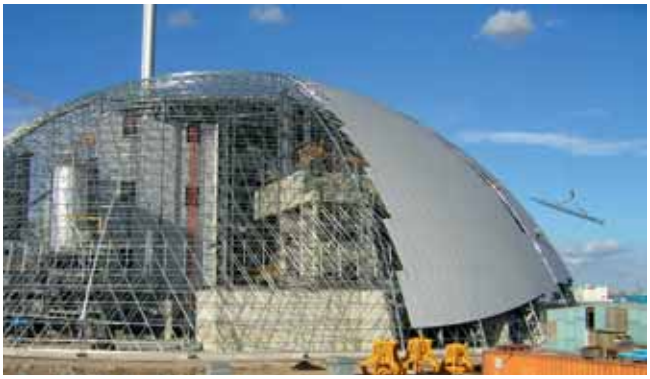
The company employs dedicated staff, trained to co-ordinate all operational activities, as well as expert surveyors who perform services such as hold tests,

supervision of loading/discharge, temperature monitoring, sampling and sample preparation, and draught surveys. Inspectorate's specialized solid fuels laboratory facilities in both the US and Europe have the following capabilities:

- ❖ crushing, grinding and dividing bulk samples for analysis;
- ❖ drying ovens for bulk and semi prepared samples;
- ❖ analysis of physical and chemical parameters, i.e.: proximate; total sulphur; calorific value; hardgrove grindability index; ash fusion temperatures; carbon; hydrogen; nitrogen; particle size distribution;
- ❖ ICP Analyzers for the determination of trace elements in various sample types;
- ❖ sample preparation and analysis performed according to recognized international standards (ISO/ASTM); and
- ❖ laboratories accredited to ISO 17025 with new laboratories in the process of preparation toward ISO 17025 accreditation.

"Inspectorate is excited about the growth of the North American wood pellet market and is developing its operational network to meet the demands of a young industry and many new customers." says Fanie Nel, Metals & Minerals Vice President for the Region.

Biomass has become more manageable — and more useful — through biopower technology. The delivery, processing and storage of biomass has certainly evolved according to Francisco Castaño, president of Geometrica. He notes that aesthetics and sustainability are a double-edged positive that has entire nations looking at power sources through a new lens. Biomass can be processed, stored and distributed beneath long spans of thoughtfully designed waste management infrastructure. These types of efficient domes are exemplified in the Marchwood facility, a prime example of biomass processing and storage in the



UK (see 'A jewel off Southampton Water', on pp115–116 of the March 2012 issue of *Dry Cargo International*).

Biomass is a natural material which is broken down in the facility much like it is broken down in nature. Beneath the Marchwood 'Silver Dome,' a host of biochemical conversions take place as a key to energy production, including sorting, compaction and incineration. Yet behind the science is an architectural feat — a famously domed exterior which brings a whimsical nuance and even a skirt to this waste-to-energy facility. "The Marchwood Energy Recovery Facility opened in 2007, looking for all the world like an ethereal spacecraft," says

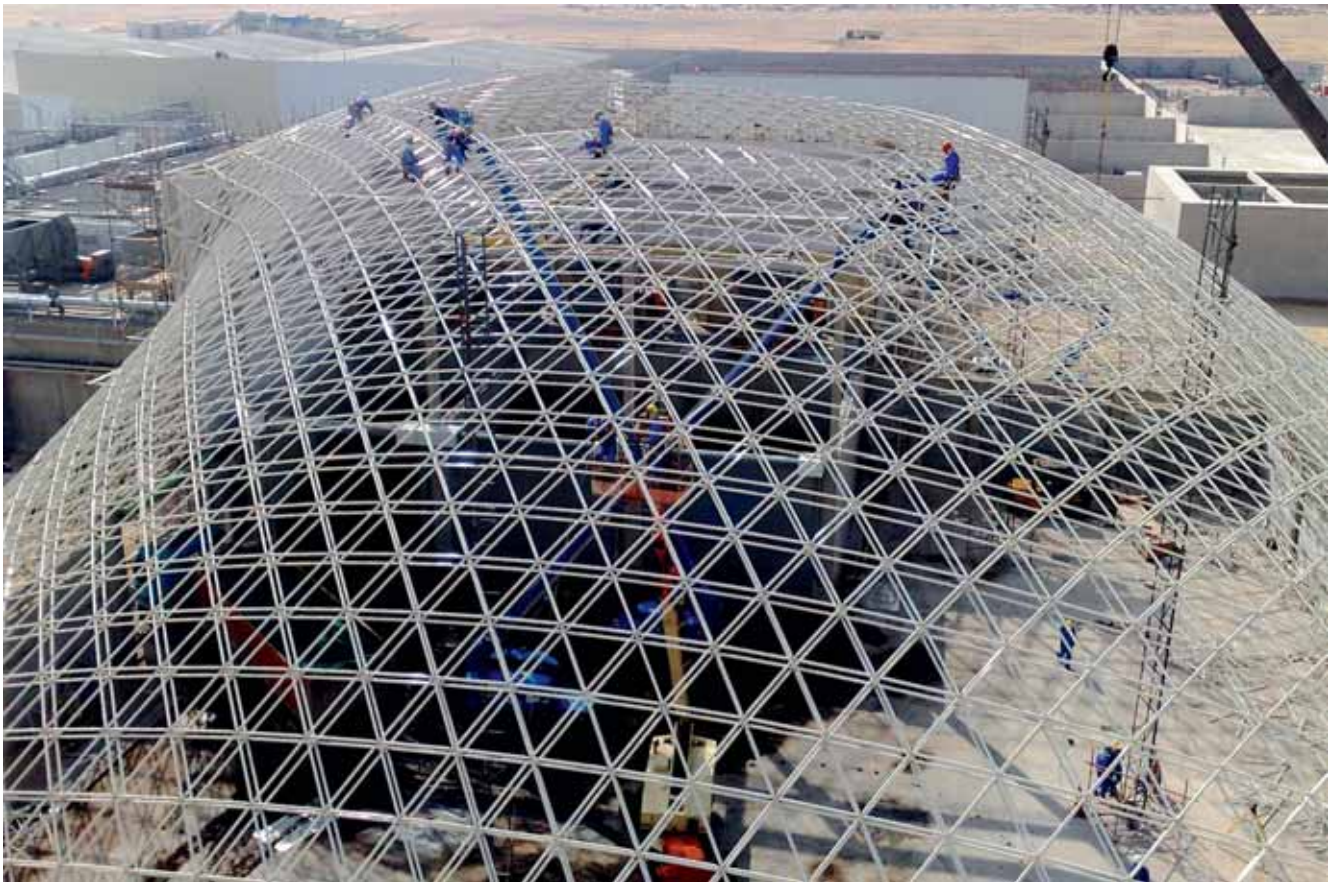
Castaño. It is, instead, a complete power plant that spans 100m and supplies electricity to more than 22,600 homes.

The energy recovery project proves that social value and careful design can elevate even a waste treatment facility into a thing of beauty. The dome, designed by renowned French architect, Jeanrobert Mazaud, now conceals and beautifies an incinerator facility, with only the twin chimneys stretching upward through the elegantly curved roof. The original concept, if built with conventional hot-rolled steel, called for more than 1,000 tonnes of superstructure. The Geometrica dome, using galvanized structural tubing joined with high-strength aluminium hubs, weighs less than 300 tonnes.

The Marchwood Silver Dome has become a stunning shoreside icon in the United Kingdom community of Southampton, Hampshire, which also plays host to the two great ocean liners, the *Queen Elizabeth 2* and the *Queen Mary*. The facility is a leading example of environmental practice and quality handling of biomass, and won the 2009 Best Designed Project Award by Partnerships Bulletin (formerly Public:Private Awards). But the real prize is that nearby families are now warmed by newly generated power as an industrial jewel graces Southampton Water.

The first of its kind in the Middle East

Word of mouth brought Geometrica into another biomass challenge. Marchwood Silver Dome contractors who had worked side by side with Geometrica shared news of a project in the Middle East — the Qatar Domestic Solid Waste Management Center (DSWMC). It was proving difficult to find a firm that could match the developer's vision of a distinctively designed facility. Because Geometrica designs some of the world's largest free span domes, its Freedomes® technology became a solution



for a seemingly impossible architectural feat.

The plans included installation of state-of-the-art systems for separation and recovery of resources and energy from waste, including sorting, mechanical and organic recycling, and waste-to-energy composting. The goal? To have these processes work together synergistically, complementing and feeding off one another to support increased energy and material recovery from households, commercial establishments and the construction industry. The side benefit included a surplus of multiple dozens of megawatts to the national grid.

Early in the construction process, Keppels Seghers, a Singaporean engineering firm, was contracted to design, build and operate the DSWMC's Green Waste Storage Composting Plant. The company sought a roof structure which processes yard and garden waste, tree cuttings, as well as food and kitchen products such as expired vegetables or peels. The material is subsequently shredded, screened and stored inside the Green Waste Storage facility. Grab-cranes then feed the material into anaerobic digesters which further break down the waste and produce biogas, which is eventually translated into a form of power generation.

To house the green waste breakdown process, Keppels Seghers required a structure that could span the large, open space of the building without internal support columns to interrupt the flow of materials and waste. Initially, Keppels Seghers designed the structure as a large steel framed roof with trusses. However, after considering the advantages of the Geometrica system, Keppels Segher opted for Freedome. "We were already aware of Geometrica's systems," said Geoffrey Piggott, the Keppels Seghers director of the Qatar facility. "But they visited us, and gave us an impressive proposal that was aesthetically attractive, cost competitive and had schedule advantages to us, as well."

The Qatar Freedome is rectangular in shape and sits on a concrete perimeter that varies in elevation. The dome is almost 20 metres tall above its support wall, is clad in with 3,384 panels of painted steel, and covers 1,923m^2 of area required to house the Green Waste storage and its various sorting and shredding machinery. According to the Qatar Green Building Council Solid Waste Interest Group, the DSWMC composting facility is the largest composting plant in the world, and Geometrica's unique structural system of creating long-span structures offered the ideal cover for it.

The DSWMC first began operation near Mesaieed, Qatar, in October 2011. The facility treats and processes domestic solid waste for the whole of Qatar, recycling select materials and using organic waste and biomass to generate various forms of energy. More than 95% of the waste is reclaimed or converted into energy, with less than 5% of the materials entering the facility diverted to a landfill. The facility is capable of treating up to 2,300 tons of domestic solid waste per day, and incinerates approximately 1,000 tonnes of other waste.

Collaboration and custom solutions

Geometrica designs and prefabricates domes that may be single-layer, double-layer vierendeel, double-layer truss, or ribbed. Lighter or heaver structural density may be achieved by varying the section of the tubes, or the length of the members. Regardless of geography, terrain, weather conditions or corrosive factors, Geometrica can design a waste management dome that helps improve the carbon footprint of the facility.

Branching into biomass: TRAMCO stays ahead of the game

TRAMCO, based in Wichita, Kansas, USA, is an established manufacturer of bulk material handling equipment. The company has recently expanded its focus into the biomass sector. For more than 47 years, TRAMCO has had a reputation for providing high-quality equipment at competitive industry prices.

Its product line includes the most complete line of chain conveyors, enclosed belt conveyors, specially designed conveyor and conveyor conversions. Each available in several models with features that meet the specific individual needs of the customer. TRAMCO is continually modifying its equipment to adapt to the ever-changing industry demands of tomorrow.

With equipment in operation worldwide, TRAMCO expanded its resources to the TRAMCO UK manufacturing facility that supplies the EU with European-spec equipment.

As a noted supplier of bulk material handling, TRAMCO continues to produce high quality, reliable equipment that meets specific customer needs. The Georgia Biomass project provided an excellent opportunity to showcase the TRAMCO quality to the wood pellet industry. Georgia Biomass is owned by the German energy company RWE Innogy, whose business area is sustainable energy. It has built up its production plant into one of the world's largest manufacturers of wood pellets.

TRAMCO's conveying equipment is an integral part of wood fibre handling, wood pellet and reject material systems. To meet the demand of this project, drag style 'G' conveyors along with TRAMCO bucket elevators handle the material as soon as it enters the pellet plant travelling to and from hammer and pellet mills and then on to storage. The facility's wood pellet production is approximately 750,000 tonnes of pellets per year.

Georgia Biomass is the largest, most modern facility of its kind in the world, and is a major source of sustainable renewable power generation in Europe.

Blug Credeblug – the biomass handling specialist

Image 1.

In recent years, Blug Credeblug's expertise and experience in handling biomass has increased significantly, resulting in a greater presence in the ports and power generation sectors.

In the next 20 years, it is expected that the biomass business will grow by 210% in the European Union (EU). Biomass is already an important product in the bulk industry.

Blug offers a wide range of solutions for biomass handling, depending on the production requirements. From closed-design orange peel grabs to CM4, CV2 or C4 type clamshell grabs, different solutions can be used to handle a reference material with a density value of 0.15-0.3t/m^3 — which can vary depending on moisture, size and compaction factors (see image 1, above).

Blug biomass solutions' range is continuously evolving thanks to latest design technologies. These are the key aspects in bulk handling grab design process:

- **material characterization:** bulk handling needs detailed material properties definition for perfect integration with a grab's movements and shapes. Computational fluid dynamics (CFD) simulations give accurate information about the material behaviour identifying most abrasive areas to be considered and are a cost-effective way to optimize a grab's design (see image 2, below). Nowadays, wear-resistant materials (Hardox type) are standard, but other possibilities like austenitic stainless steels are a good option to avoid corrosion and friction increase. Blug's design stage starts with a complete material characterization (flow patterns, granulometry, density and compaction factor, moisture content...) so that CFD and finite elements simulations can show relevant information for a better material flow and grab's payload.
- **dust control:** environmental protection is one of the key aspects to consider during the design process, and it is probably the main disadvantage for crane-grab type bulk unloading versus continuous ship unloading systems. The grab's special valves sealing and closing structure complement Blug's dust-control features, together with shape optimization by preventing material degradation during continuous handling cycles.
- **loading capacity:** Blug grabs' sizing process is specially developed so that the weight of the grab itself is minimized. Nominal volume is always defined by the capacity inside the valves/arms but real loading volumes can change from cycle to cycle:
  - penetration volume: defined by valves/arms outer surface in open position and grab's penetration depth before closing.
  - dragging volume: the material that's delimited by the valves/arms edge during closing movement.

Dragging volume is a fixed parameter limited by the grab's

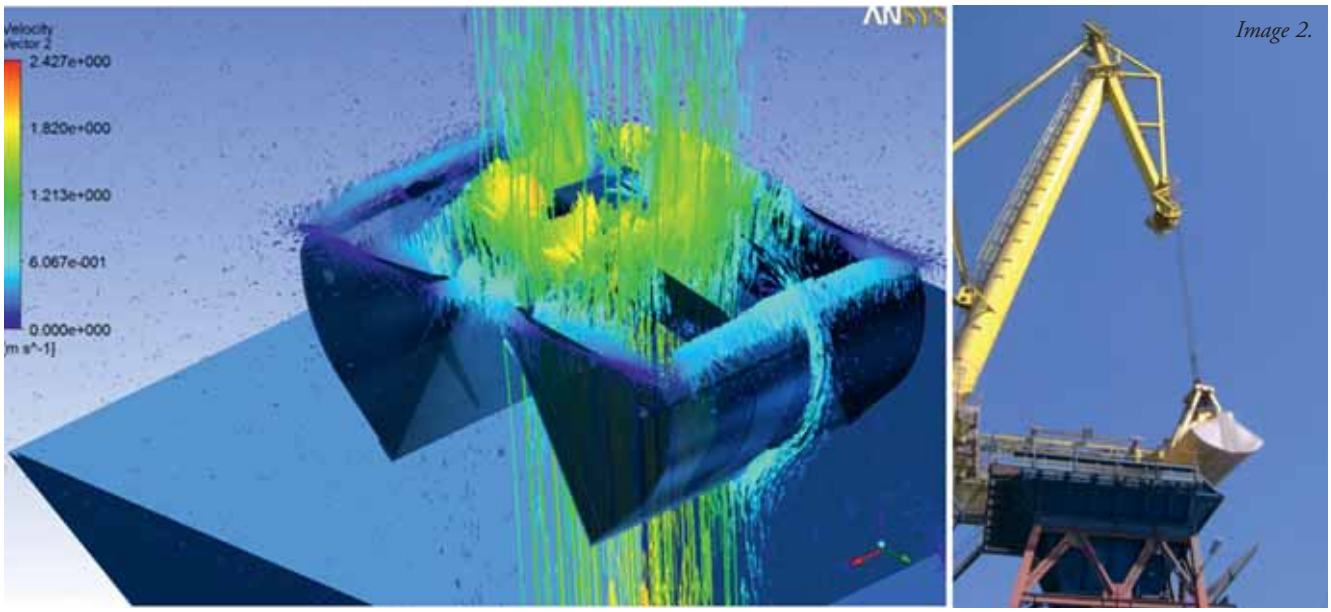


Image 2.

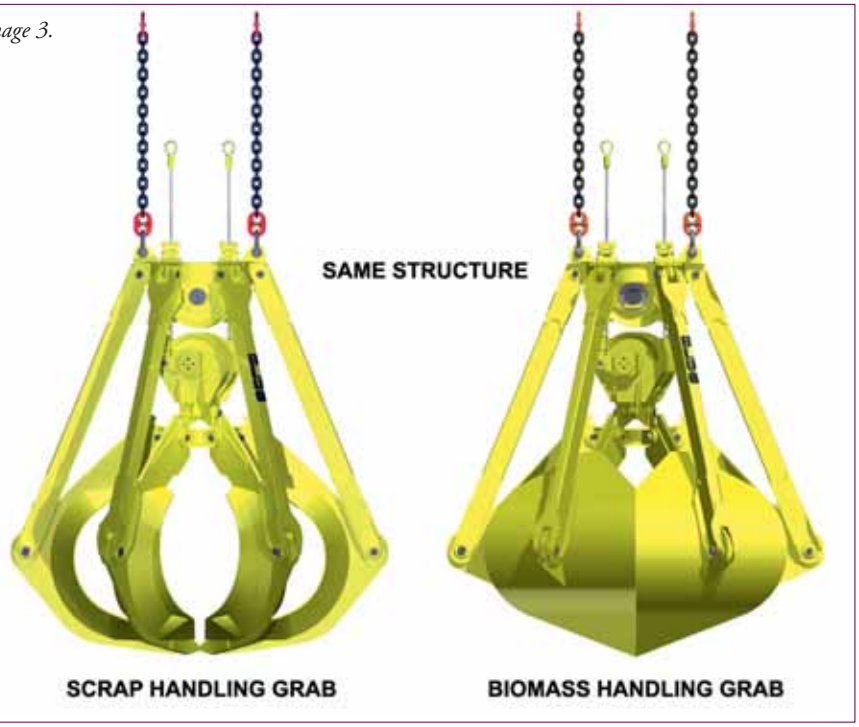
size and geometrical conception, whilst penetration volume can change substantially due to grab working inclination, material compaction or crane operator ability.

Blug grabs' volume definition is always based on dragging volume so that high loading values can be regularly assured minimizing production non-controllable variables.

- **crane integration:** once a grab's loading features are correctly specified, Blug grabs are adapted to their operating crane(s) working and connecting characteristics. Other aspects like climate conditions and vessel type should be also considered so that grab operation can be fully integrated and offer long-term productivity lifecycle. Blug references are classified as A8/M8 design according to FEM 1001/1998 standard.
- **modularity and operational flexibility:** grabs return on investment delay can be significantly reduced if the structure can be modified by detachable plates or arm replacement and use same motion system to handle different density and shaped materials. Blug products' design is based on a modular conception so that grab's structure could be easily transformed (see image 3 below).

In the last few months Credeblug's activity has been strongly related to biomass handling, providing three 12.5m³ grabs for the European market. Some important orders related with bio-fuel handling grabs for American port market will be manufactured within the next few months.

Image 3.



Jenike & Johanson lends its expertise to biomass handling

Biomass is a general term used to describe a variety of materials including wood chips, pellets, saw dust, milled switch grass and corn stover, etc. From a material storage and handling perspective, these materials can exhibit various handling challenges. Materials such as milled corn stover are very light and may experience discharge issues, whereas materials such as woodchips exhibit strong interlocking tendencies. Pellets may undergo attrition and generate dust, which can pose an explosion hazard. Whether it is gravity-reclaim stockpiles, silos or feed hoppers, unless properly designed, it can experience flow problems such as flow stoppages, limited live storage capacity, feed rate limitation, etc. Similarly, if the feeder and transfer chutes are not designed properly, they can result in flow problems. These problems can be avoided by properly designing or retrofitting the storage and handling systems.

Established in 1966, Jenike & Johanson is a world-renowned technology company which provides solutions for reliable storage and handling of bulk solids.

Problems Jenike & Johanson solves/avoids include:

- flow stoppages or erratic flow due to arching and ratholing in silos and feed hoppers
- limited live storage capacity in silos and gravity reclaim stockpiles
- feeder discharge issues
- chute pluggages
- attrition and dust generation during pellet handling
- solids handling equipment failure investigations.

Bulk solids handling problems are often the major cause of costly downtime and demurrage charges for many facilities, especially during start-up. These same flow problems continue plaguing on-going operations by limiting throughput and creating safety and health risks, as well as reducing equipment life, increasing maintenance costs and causing premature equipment failure.

To address these costly problems, Jenike & Johanson has developed proven ways to design handling equipment that will promote reliable, smooth and unrestricted flow of bulk solids. Bulk solids handling equipment design should not be a trial-and-error approach; Jenike & Johanson doesn't guess at material properties, it measures them. It has the largest and most complete laboratory in the world for characterizing the flow properties of bulk solids under representative environmental conditions. For over 40 years, Jenike & Johanson has focused on developing first principle theories on bulk solids flow and conveying behaviour.

Jenike & Johanson's services include:

- biomass flowability study
- silo, hopper and stockpile gravity-reclaim system design
- feeder design
- transfer chute design
- calculation of material flow induced loads on silo & hopper walls
- training on solids flow and pneumatic transport

Jenike & Johanson combines test results and real world project experience, which yields the best solution in terms of reliability and cost-effectiveness. Its skilled and experienced engineers provide detailed structural and mechanical design of solids handling equipment, and routinely design silos, hoppers, feeders and transfer chutes.

Filtration technology with a high sustainability factor

Dust collection in biomass storage and transport

When it comes to dealing with dust emissions that occurring during the biomass handling and storage process, there are several technologies available. The PowerCore® technology, developed by Donaldson, offers specific advantages which result from the high efficiency of the new dust collector and innovative filter packs. This filtration technology has made it possible to reduce the construction volume of a dust collector up to 70% in comparison to traditional baghouses or cartridge collectors (Figure 1).

There are two different ranges of PowerCore dust collection systems. The PowerCore CP (Compact Pulsed) series was designed for the efficient filtration in fibrous or fluffy dust applications (Figure 2), whereas the PowerCore VH series is used for abrasive dust applications like bulk handling, metalworking and mining.

Image 2: The two explosion rated PowerCore dust collectors for paper dust at ASFI in the Czech Republic are characterized by their long filter life, low maintenance and compact design.

A single PowerCore VH filter pack can replace up to 14 bag filters of 2.4 metres in length. This results in the high power density of the dust collectors: a PowerCore VH dust collector for a flow rate of 23,000m³/h requires only 12 filter packs and 65% less installation space than a conventional filter system of the same capacity, which is equipped with 162 bag filters.

The small construction size at high filtration efficiency and easy handling of the filter packs are the decisive criteria for users

Figure 1: Compared to conventional dust collectors, PowerCore VH units are up to 70% smaller. They meet the high standards as required in abrasive dust applications from metalwork - for example in shot-blasting or grinding.

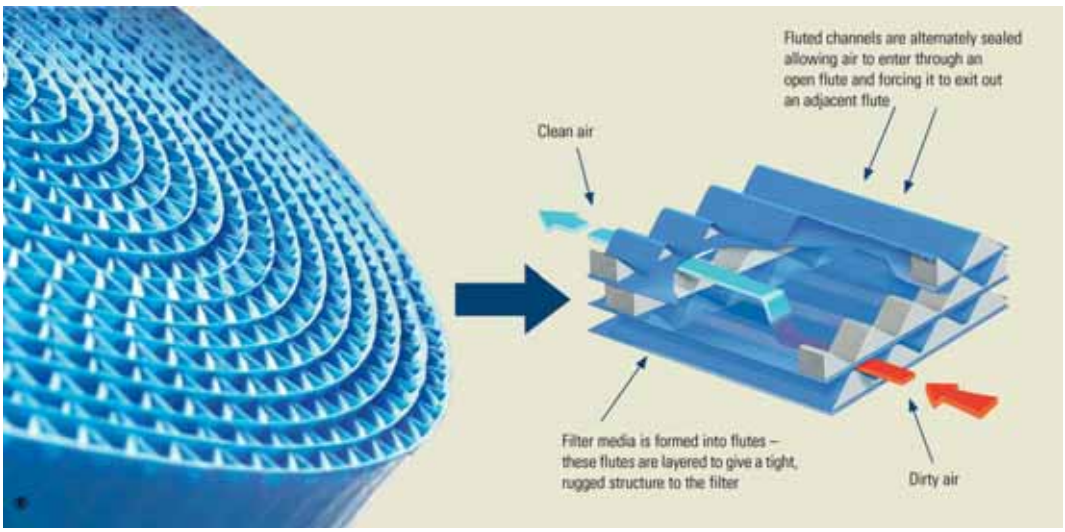


Figure 3: The PowerCore filter packs combine the proprietary Ultra-Web nanofibre technology with the latest findings of filter media manufacturing, so that the particles are collected without depth-loading.

(Figure 3). PowerCore filter packs combine the proprietary Ultra-Web® nanofibre technology with the latest findings of filter media manufacturing, so that the particles are collected without depth-loading (Figure 4). This dust collection technology by Donaldson is a prerequisite for 'downsizing' in comparison to conventional systems with filter bags or cartridges.

The filter packs are lightweight and can easily be handled by one person. While previously ten minutes were necessary to replace a conventional bag filter or cartridge, the time is now reduced to only two minutes with the PowerCore filter packs (Figure 5). At the same time, the filtration efficiency was considerably increased. Independent laboratory tests confirm: PowerCore filter packs reduce emissions by up to 78% when compared with standard polyester bags.

All PowerCore dust collectors feature an innovative and highly effective cleaning mechanism with pulse shaping technology. The pulse flow effectively covers the entire filter pack and improves the filtration efficiency, keeping pressure drop low and increasing operational life.

With these qualities and functions, the PowerCore dust collectors are well suited for the dust collection of processing units, conveying systems and silos for biomass products. From the view of the customers, they offer another advantage: With their compact size, economic operation and long life they fulfil the main criteria of sustainability which is essential for applications in the handling and storage of renewable energy sources.

Donaldson is a renowned worldwide provider of filtration systems that improve people's lives, enhance its customers' equipment performance, and protect the environment. It is a technology-driven company committed to satisfying its customers' needs for filtration solutions through innovative research and development, application expertise, and global presence. The company's approximately 12,200 employees contribute to its success by supporting customers at its more than 140 sales, manufacturing, and distribution locations around the world. Donaldson is a member of the S&P MidCap 400 and Russell 1000 indices, and its shares trade on the NYSE under the symbol DCI.

Image 4: The filter packs are lightweight and can easily be handled by one person.

Image 5: Savings at each filter replacements: While previously 10 minutes were necessary to replace a conventional bag filter or cartridge, the time for replacing a PowerCore filter pack has been reduced to just two minutes.

A floating solution to biomass handling

Floating cranes are playing an increasingly important role in ship-to-ship and ship-to-shore bulk loading, unloading and transshipment of numerous cargoes including biomass. Because they require no port infrastructure, floating cranes are flexible and can operate within or outside of ports. The importance of floating cranes is particularly driven by port charges and bulk carrier size. Higher port charges are generally causing operators to reconsider their loading and unloading operations, moving them away from the quayside. Larger bulk carriers and the resultant deeper draughts mean that the ports need to be deepened or the bulk carriers must lighten their cargoes before entering port. Due to their flexibility and high throughput capacity, NKM Noell's lemniscate floating cranes are increasingly used in The Netherlands to transship cargo from bulk carriers into barges for further shipment.

Advanced concept

Predicting these developments, NKM Noell started to develop an advanced floating crane concept in 2005. Computer simulations, interviews with crane drivers and 30 years of experience showed that crane throughput could best be increased, not by substantially increasing the hoisting capacity, but by increasing luffing and slewing speeds. With the intention to develop a floating crane, stability considerations played another major role.

A crane can have a high theoretical throughput, but the actual throughput is largely determined by the skill of the crane driver. The driver must be able to see the cargo, must not be subjected to excessive vibration and acceleration forces, must have easy access and must feel safe. Moreover, a theoretically fast crane is only effective if it remains operational. This puts demands on reliability, availability and the life of the crane. Essentially, the crane must be economical to operate and be environmentally friendly. In this respect, one optional design feature of the NKM Noell floating crane is the use of a flywheel to 'charge' the generator-sets located in the pontoon. The flywheel itself is 'charged' using regenerated energy from the movement of the grab. This feature reduces energy consumption and smoke emissions.

Principle design

The design of the advanced crane concept is derived from the classical lemniscate crane and incorporates the lessons learned from the above. This has resulted in a crane design that includes:

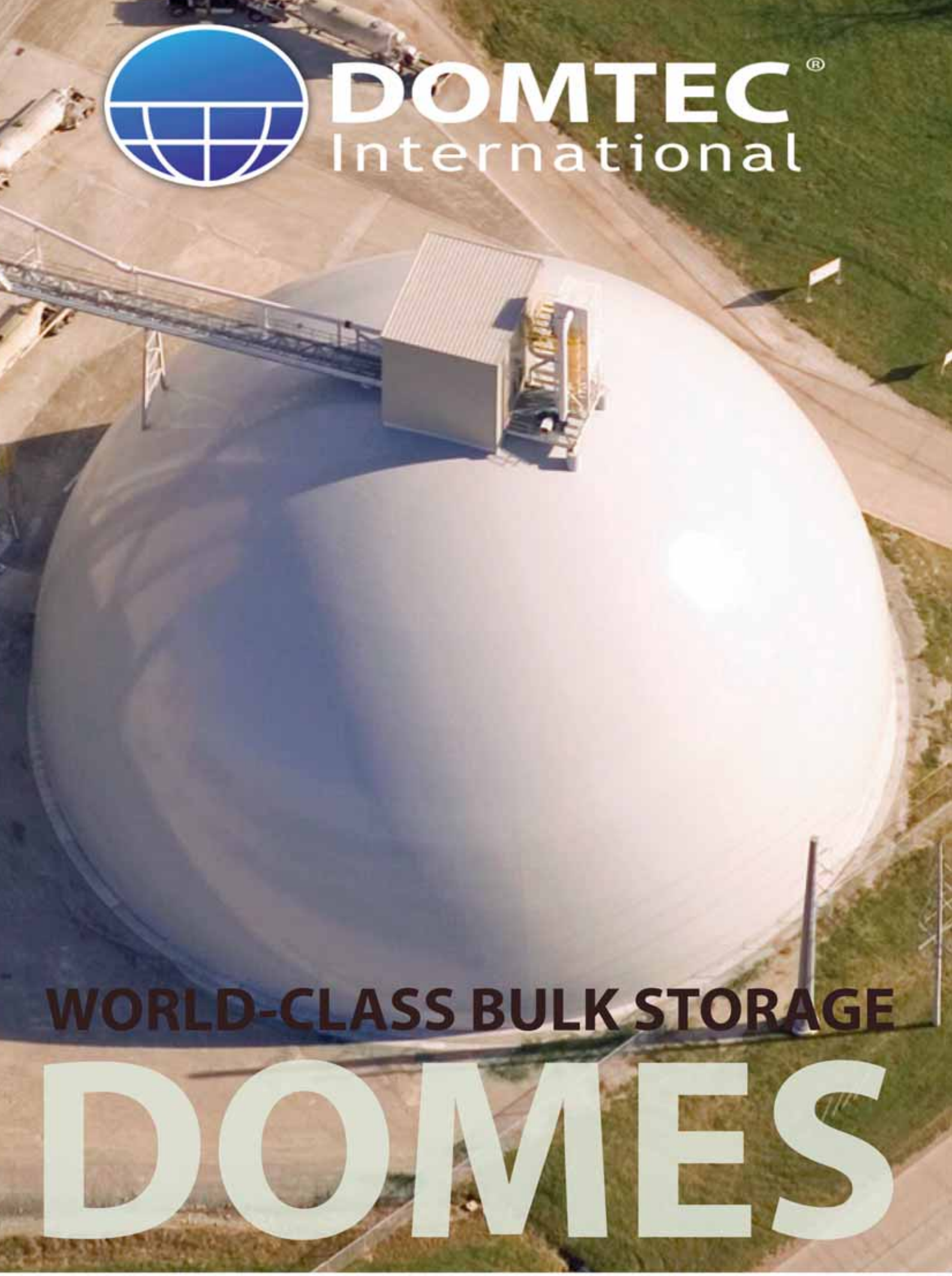
- improved stiffness;
- a low centre of gravity;
- redundancy in the slewing and luffing mechanisms;
- an optimal balance system;
- optimized slewing speed;
- optimized luffing speed;
- PLC control;
- semi-automatic grab control;
- a comfortable cabin with sophisticated suspension and optimized view;
- a safe escape route (no need to enter the machinery room);
- low fuel consumption;
- low smoke emissions;
- low exhaust emissions;
- a minimum design life of 25 years;
- elevator access (optional); and
- use of flywheel (optional).

The product

Based on the principles described above, NKM Noell designs and builds cranes to customer specification. Each crane is tailored to the customer's specific needs.

NKM Noell can also supply the pontoon on which the crane is installed and can arrange the installation. Life-time maintenance is available via a service level agreement and any delivery is backed by the comprehensive NKM Noell guarantee. Even though custom-built floating cranes are complex, NKM Noell's continuous improvement approach is continually driving down delivery times.

NKM Noell Special Cranes GmbH is a renowned supplier of special cranes and special handling equipment. In addition to advanced special cranes, it can also supply R&D, consulting, feasibility studies, design, engineering, manufacturing, shipping, installation, commissioning, training and after sales service. NKM Noell is part of Groupe Reel, which was founded in 1946, with its head office in Lyon, France.



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Cement

how to store and handle it efficiently

Djebel Ressas is a high and rugged outcropping of Jurassic limestone situated on the horizon southeast of Tunis, Tunisia.

Completed in 2013, Djebel Ressas is the largest and most technically advanced cement plant in Tunisia.

Louise Dodds-Ely

Geometrica's green footprint at Tunisia's largest cement plant

This article describes Geometrica's contribution to the collaboration between Carthage Cement, FLSmidth (FLS) and EKON to produce the largest and most technically advanced cement plant in Tunisia, *writes Melanie Saxton of Geometrica*. The challenge was to balance the needs of the regional environment and nature preserve with a world-class industrial cement manufacturing facility.

Preserving environment and production

"We paid particular attention to adopting the latest technology, high economy of energy consumption and great respect for the environment," said Lazhar Sta, CEO of Carthage Cement, who entrusted global engineering company FLSmidth (FLS) to identify, design and implement the best solutions. Turkish contractor EKON was FLS's partner for the civil works, including civil

Orchards, wine... and cement

In Arabic, the name Djebel Ressas means 'mountain of lead', a reference to the ore that has been mined near this 800m peak in Tunisia since antiquity. To this day, this region continues to be a rich source of construction materials, which must coexist with agricultural and neighbouring communities. Carthage Cement demanded from the engineers and builders a cement processing plant that would work harmoniously alongside the olive orchards, small herds of domestic livestock and wine production.

The limestone building is a 90m circular dome.

design, supply of structural steel and plate work, site preparation and plant erection.

The dome and space frame structures consist of three storage buildings for additives, coal and limestone.

5,800 Daily tonnes

The civil work compared in scale to that required to build an entire town, and the immense processing facility is capable of producing 5,800 tonnes of cement per day. "We learned about Geometrica through an international cement trade magazine and the Internet," said EKON project manager, A. Cem Sevük. "We chose Geometrica because, compared to their competitors, they gave us a better price and speedier delivery." Geometrica worked with EKON, the builder of the plant, and supplied three bulk storage buildings. The goal was to spare the environment from dust and debris from material handling and stockpiling. This was an ideal spot for Geometrica, a design and manufacturing firm renowned worldwide for promoting beauty and environmental responsibility within industrial settings.

Quality, efficiency and… Lego®

Geometrica supplied three storage buildings for additives, coal and limestone. The additives and coal longitudinal buildings are 200m and 300m long, respectively, and similar in span (50m). The limestone building is a 90m circular dome.

All domes were reinforced with arch ribs. "We assembled the domes in half-arch segments on the ground. Then we lifted the arches into place and stitched them to the growing structure. This minimized the amount of time workers had to spend working at heights," said Fernando Gracia, Geometrica's lead designer for the project. "Oval hubs in the bottom chord of the domes' ribs allowed us to use two rectangular bars in parallel, reducing the overall arch count, and increasing structural efficiency," Gracia explained.

Geometrica's bulk storage structures capture and contain the dust caused by the stacking and blending of raw materials and fuel, helping meet the plant's environmental goals. "Their structures are light and easy to install — like Lego®!" said Sevük. "Because the components are packaged so efficiently, we saved money on transportation, as well. Those savings in time and money, combined with their co-operative and professional approach, confirmed that we'd made the right decision in choosing Geometrica."

Achieving green, defeating dust, creating jobs

The new plant created over 400 direct jobs and now supplies cement to Tunis, the national capital and source of 50% of Tunisia's cement demand. The environment near the 'lead mountain', including its orchards, livestock and nature preserve, are protected, and Carthage Cement helps Tunisia continue on its growth path.

Geometrica has supplied domes in countries ranging from Canada to Chile, from Spain to Singapore, and from the UAE to the UK, with dozens more in between.

New multi-compartment cement silo for Cementa AB

Fig. 1: New cement terminal during ship unloading.

Jan Gabrielson[1], Carsten Niedworok[2], Wolfgang Schlüpmann[3]
[1] Cementa AB, Malmö, Sweden
[2] IBAU HAMBURG, Hamburg, Germany
[3] HAVER & BOECKER, Oelde, Germany

Introduction

Cementa AB, a group company of HeidelbergCement, decided to build a new cement terminal at Norra Hamnen (Northern Port) in Malmö, Sweden. The 30,000-tonne-capacity multi-compartment silo replaced Cementa's existing depot at the waterfront location in Linhamn, which gives room for the building of apartment houses. However, the new silo has a far better location with regard to connecting transport operations. For planning and construction of the new terminal a number of project challenges were given. IBAU HAMBURG was chosen as the turnkey contractor for the project. Handing over of the project was in November 2011, less than two years after planning, construction and commissioning.

Project background

Malmö is an important cement distribution hub for Cementa AB in Sweden. The new 30,000-tonne-capacity terminal was designed to fully cover future needs in terms of storage capacity and cement types (Fig. 1). The location in Norra Hamnen of Malmö allows the feeding of the silo via Cementa's cement carriers. Cement distribution is by trucks and by railcars because there is a railway line next to Norra Hamnen. The silo location has less environmental impact on nearby residents than the former cement depot in Linhamn. The depot area of Linhamn was taken over by the Malmö Municipality to become a recreational area with attractive apartment houses.

The objective of the new silo was to operate it for about 50 years. The large volume of the silo was based on comprehensive investigations of the expected demand. The silo is of multi-chamber design to achieve the greatest possible flexibility in the

Fig. 2: The new cement terminal.

Fig. 3: Integrated terminal jetty.

storage of different types of cement. For the unloading of cement ships, pneumatic and mechanical unloading facilities are foreseen. The silo has to integrate three loading lanes: two for trucks and one for a combination of trucks and railcars. IBAU HAMBURG was awarded a turnkey contract for the design and construction of the terminal in December 2009. The contract was given after first solutions were developed by the engineering company starting in March 2008. The site installation began in May 2010, commissioning ended in October 2011, the handing over date of the terminal was in November 2011 (Fig. 2 on p95). The turnkey project included, besides the engineering, delivery and installation of the terminal equipment, the piling, concrete works, steel works, electrical works and automation, erection and commissioning.

Project challenges

In addition to the planning permission, special permits were required to set up and operate the new cement terminal. Strict environmental demands had to be fulfilled. A major issue was the expected noise level and the aesthetic design of the silo of such a large capacity. The other major challenges derived from project requirements. Cementa's parent company HeidelbergCement decided to handle the project as a turnkey contract. Delivery of major equipment should be preferably from a single source. Also, the financial aspect was important, because the complete investment was around € 15 million, which required adequate bank guarantees and could only be handled by a capable project partner. For the project, a narrow timeframe was given with just 18 months' construction time.

Major challenges also derived from the chosen project site, which was characterized by a soft underground on top of a 15m-deep rock formation. The architectural aspects required for a tall silo with some aesthetic feature, so that the complete terminal will be able to improve the harbour skyline of Malmö. Therefore, Cementa included at an early project stage local Fojab architects, of which Greger Dahlström came up with a very interesting design. The technical issues are properly described by the large storage capacity of 30,000 tonnes, the requirement for a six-compartment design, the mechanical and pneumatic unloading of 8,000dwt ships (max) with high capacity from a terminal integrated jetty (Fig. 3), as well as bulk cement loading into trucks with trailers and rail cars with a refilling possibility, material re-circulation for longer storage times as well as a fully dust-proved design, low specific energy consumption and a completely automation, so that no operators are required at the terminal for the daily business.

Project implementation

IBAU HAMBURG the turnkey contractor for the project involved as sub-suppliers Peter & Lochner for the structural engineering and static calculations of the silo construction, Brückner Grundbau for the piling and foundation works, DIWYDAG for the concrete works, SGS for the structural steelwork erection and equipment erection and HAVER & BOECKER for the electrical works and automation. The systems include the following components:

- PCS7 process control system with CEMAT, as to HeidelbergCement standard;

Fig. 4: Switching room with MS gas-isolated switchgear.

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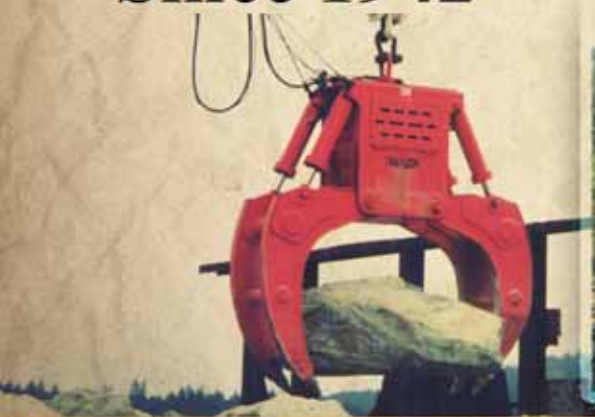

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Fig. 5: Electrical installation in the bucket conveyor tower.

- gas-isolated medium voltage switchgear, 11kV;
- dry-type transformer 1,600kVA;
- low voltage main distributor with compensation;
- switching and control cabinet with S7-400/ET 200M, according to HeidelbergCement standard;
- electrical grounding and lightning protection;
- cable and installation material;
- IT network and infrastructure;
- video-monitoring of the loading stations as well as the entrances and exits;
- interior and exterior lighting; and
- engineering and complete electrical installation and start-up.

During the planning phase, IBAU worked in close co-operation with Heidelberger Technology Center in Brussels and it was decided that the control room in the multi-chamber silo would be moved to Level 1. This offered the advantage of considerably reduced cable paths through silo walls. Because space for the switching and control cabinets, energy distribution and transformers was limited, IBAU HAMBURG opted for maintenance-free, gas-isolated medium switchgear (Fig. 4, on p96).

The electrical installation involved a number of demanding challenges for the personnel. Installation of the cable works and laying the cable in the bucket conveyor tower — from Level 0 to 100 metres — required special cranes and had to be carried out by workers who weren't afraid of heights (Fig. 5).

One challenge for the automation systems supplied by HAVER & BOECKER was adapting the PCS7 process control system to the silo processes so that clear and well-arranged process groups resulted and thus allowed easy operation and rapid fault detection (Fig. 6). The multi-compartment silo is of the IBAU Central cone design (Fig 7). The silo has an outer diameter of 26m and a 90m height. The silo has six compartments with an inner compartment of 15.75m diameter with 10,000-tonne capacity and the outer ring compartment, which is split into five separate compartments, each having 4,000 tonnes of storage capacity.

The construction of the silo required 8,200m³ of concrete, 1,300 tonnes of prefabricated concrete elements, 1,600 tonnes of steel reinforcements (Fig. 8 on p103), 700 tonnes of structural

Fig. 6: PCS 7 process control system.

Fig. 7: IBAU central cone during construction.

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Fig. 8: Steel reinforcement construction works.

steel, 450 tonnes of mechanical equipment and 56,000m of electrical cables. The complete weight of the filled silo construction is 70,000 tonnes. The silo foundation is loaded on 63 piles, which have a diameter of 1.5m and which are 15–17m long to transfer the silo load to the flint stone rock formation below the terminal area. Accordingly, each pile has to carry a load of more than 1,000 tonnes. The silo foundation was produced with *in-situ* concrete while all the silo walls were fabricated using a complex sliding formwork system (Fig. 9). The formwork and working platform were raised quasi non-stop metre by metre with a hydraulic system. The speed of the sliding formwork and the raising of the platform were adjusted to the drying time of the concrete. Every day a height of 1.5–2m was achieved so that the entire slip-forming was completed in 25 days. On each shift, up to 50 construction specialists were needed for this job and about 60 others for the steel reinforcements.

The architectural design of the silo comes from the white-pigmented silo surface which also includes two vertical conveyors situated in a stair tower, which has a circular design and which was fabricated in segments (Fig. 10 on p104). After installation of the conveyor, the tower was covered with large white surface

Fig. 9. Sliding formwork.

sheets, so that the silo and the stair tower form an integral part. The other highlights are the blue glass facade with night illumination on the silo top as well as a tubular walkway with integrated fluidslide conveyor (Fig. 11) between the jetty and the silo. It has always been Cementa's ambition to have an aesthetically pleasing and functional terminal facility. It can now be said that Malmö has another attractive addition to its skyline.

The new cement terminal is ultra-modern and fully automated. Accordingly, no operators are required and the reloading of cement onto trucks and railcars is possible at any time of the day or night by using a chip-card system. This flexibility could only be assured by installing a truck/wagon unloading system in cases when off-specification batches have been chosen. In that situation, the material in the vehicles is to be refilled into the respective silo compartment. Additionally, there is a cement recirculation system, which is activated if no ship unloading truck/wagon unloading operation is performed for a longer period of time.

Fig. 10: Stair tower during construction.

Operational aspects

Fig. 12 on p105 shows the silo bottom aeration scheme. The silo bottom is equipped with slopes open-type fluidslides, which are covered with air-permeable woven fabrics. The aeration air is injected under the aeration fabric in order to fluidize the cement above the fabric to direct the material flow to the compartment outlets. Only one base section is active at any time for discharging a compartment[2]. The aeration is effected section after section, so that all sections are used in a complete cycle. Only comparatively small quantities of air are needed for the section aeration and material extraction from the compartments. The aeration air is drawn off with the material and fully dedusted before it is released to the atmosphere.

Each of the five silo compartments in the ring space has an identical extraction system, which is standard in the IBAU concept[3]. The base of the ring compartment is made of concrete screed with a slope of 20 degrees. Each compartment has two aeration sections with a right and left hand subsection with tangential fluidslides that convey the stored material through radial fluidslides to the compartment outlet. The material flow is regulated by a flow-control gate so that there is always a fully

Fig.11: Fluidslide conveyor tunnel.

controlled material extraction from the silo compartments. From the flow-control gates the material stream is divided and separated to the required reloading lanes.

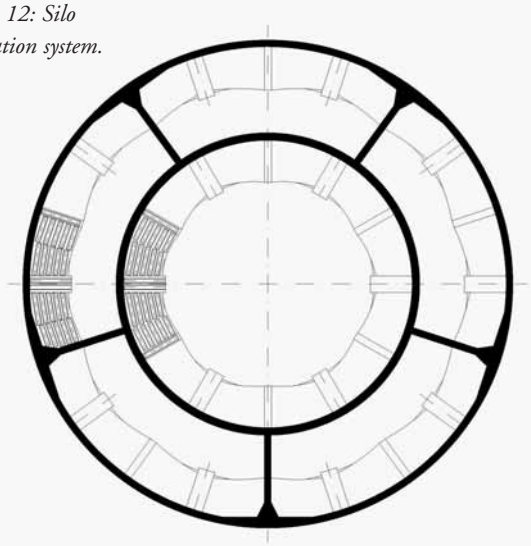
The inner silo compartment has the central cone design and a number of six outlets with six aeration sections, each with a right and left subsection, which are similar to those of the outer silo compartments. The compressed air for the silo aeration is generated by rotary piston blowers.

The material discharge from the ships can be done either mechanically or pneumatically. When using the ship's mechanical unloading screw, which has a maximum capacity of 1,100tph (tonnes per hour), the material is transported via a flexible chute towards a first bucket elevator. This bucket elevator lifts the cement to a height of approximately 15m. From there, a 35m-long fluidslide conveyor distributes the material towards the two 80m-high silo feeding bucket elevators, each having a maximum capacity of 550tph.

During the pneumatic ship unloading, either by pressure vessel or pump system, depending on the vessel, the material is discharged with a maximum capacity of 400tph to a collecting bin, located inside the stair tower. From there the material is transported to one of the two silo feeding bucket elevators. Furthermore, the silo can also be fed from a truck unloading station by using the same collecting bin.

Cement bulk loading from the silo is via two truck loading lanes and one combined truck/railcar loading lane. Each loading lane is equipped with three IBAU mobile loaders with a loading capacity of 250tph and either ±2.5 resp. ±3.0m travelling range (Fig. 13). The main characteristic of the loading devices is their flexible structure compensating for differences in the height of various tank trucks and the travel mechanism which allows the mobile loader to be positioned exactly above the blow tank filling socket. The electrical and automation concept of the terminal, which was planned, installed and delivered by HAVER & BOECKER allows a safe and reliable reloading of cement by using a chip-card system. All operations, such as mobile loader positioning, can be facilitated by the truck drivers. No Cementa operating personnel are required.

Fig. 12: Silo aeration system.



Plant commissioning took place in October and November 2011. During that time cement, was delivered by cement carriers of different ship sizes. All terminal functions were tested and were according to the requirements.

Conclusion

The new Malmö cement terminal is a truly world-class cement storage and distribution centre. The facility is of major strategic importance for Cementa AB and the growing Malmö and Öresund Region. With the terminal location at Norra Hamnen, Cementa now owns a convenient logistic facility, where ship, road and rail transports are taken into account. The complete project was fully supplied in time, according the client's expectations and without any accidents at all. IBAU HAMBURG, the turnkey contractor for the terminal was thus able to supply another facility, which is a benchmark for the industry. The turnkey capabilities of the company begin with a pre-order concept study, detailed planning and design and end with the timely project delivery. Specific job functions are provided by very appropriate sub-contractors, while IBAU HAMBURG has the complete project know-how and integrates mechanical and pneumatic equipment that best fits the client's needs.

Fig. 13: Bulk loading on trucks with trailers.

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Improving raw material flow with Jenike & Johanson

Jenike & Johanson is a renowned technology company for bulk material handling, processing, and storage. It delivers engineered solutions to achieve reliable powder and bulk solids flow based on proven theories and decades of project experience.

The cement industry provides the main building material for commercial, residential, and governmental projects involving infrastructure (e.g., roads, bridges, tunnels).

Most new plants or line expansion projects are seeking techniques to reduce production costs, while minimizing adverse environmental impact during cement production. To meet ever-increasing demands, cement kilns must have consistent, reliable feed of raw materials, such as limestone, clay, sand, mill scale/iron ore, and bauxite. Though dry process cement plants are advantageous over wet process plants due to significant energy savings, they experience additional material handling problems during feeding, milling, and calcination. Cement plants continue to seek ways to reduce fossil fuel consumption through use of alternative fuels. Clinker substitution with limestone or pozzolanic additives is now a common practice.

Common cement industry challenges

Cement quality relies upon consistent kiln feed and reliable raw mix formulation. The majority of raw materials handled at a cement plant are prone to poor flow during reclaim from stockpiles, storage silos, or hoppers. These problems can lead to process upsets, down time and require frequent operator intervention. Materials handled are often dusty, cause abrasive wear of equipment, and stick in chutes and conveyors, all contributing to reduced cement output. Erratic feed and wide particle size variability (segregation) will lead to poor mill performance, increased energy consumption, and vibrations in vertical roller mills. Cement can be prone to both caking and flooding (flushing) behaviour.

Common materials handled

Below is a shortened list of the bulk materials Jenike & Johanson has successfully handled in the cement industry to date. This is just a small sampling of the materials the company has handled for clients in the cement industry. The materials include: alternative fuels; alumina; amorphous silica; ash; bauxite; borax, anhydrous; cement; clay; coal; coke; diatomaceous earth; dolomite; foundry sand; fuller's earth; granite; gravel; gypsum; lime; limestone; magnetite; mica; pozzolan; pyrite cinders; quartz; quartzite; raw meal; sand mixtures; shale; silica; silicon; slag; stone dust; and volcanic ash.

Cement industry clients

The following is a sampling of clients for which Jenike & Johanson has successfully provided bulk material engineering services for in the cement industry. These include: Atlantic Cement; Ash Grove Cement; Blue Circle Cement; Caribbean Cement Co. LTD; Cemento Polpaico SA; Cementos Nacionales; Cementos Progreso; Cemex; Essroc; Fuller Company; Heidelberger Cement; Holcim; Holderbank; Holnam; Humboldt Wedag; Irish Cement; Kaiser Cement; Korean Cement; Lafarge Canada; Lafarge North America; Lake Ontario Cement, Canada; Lantic Cement, Canada; Lehigh Cement; Medusa-Citadel Cement; Nesher Israel Cement; Phoenix Cement; St. Lawrence Cement; St. Mary's Cement; South Dakota Cement; TEC, Inc.; Tilbury Cement; and US Gypsum.

Technological developments

Jenike & Johanson has engineered custom equipment solutions including hopper, feeders, gates, and storage equipment. Its mass flow container is a portable container for reliable, uniform powder discharge. Similarly, its mass flow tumble blender provides for reliable blending and powder discharge. The company's BINSERT may serve as a better alternative to

mechanical mixers because it is designed to eliminate stagnant zones by maximizing the difference of flow velocity in its centre. The dimensions of the BINSERT are determined by the flow properties of the solid, which helps to prevent arching.

Discrete element modelling (DEM): simulation of particle flow in:

- transfer chute analysis and design (use of calibrated DEM model);
- prediction of absolute wear in transfer chutes and hoppers/silos;
- hopper analysis and design; and
- rotating equipment (kilns, blenders) analysis.

Cement industry services

Jenike & Johanson offers a wide array of services for the cement industries:

- on-site review of material flow problems;
- raw material, additive, cement flow testing;
- silo and feeder design for all bulk materials;
- belt-to-belt transfer chute design using DEM technology;
- troubleshooting of pneumatic conveying systems;
- silo and bin structural engineering;
- primary or secondary crusher selection; and
- assistance with stacker/reclaimer selection.

Whether retrofitting bins to alleviate flow problems, implementing a new mass flow silo or stockpile to maximize gravity reclaim, or feeding alternative fuels to the kiln, Jenike & Johanson can help achieve reliable material flow and consistency at your cement plant.

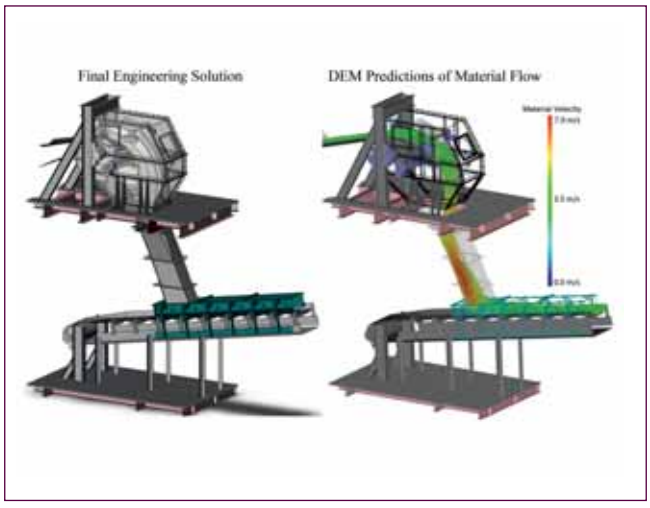
Case study

Fixing costly limestone flow problems at Titan Cement

The need

Titan America manufactures Portland cement at its Medley, Florida USA plant, and in June 2004 commissioned a new 5,000-tonne-per-day kiln that greatly increased clinker production capability and efficiency. However, due to poor flowing raw materials handled in the new silos, large variations in raw meal properties resulted, principally from erratic flow of limestone.

Jenike & Johanson engineers visited the new plant to review the solids handling difficulties and to develop a scope of work necessary to alleviate the costly flow problems. The efforts, in part, allowed Titan to eventually exceed design clinker production



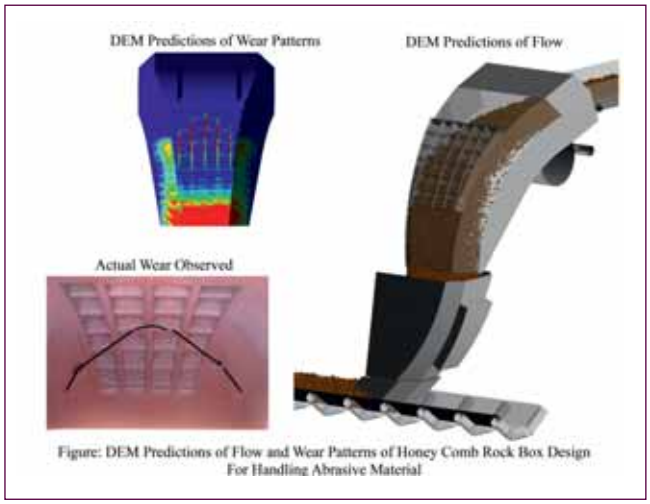


Figure: DEM Predictions of Flow and Wear Patterns of Honey Comb Rock Box Design For Handling Abrasive Material

capacity by 10%.

Jenike & Johanson's scope of work consisted of:

- an on-site flow assessment (audit);
- material characterization studies and abrasive wear tests with the limestone;
- functional design engineering for retrofitting the existing silo to achieve reliable flow;
- analyses to determine material-induced and external loads on the silo structure; and
- detailed engineering design of the retrofitted silo components.

A discussion of each of these key efforts follows.

Titan requested that engineers from Jenike & Johanson visit the Medley plant as soon as possible to diagnose various solids handling problems occurring during the commissioning of the new line. Engineers observed flow problems, such as arching, ratholing, and segregation occurring with the limestone, as well as other additives like bauxite and mill scale. The flow problems were costly to Titan in several ways: first, the production capability of the new line was less than required; second, there were numerous labourers required to unblock flow obstructions formed in the additive silos; third, the particle size variability of the limestone induced unacceptable chemistry variations (excessive lime saturation factors) in the raw meal; and fourth, valuable resources were redirected to address the ongoing critical problems.

The original blended limestone silo has about a 9m diameter cylinder section followed beneath by a conical hopper then a transition hopper terminating at an apron feeder.

The limestone flow problems rapidly degraded production efficiency, and in some cases, stopped production all together. The bridging problem occurred when an arch-shaped obstruction formed above the outlet of the transition hopper and prevented any further material discharge. Operators were frequently required to use sledgehammers to strike the walls of the hopper to overcome the bridging problem; in many cases, their efforts were not fruitful.

Ratholing in the silo was also resulting, especially when the limestone was fine and wet. With ratholing, flow takes place in a small channel located above the hopper outlet, leaving large zones of stagnant material in the silo. Consequently, even though the silo's total capacity was 1,000 tonnes, its actual 'live' capacity was far less; this required operators to vigilantly keep the silo filled so that the raw mix would contain the blended limestone.

Another problem, sifting segregation, was resulting during the filling of the silo. This segregation occurs when fine particles

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concentrate in the centre of a silo during filling, while the more coarse particles roll to the pile's periphery. Since discharge from the segregated pile in the silo occurred from a central core, during initial drawdown, a high concentration of fine particles was reclaimed onto the raw mix conveyor. Unfortunately, with the limestone extracted from the quarry near Titan, as the particle size changed, the chemistry of the material changed; in particular, the silica content varied substantially across the particle size range. As the level in the blended limestone changed, the particle size distribution of the material varied.

The Solution

Material Testing

After the site visit audit, Jenike & Johanson engineers recommended to Titan that flow properties tests be performed on the limestone at moisture contents ranging from 5% to 11%. The flow tests were measured using ASTM protocols. Not surprisingly, the results of the flow tests confirmed the limestone was cohesive (prone to bridge and rathole), frictional (sticks to surfaces), and compressible (having a variable bulk density).

Functional design modifications

The flow problems occurring were directly influenced by the type of discharge pattern in the blended limestone silo. Per flow test results and field observations, a funnel flow pattern was resulting, whereby an active flow channel forms above the hopper outlet, with large dead zones of material residing in the silo. As the level of limestone in the silo decreased, the non-flowing material generally did not slide into the flowing channel, which resulted in the formation of a stable rathole.

Jenike & Johanson recommended to Titan that a mass flow pattern be implemented, which allows a first-in, first-out discharge that prevents ratholing, ensures consistent flow, eliminates sifting segregation, and reduces the loads on the apron feeder.

The recommended modifications to the silo involved installing a new, steep conical hopper that extended past the existing cone up into the existing cylinder section. A new transition hopper, pin gate, and mass flow interface was implemented above a new apron feeder. A separate weigh belt feeder was placed below the apron feeder, but oriented to run in the opposite direction so that the feeder allows weighing capability as well as clean-up duty, which eliminated the need for a separate dribble conveyor running below the apron feeder.

The apron feeder and its interface were properly designed to ensure complete withdrawal of material along the entire length of the hopper outlet, thereby eliminating stagnant material. The increasing capacity along the length is achieved by the increase in height and width of the steel interface above the feeder. Jenike & Johanson engineers worked closely with apron feeder and interface supplier to ensure its structural integrity and functional design specifications were strictly followed. Abrasive wear tests were conducted to assess erosive wear life of various liners for the interior silo walls and the interface.

Analyses were also performed by Jenike & Johanson to determine material-induced and external loads (e.g., wind, seismic, etc.) on the silo and structure. Bulk solids do not behave like liquids since they develop frictional forces against the wall in their static and sliding conditions; this considerably affects the loads on the silo structure. Material-induced loads from initial fill and mass flow discharge scenarios were analysed.

Detailed engineering

Generally, retrofit projects in silo structures are more complex than new silo construction. In addition to meeting strength requirements, the new components in the silo have to be designed for easy installation and be sized to fit space constraints due to surrounding structures, equipment, etc.

During the structural design phase of the project, it was decided to install the new mass flow cone inside the existing structure without demolition of the existing cone and support system. An arrangement of vertical stringers and rings were designed to facilitate installation of the conical hopper. The conical hopper was designed to be supported at its top edge by welding it to the cylinder. With the location of the new mass flow cone, the load transfer to the supporting structure was modified. The cylindrical portion below the cone top edge was required to carry all the structure and material weight as well as resisting external loading. The transition hopper was designed to be a bolted connection to the adjacent components of the structure, with its pieces to be assembled on-site; this approach simplified installation. The engineering for the arrangement/installation of the steel liner panels as well as their connection details to the new cone and existing cylinder was provided to Titan.

The result

According to John Anagnostou, production manager at Titan, the modified silo has provided reliable, consistent flow of the blended limestone, even when handling moist and fine material. Since the modifications, mass flow has been achieved which has eliminated the costly bridging, ratholing, and segregation problems. The apron feeder has worked well, and the weigh belt feeder/clean-up conveyor system has allowed fine-tuned control of the raw mix chemistry. Not only were critical details for flow supplied, but also, engineering specifications for demolition, scaffolding, installation, and fabrication were provided to Titan in a complete drawing package.

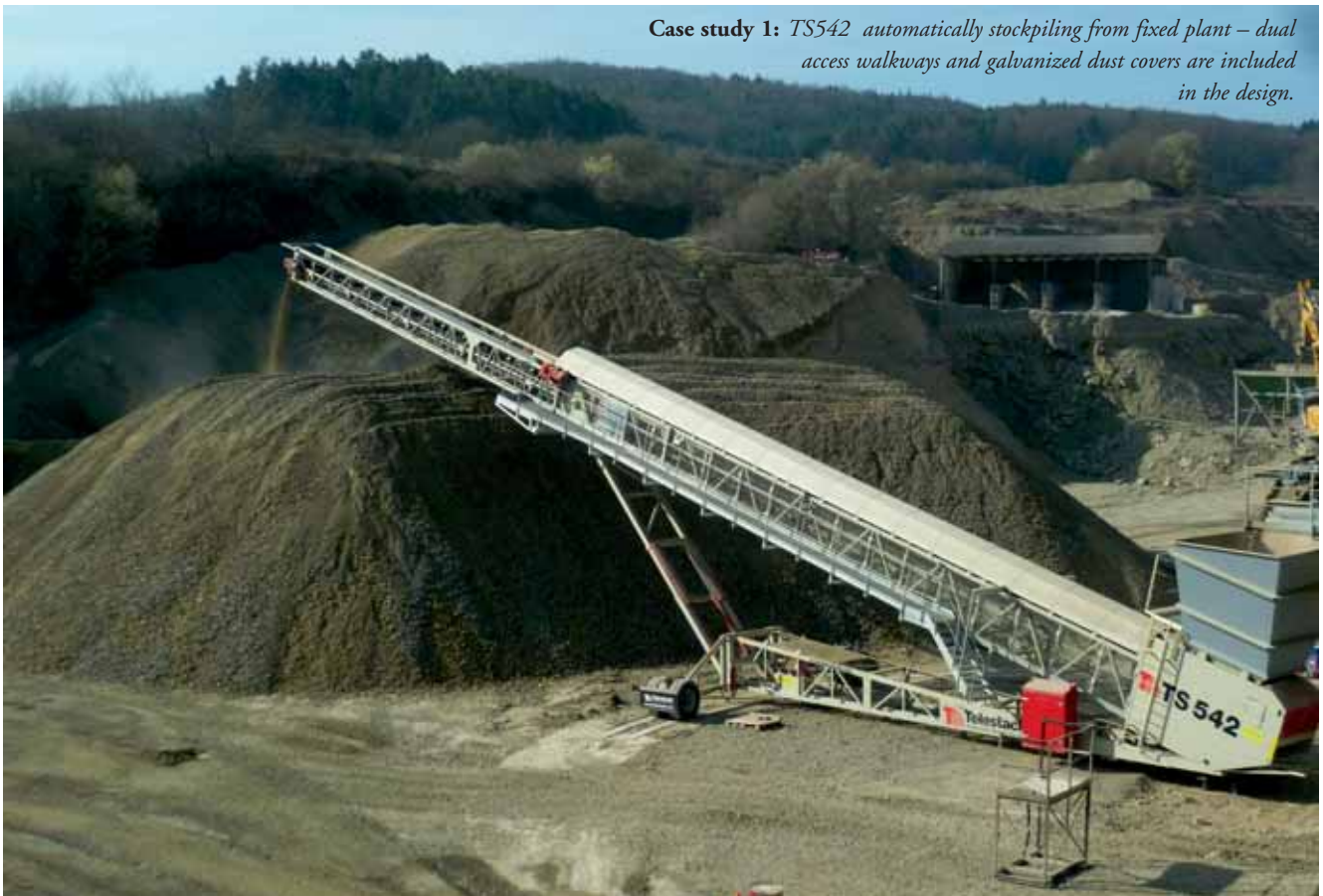
Flexibility: Telestack's not-so-secret weapon

Case study 1: *TS 542 stacker automatically stockpiling limestone in windrows.*

Telestack offers a range of mobile bulk material handling solutions. Below are details of three different applications, which illustrate the flexibility that the company's technology provides to the cement industry.

Case study 1

Telestack's customer in Europe operates a limestone quarry for its cement plant operation. It handles a range of materials for construction and cement manufacturing such as lime, cement,



Case study 1: *TS542 automatically stockpiling from fixed plant – dual access walkways and galvanized dust covers are included in the design.*

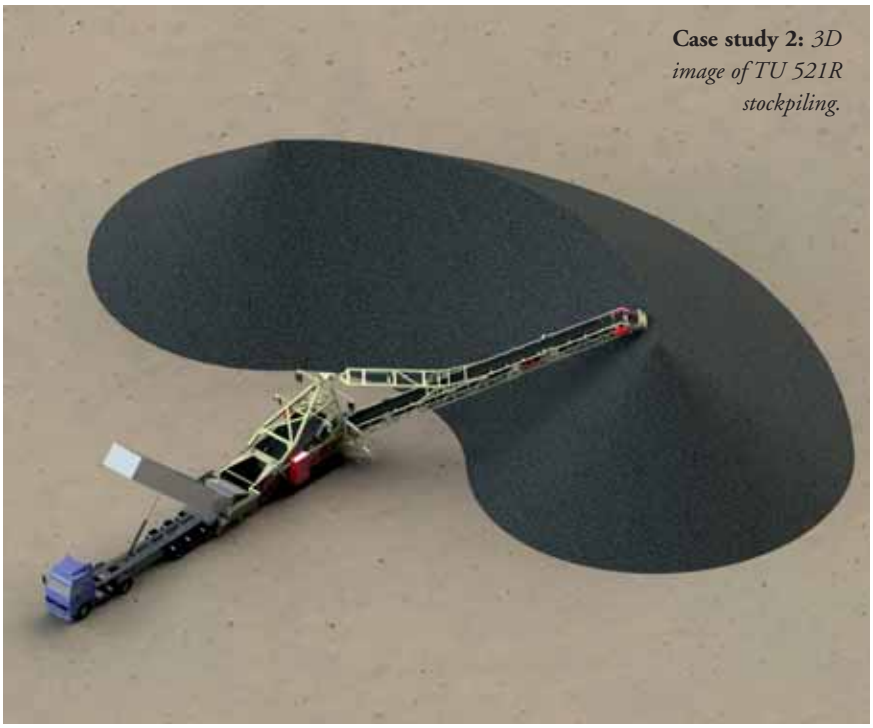
Case study 1: *Windrow method stockpiles automatically created by the TS542 for 'in-specification material — this replaced the use of wheel loaders stockpiling the material which was ineffective and expensive.*

plasters, mortar, crushed sand, aggregate and various environmental products within the plant; it is critical that all of these materials are handled in the correct manner.

Previously, the customer used wheel loaders to stockpile the recycled material from the calcinations of the limestone for the making of its cement. This method was ineffective in operation as it created unwanted dust generation, degradation and segregation and compaction of the material. It also involved high costs for fuel, labour and maintenance of the wheel loaders. As the material was stockpiled in this way, this significantly degraded the quality of the material that was fed into the furnace.

To reduce costs and improve this process, the customer installed the Telestack radial telescopic stacker which is used to stockpile the raw material for the plant that was to be loaded into the furnace for the cement-making process. During this process within the furnace, the material can only be loaded if it is within certain specifications; this is to ensure that only the 'in-specification' material is fed into the system to guarantee the correct product ratio. For the customer to achieve this 'in-specification' material,

Case study 1: *TS 542 stockpiling in windrows to eliminate segregation, degradation, contamination and compaction of the material — unit fully integrated with electrical communication system.*



Case study 2: *3D image of TU 521R stockpiling.*

Telestack installed its radial telescopic stacker to automatically stockpile the material in windrows. This method of stockpiling is scientifically proven to reduce/eliminate the segregation, degradation, contamination and compaction of the material.

The radial telescopic stacker automatically stockpiles the material and radials left/right via the electric hydraulic-driven wheels, raises/lowers and telescope's in/out to allow for a windrow type stockpile to ensure the 'in-specification' material is maintained throughout to feed the furnace. The all-electric-driven unit stockpiles up to 96,600 tonnes of material at 270° (based on 1.6t/m^3) in one area for large stacking capabilities. The unit is fully integrated into the current electrical communication system within the plant so it can be monitored and controlled from one central location. The inclusion of full-length galvanized dust covers ensure there are minimal dust emissions on site. Also, the dual access walkways the length of the outer conveyor allow for easy maintenance and safety for the operator. At a full length of 42 metres (140ft) length, the TS 542 radial telescopic stacker can discharge at heights up to 13.05 metres (43ft) at 500tph (tonnes per hour) for maximum capacity in the small areas within the site.

By utilizing Telestack's technology, the customer has reduced its operating costs significantly. The elimination of wheel loaders for stockpiling the material has meant a saving of 3,000 hours per year of operation of the wheel loader. Taking into account fuel consumption, labour and maintenance (tyres etc…) of a typical medium-sized wheel loader, this represents significant savings. In terms of fuel alone, the customer has saved 40,000–50,000 litres of diesel per year by using the Telestack radial telescopic stacker in place of the wheel loaders that were previously in operation. Also, from an environmental point of view, the carbon emissions have been significantly reduced on site, the noise level is reduced, and the dust generation is significantly less.

Telestack can also help improve site safety as the elimination of wheel loaders reduces site traffic movements and the potential for accidents.

Case Study 2

Telestack has recently been awarded a contract for a mobile track mounted truck unloader in South America for stacking cement clinker in covered storage. The unit was chosen for several reasons but the system's flexibility and mobility were major factors in the decision-making process.

The client imports clinker into the country in Handysize vessels and unloads these using mobile harbour cranes into conical hoppers. Road trucks receive the material from the conical hoppers and bring the cargo to the covered storage area. The trucks then reverse onto ramps which are hydraulically foldable for transport and they then tip the material into the Telestack mobile truck unloader for the stacking of the material. The material will be regulated in the feeder by means of a levelling blade which can be manually adjusted. The material is then transferred via a chute incline radial conveyor boom. The boom has the ability to slew ±45°, creating a radial stockpile.

The radial boom slews on slew bearing and is driven by a hydraulic motor with limit switches, limiting the slew range to a maximum 45° angle of centre line in a left/right direction. The incline boom can be positioned at a angle of inclination from 8° up to 23°.

An additional feature of an ultrasonic height sensor allows for a minimum drop height of clinker which reduces dust emissions and degradation of the material. The unit can stockpile to a height of 9 metres which gives a conical capacity of 1,680 tonnes at 1.4t/m^3 and a radial stockpile capacity at 90° of 6,125 tonnes.

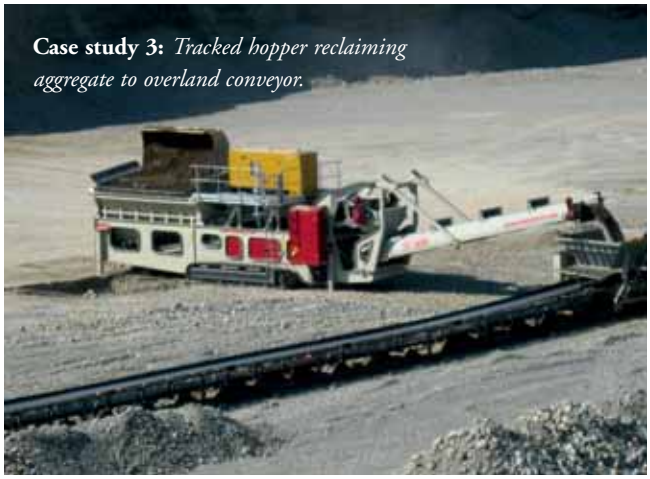
The truck unloading/stockpiling machine is fully self-contained with a CAT 4.4 litre engine generating 96kW of power. The mobile truck unloader is track mounted and has optional rubber pads therefore not marking the concrete within the storage area.

The client commented the TU521R will significantly reduce the operating costs for stacking of the clinker in the storage area. Prior to this contract, a 30-tonne excavator was used, which could only attain a heap height of 6 metres. The client will also increase its storage capacity with the same footprint. Further, less dust will be generated when stacking, resulting in a better quality product and a safer environment for company employees.

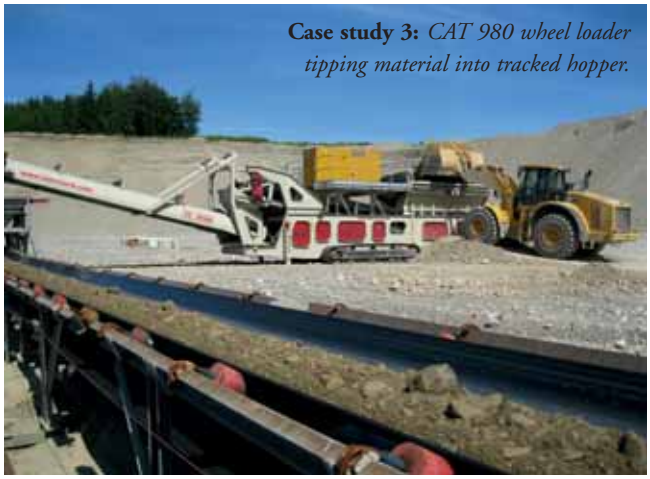
Case Study 3

Telestack has recently commissioned and installed a mobile reclaim hopper into sand and gravel operation in Europe. The client replaced a previous system which could only be fed with a 50-tonne excavator — consequently the diesel consumption for the excavator was excessive. The client had a very specific design brief for the new mobile reclaim feeder; some of the technical features are detailed below with regards to the unique design needed to meet the client's particular requirements.

The client chose a CAT 980 wheel loader to perform the reclaim operations from the mine face to the mobile reclaim feeder. Due to the reclaim hopper being track mounted, it can be easily manoeuvred along the uneven mine surface to a suitable position from where the wheel loader will feed it. This distance can vary between 20–50 metres. After 50 metres, load and carry distance has been reached, so the client moves the ground conveyor closer to the mineface and repeats the process.



Case study 3: *Tracked hopper reclaiming aggregate to overland conveyor.*



Case study 3: *CAT 980 wheel loader tipping material into tracked hopper.*

The wheel loader picks up the run-of-mine material which ranges from fine sand to 350mm gravel boulders. The wheel loader then carries the material to the hopper which is fitted with a 1,500mm aperture tipping grid. The grid is a heavy duty construction and the grid bars are made up of coffin shaped bofor bar. The grid size is remote control operated from the driver's cab of the wheel loader.

The grid can be tipped to an angle of 80°, which enables the effective removal of boulders which normally would become entrapped in the grid. The grid is reversible which enables it to be quickly changed to tip either side of the hopper. The material greater than 150mm is rejected and material under than 150mm passes through the grid and into the hopper which is lined with 10mm Abro 400 liners.

The hopper has a capacity of 18m³ and incorporates a drag out feed out conveyor. This feeder is speed-controlled by means of a variable-speed drive and in conjunction with a variable height gate means that the client can finely set the machine output.

The feed conveyor of the hopper is fully skirted up to the discharge point where it passes onto the incline conveyor. The incline conveyor has the ability to slew ±90°. The incline boom also incorporates an anti roll back system to prevent the larger boulders from rolling back in event of material feed stopping. The complete system is powered by a 165kVA CAT enclosed generator set or can be powered by mains electricity to further reduce operating costs. From the mobile reclaim conveyor the material is then transferred to a ground conveyor which feeds the material onto a primary surge stockpile. The stockpile is automatically reclaimed and gives a buffer of three days processing to the crushing and screening plant.

The client has realized the benefits both in terms of reduced operating costs for reclaiming and also increased manoeuvrability and quicker set-up times.

Telestack offers a range of mobile bulk material handling solutions which are in operation across the globe handling materials such as coal, iron ore, aggregates, fertilizer, grain and so forth in mines, ports, quarries, power plants, steel mills and cement kilns.

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textile packaging | consumer bags | recycling technology | viscotec

Cement and its packaging: Starlinger shows how it's done

Starlinger is a machine manufacturer, which specializes in equipment for the production of woven plastic packaging, and its products are widely used in the cement industry.

The company supplies machinery for every step in the bag-making process: tape extrusion lines, tape winders, circular looms for weaving of endless tubular tape fabric, coating and lamination lines, flexographic printing machines, and sack conversion lines.

Major markets and clients

Starlinger's customers are mainly packaging producers who cater to the construction and building materials industry (cement, lime, gypsum, and so forth) but also the chemical (powders, resin, etc.) and food (flour, grains, cereals, dry pet food, etc.) sectors. In recent years, a growing share of cement producers have started to produce their own packaging, many of them using Starlinger technology to produce woven block bottom sacks to provide durable and highly protective packaging for their product (AD*STAR® technology). Woven tape fabric is also used in FIBC production, providing adequate strength and durability.

The main markets are the Middle East, Maghreb and Central African countries, China, India and the South-East-Asian region, as well as Latin America.

Measures for staying competitive

To keep its customers one step ahead of the competition, Starlinger continuously improves existing technology and develops new technical features that improve production efficiency, output and product quality. The aim is to reduce the production costs of the sacks and thereby ensure competitive prices.

An important cost factor for producers is raw material: as natural resources are getting scarcer, raw material prices continue to rise — in the case of polypropylene, prices have increased by more than 18 % since 2008. Less packaging weight means less raw material input: with this fact in mind Starlinger gears production technology towards less raw material consumption, ensuring at the same time that the required packaging characteristics are achieved. The special properties of woven polypropylene tape fabric make the produced sacks extremely break- and tear-resistant, despite being very thin and lightweight, and ensure that their content is protected against humidity or other environmental impacts. To give an example: a woven sack that holds 50kg of filling weight can weigh as little as 55g itself.

Starlinger also develops new packaging products made of woven tape fabric in order to open new markets for its customers. One of those innovations is the AD*STAR® block bottom valve sack that was developed in the mid-1990s. Recognizing the advantages of polypropylene tape fabric, especially in the field of cement packaging, Starlinger combined it with the brick shape and suitability for automatic handling of paper bags and created a new packaging concept that is used worldwide today.

Recent contracts awarded/completed:

Dangote Agro Sacks Ltd., Nigeria. Machinery for the production of 240 million AD*STAR® sacks/year to increase existing capacities.

Products and application: block bottom valve sacks made of laminated woven polypropylene tape fabric for cement packaging, open-mouth sacks for agricultural purposes.

Recent technological developments

High-speed conversion line for block bottom valve sacks ad*starKON SX+

Designed for the economic production of standard, open mouth, 2-ply, pocket valve and BOPP laminated AD*STAR® sacks with patented hot air sealing technology. High production efficiency is achieved with quick material roll and format change, little machine downtime and a very low waste rate. Production speed: up to 100 sacks/minute. The pin-free continuous sack transport system and the high-precision bottom forming section ensure reliable bottom and top closure without harming the fabric. An

integrated fabric width monitoring system continuously checks the fabric width and automatically compensates width variations, ensuring constant high-quality bottom geometry. This not only avoids unnecessary machine stops, but also reduces the number of rejects significantly.

Circular loom for tape fabric RX 8.0

The RX 8.0 loom is primarily designed for the production of PP and HDPE tape fabric for heavy-duty applications such as FIBCs, tarpaulins, as well as geo- and agrotextiles. The eight-shuttle loom ensures high-quality fabric production within a weight range from 55 to 260 g/m². Electronically controlled settings and well-engineered technical features ensure high-quality fabric, easy handling and smooth operation. The use of new materials for the loom components reduces strain and friction on the tapes and increases the lifetime of wear and tear parts, keeping maintenance and spare part expenses down.

Small-size block bottom valve sack *mini AD*STAR®

To extend the size range of AD*STAR® block bottom sacks and to reach the end-consumer market it is now possible to produce also very small sack formats on Starlinger block bottom bag conversion lines. The *mini AD*STAR® sack is currently the smallest woven block bottom valve sack worldwide. With a capacity of 5–15kg (depending on the bulk weight of the content), it is perfect for packaging smaller quantities of dry bulk materials sold in the retail sector.

GENERAL COMPANY BACKGROUND:

Starlinger & Co. GmbH, a Viennese family business with production sites in Weissenbach and St. Martin, Austria, and Taicang, China, has been in the mechanical engineering industry since 1835 and has been exporting products worldwide for over 45 years. Being the world market leader in the field of machinery and complete lines for woven plastic bag production and PET (polyethylene terephthalate) recycling and refinement, Starlinger has an export quota of more than 98 % and is a synonym for leadership in quality and technology in over 130 countries.

Branches in Brazil, China, India, Indonesia, Russia, South Africa, USA and Uzbekistan underline Starlinger's emphasis on customer-oriented service and support.

AD*STAR® is a registered trademark. AD*STAR® sacks are produced exclusively on Starlinger machinery.

Ausenco: serving the cement industry from early stage to project completion

Ausenco has extensive experience, and has provided services to the cement, concrete and aggregate industries ranging from preliminary studies, detailed design, site resident engineering, construction consultation and programme management of projects ranging in size from small upgrades or modifications to major plant additions, upgrades and optimizations.

A selected list of completed project examples highlighting some of the company's cement handling experience include the following:

Tilbury cement plant expansion

Client: Tilbury Cement Limited
Scope: Increase production capacity to 1,050,000 tonnes/year
Services: Detailed design, construction supervision assistance

Ausenco provided detailed design and assistance in construction supervision for modifications to increase the production capacity of the Tilbury Cement Plant by approximately 20% to over 1,050,000 tonnes/year.

Plant modifications included:

- removal of the existing planetary cooler and installation of a grate cooler and all ancillary work including conveyors and a new electrical room. Air from the cooler is ducted to a new electrostatic precipitator where it is cleaned before being discharged to the atmosphere.
- modifications to the pre-heater tower including a new calciner, a new gas burner to the calciner, and a new coal burner to the riser duct.
- conversion of the direct pulverized coal firing system to indirect firing, including the installation of an inert gas generator, dust collectors, and a new coal silo.

The major emphasis of the project was on design and contracting strategies to allow as much work as possible to be carried out while the plant was in operation. Cooler replacement was completed during tightly scheduled eight week plant shutdown.

Sugar Creek Project

Client: Lafarge Corporation
Scope: Industrial complex construction
Services: Design, site management, quality control, project co-ordination

The project involved construction of a preheater precalciner kiln line, raw grinding, solid fuel firing, along with storage areas and silos, material handling, finish grinding, shipping facilities and an underground mine.

Project features included the latest in dust control technology, centralized closed loop re-circulating water system, central air compressor station, central control room and laboratory.

Ausenco provided design, site management, engineering quality control, coordination and integration between the project team, contractors and the operations team.

The site management functions included engineering and construction quality control, safety OCIP (owner contractor insurance programme), contract administration, schedule and cost monitoring, and document control.

Poraver® manufacturing facility

Client: Poraver North America
Scope: Design a new manufacturing facility
Services: Process assessment, design, construction management

Poraver North America (PNA) selected Ausenco to assess, quantify, engineer and develop the design for a new state-of-the-art North American manufacturing facility.

PNA manufactures and distributes Poraver®, expanded lightweight glass beads (.04 to 8 mm in diameter) using all colours of recycled 'Blue Box' glass as the base material.

Originating in Germany, the existing manufacturing process represented the culmination of 20 years of development in bringing lab results to a full scale mass production facility.

Existing clay expanding equipment and used cement handling equipment were modified, added, and re-modified routinely over this period, resulting in a process that could produce Poraver®, but was inherently convoluted and undocumented.

Ausenco assessed the existing process, designed and constructed the first North American facility on a fast track schedule.

To improve accessibility to equipment, a maximum gravity flow concept was used in the design of the material handling processes. The plant was constructed with a 33m-high roof,

which incorporates multiple standardized working levels.

Modularization of key process functions and phased design, procurement, construction and commissioning program allowed portions of the facility to be constructed before the design completion.

Constructed in a sensitive ground water recharge zone, the plant has zero process water/effluent discharge to the environment.

An intense safety programme incorporated work practices that minimized risk. The facility was constructed on budget with zero loss time accidents.

Kanowna Bell Backfill Project

Client: North Limited

Scope: Design and supervision of metallurgical testwork and preparation of capital and operating costs along with detailed engineering and preparation of all specifications

Services: Engineering, procurement and construction management (EPCM)

This project involved an initial study of backfill options, followed by the design and construction management of a surface cement slurry plant and pumped reticulation system, as well as the underground cement slurry/aggregate dosing and mixing system.

Ausenco's scope included the design and supervision of metallurgical testwork; preparation of final process flowsheets, mass balances, design criteria and P&IDs (process and instrumentation diagrams); preparation of capital and operating costs for the entire project to a ±10% accuracy; detailed engineering and preparation of all specifications; procurement, inspection and expediting for all process equipment; and preparation and administration of all fabrication and site construction contracts and site construction management, project management and commissioning.

- fully automated underground truck loading system;
- high level process control to optimize reagent dosing;
- one process operator to oversee surface and underground plant operations;
- surface crushed aggregate distributed via raise to reciprocating feeder.

Lafarge Cement Mill No.3

Client: Lafarge Canada Inc.

Scope: Analyse and design structural steel braced frame building structure

Services: Structural 3-D analysis, steel design, concrete design, seismic design, vibration analysis, project management

Ausenco conducted the detailed design and project management for the structural and mechanical components for the Lafarge Cement Mill No. 3 plant in Richmond, B.C.

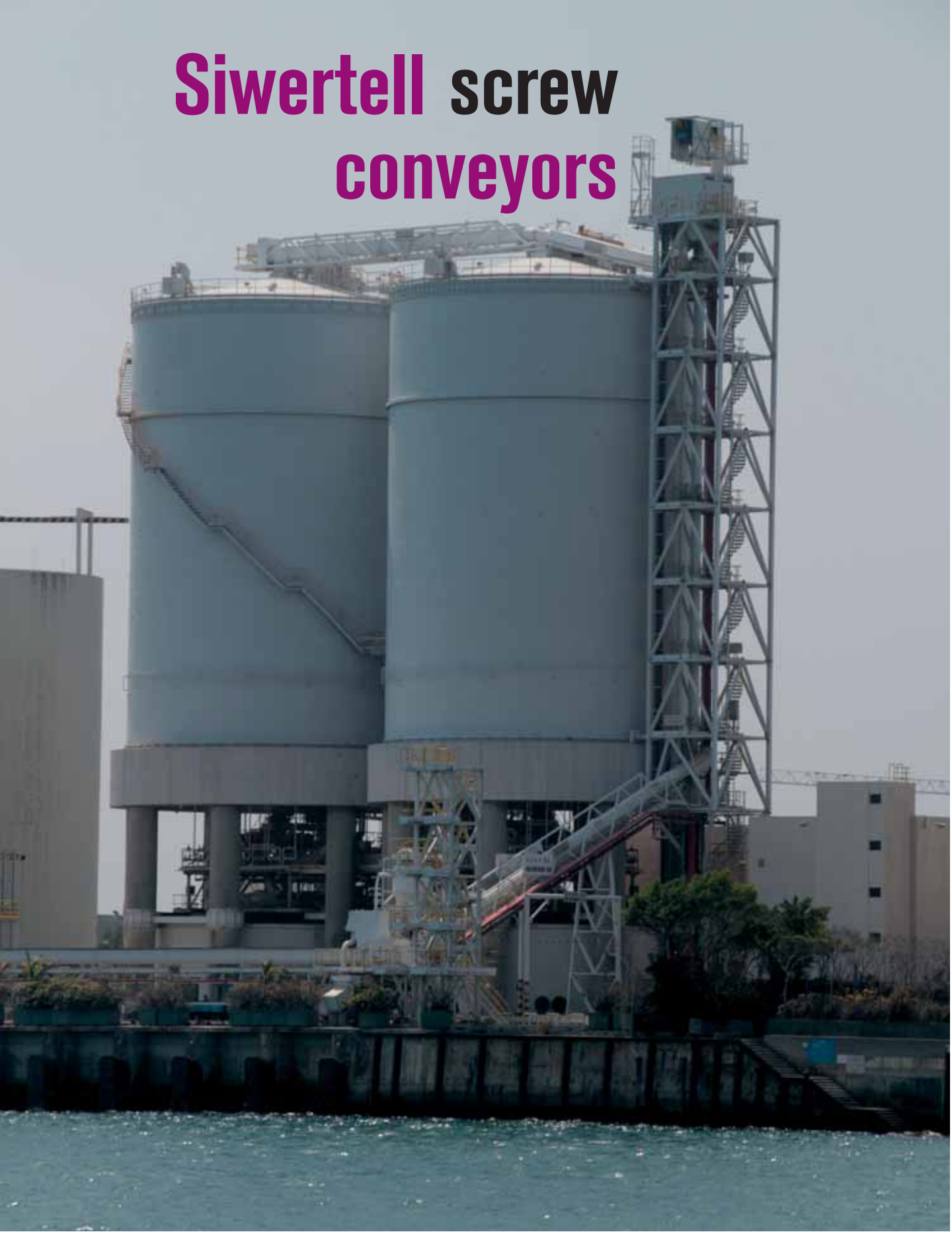
The 130ft × 65ft × 130ft-high structure is composed of braced frame structural steel with a number of elevated concrete floors.

The highly complex spatial layout of the equipment, ductwork, and conveyors, and the necessity to provide sufficient clearance for future removal of the main mill for maintenance required unique solutions for the structural configuration.

The building was modelled in 3-dimensions using the computer software SAP2000 to optimize and design the structural steel. Vibration analyses were conducted on the structural model to simulate the out-of-balance forces likely to occur during normal operations of the main cement separator cyclone.

The peak velocities and accelerations from this simulated vibration analysis were then compared to acceptable limiting criteria provided by Lafarge. Minor refinements to the structure were made to limit this vibration to an acceptable level. DCi

Siwertell screw conveyors



Delivering economy and efficiency over a long life span

Meeting the world's growing power demands requires efficient, bulk transfer installations and, while all systems can be expected to work well in the early stages, few can deliver decades of reliable service with minimal input in the way that Siwertell systems do.

For two decades Siwertell systems have been in operation, without upgrade, at Hong Kong Electric Group's Lamma Island power station's flue gas desulphurization plant. The company's Lamma Island facility has been in operation since 1982. Twenty years ago, in a move to make the primarily coal-fired power

Siwertell screw conveyors: key facts

Siwertell screw conveyors require minimal installation space for a low capital investment. They are completely enclosed, which reduces dust creation to a minimum and have been supplied to numerous customers for worldwide installations in port terminals, ships, silos, shore-based industries and power plants.

Siwertell screw conveyors can handle a wide variety of dry bulk materials including cement, lime raw meal, apatite, urea, fly ash, and gypsum in harsh conditions. Other attributes include:

- completely enclosed lines for environmentally friendly dust- and spillage-free conveying;
- low noise levels;
- easily replaceable, wear-resistant intermediate bearings;
- automatic electrically-driven intermediate bearing lubrication;
- high temperature material transport possible;
- wide range of applications available including:
  - silo/flat storage loading/reclaiming
  - receiving from a ship unloader
  - truck/railcar loading/unloading
  - distribution/reclaiming system on board vessels and in marine terminals
  - mobile installations
- quality service and long-term support to suit customer requirements.

Special features of vertical screw conveyors

- specially developed long-life intermediate bearings
- loading box with fluidized bottom
- conveying with different angles
- single or twin motor drive
- v-belt transmission
- speed guard included
- flexible connection at outlet

Special features of horizontal screw conveyors

- reversible conveying direction;
- one or more inlets;
- one or more outlets;
- the drive unit can be located either at the loading or the unloading end or both;
- inclined conveying possible;
- various types of drive units available (for example electric drives); and
- speed guard included.

station more environmentally friendly, the company installed a flue gas desulphurization plant. The project called for an environmentally friendly, fully enclosed limestone discharge and transfer system with a guaranteed noise level of less than 75dBA, consuming less than 1kWh/tonne from ship to silo.

It was no problem at all for Cargotec to meet these criteria, as its Siwertell bulk handling products are all designed with fuel efficiency, low noise levels and minimal environmental impact among the key drivers. Cargotec supplied a rail-mounted ST 490-F Siwertell continuous screw-type unloader feeding into a screw conveyor system. A coverbelt with a belt lifter allows for continuous loading of material onto the jetty conveyor. The totally enclosed system provides dust and spillage-free operations. It was designed to handle limestone powder from ships of up to 10,000dwt at a rate of up to 400tph (tonnes per hour), elevating the material by 32m to the top of the two silos.

"Siwertell technology was ideal for this design brief " says Conny Johanson, sales manager for the Siwertell brand at Cargotec. "When a Siwertell screw-type conveying system is used in conjunction with a Siwertell screw-type unloader, the entire system can be totally enclosed, delivering exceptionally clean performance.

"Furthermore, noise levels are kept very low, so the impact on those working and living close to the terminal is minimal. These qualities were very important for the Hong Kong Electric installation."

Hong Kong Electric's conveying system employs Siwertell HSC 800, HSC 800S and SEC 601D horizontal, inclined and vertical screw conveyors. The equipment was designed to allow for the installation of an additional unloader if required in the future.

Hong Kong Electric Group says the design, construction, delivery and commissioning was carried out to its satisfaction and, since then, the system has been reliable and durable in operation with no serious problems, displaying acceptable wear rates. Customer care from Cargotec has been good, it says,

Conny Johanson, sales manager for the Siwertell brand at Cargotec.

adding that periodic planned maintenance has been carried out without any problems and it expects to continue operating the system for as long as the desulphurization plant remains in service.

"The compact, clean and efficient Siwertell terminal conveying systems showcased at the Lamma Island facility are available to virtually all terminals," says Johanson. "Although the loading and unloading processes may attract the most attention, the transport of bulk materials smoothly and efficiently around a terminal is vitally important and demands versatile, reliable, environmentally friendly conveying equipment that can be relied on to perform for a very long time with little routine maintenance."

Siwertell puts its long experience in screw conveyor technology to good use in this field, offering systems that can cope with the most demanding terminal installations, offering horizontal, vertical and inclined screw conveyors. "With these we can design and install highly efficient, totally enclosed bulk material transfer systems for virtually any terminal, including those with complex conveying requirements," he notes. "A single screw conveyor can elevate material by up to 40m depending on size and capacity. If you need to raise material higher than that, we combine two or more conveyors in series, one feeding into the other. We apply the same principle for extended horizontal conveying requirements.

"Furthermore, by arranging conveyors in parallel we can deal with very high capacity situations, increasing the amount of material that can be handled per hour simply by installing two or more screw conveyors alongside each other, served by the same loading box.

Siwertell screw conveyors offer very compact solutions. For example, a vertical screw conveyor takes up much less space than a bucket elevator, so it can be used even where space is very limited. The highest capacity Siwertell vertical screw conveyor currently available is the VSC 700 with a capacity of 1,500tph.

An important feature of Siwertell screw conveyors is the easily replaceable, wear resistant intermediate bearing. Its useful working life is governed by factors including the material handled, but when the time comes for replacement, the process is quick and simple, keeping downtime to a minimum.

Generally speaking, Siwertell vertical screw conveyors involve less capital investment than systems employing other technologies. Their rigid, heavy-duty construction also reduces deterioration and enables easy maintenance at infrequent intervals. In addition, the flexibility inherent in the design and the different ways in which the basic components can be arranged means that they can be used to meet complex conveying requirement, Johanson explains.

"While some terminals have very straightforward operational requirements, others need complex bulk conveying arrangements to meet the demands of a variety of bulk trades. Our horizontal and inclined conveyors are reversible and can be supplied with multiple inlets and outlets, providing the potential for very flexible cargo distribution arrangements. Their modular construction also ensures swift and easy installation in new and existing bulk conveying systems."

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Breathe clean air

Sustainable by durability with Van Aalst Bulk Handling

In the last decade, it has become more and more common for more companies to focus on three particular areas. This article details the drive and vision of Van Aalst Bulk Handling in terms of its plans for the future, and discusses those three interesting areas. Van Aalst Bulk Handling is known worldwide for the manufacture of reliable and low maintenance pneumatic shiploaders and unloaders for cement, fly-ash and china clay. So, what it does is known by the majority of people in the interesting market of cement, but why and how it is done is less known. Therefore, below is an explanation of the company's focus on the planet, people and profit.

Planet

A few years back, the people from Van Aalst had the honour to meet the first Dutch astronaut ever to go into space. His name is Wubbo Ockels, and he was in 1978 selected by the ESA (European Space Agency) and NASA (National Aeronautics and Space Administration ([USA]) to work on the Space-lab programme. Eventually he went in to space in 1985 for seven days with the space shuttle *Challenger*, the same one which exploded 90 days later with the first female astronaut on board almost seven minutes after take-off.

Wubbo Ockels' journey was a successful one and this trip is still a very important part of his life and work today. He now is associated as professor Aerospace Sustainable Engineering and Technology (ASSET) at the University of Groningen. He is still a very enthusiastic and inspiring man.

At the meeting with Van Aalst, he started with showing a picture from planet earth 400km out in space, and let us realize the sensitivity and vulnerability of the planet we all live on. He mentioned the eye-opening fact that everything on earth and earth itself is only protected by the atmosphere, approximately 40km high. This is, of course, a quite ridiculous distance when you think about it. Another interesting thing is the fact that everything that is on this planet is there to stay. He tells everybody that they are actually 'Astronauts of spaceship Earth',

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and that everyone is responsible for this beautiful planet. Van Aalst Bulk Handling takes this responsibility very seriously. Therefore, we ensure that every new piece of equipment that we produce uses less power and energy, and is lighter, needing as little transportation as possible.

Van Aalst's technical innovation department spends almost 30% of its time improving these characteristics — and it demands the same dedication from its partner suppliers.

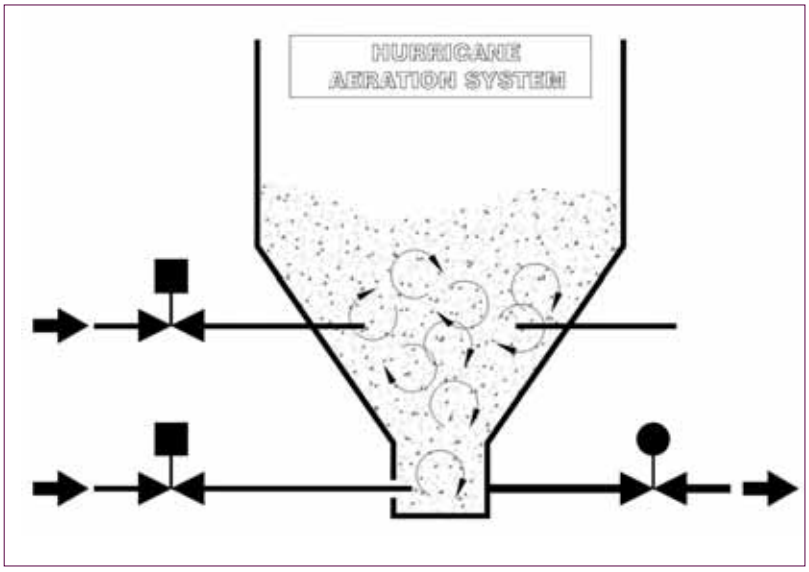
People

As an extension of this, Van Aalst Bulk Handling also wants to take care of the human species that live on this 'spaceship'. Besides the fact that dirty and dusty workplaces are very counterproductive, they can also result in a negative image of the workplace — a bulk handling terminal, for example.

Employees' motivation improves when they are in a clean working environment; they get sick less often, and are much more productive.

Low maintenance equipment is another way of taking care of people, because it significantly decreases the (mostly heavy and dirty) work in a cement terminal. For this reason, Van Aalst always uses the most innovative equipment, with the lowest wear, so that any dust emissions are not caused by Van Aalst equipment. These days, the ever-more-stringent environmental

regulations demand all types of certificates relating to safety. Further, more and more companies demand a good, clean terminal. In the future, certificates will be awarded more frequently as safety measures are followed more closely.



Profit

Nobody denies that profit margins are important — equipment is bought only by businessmen. Equipment is purchased with the aim of making money.

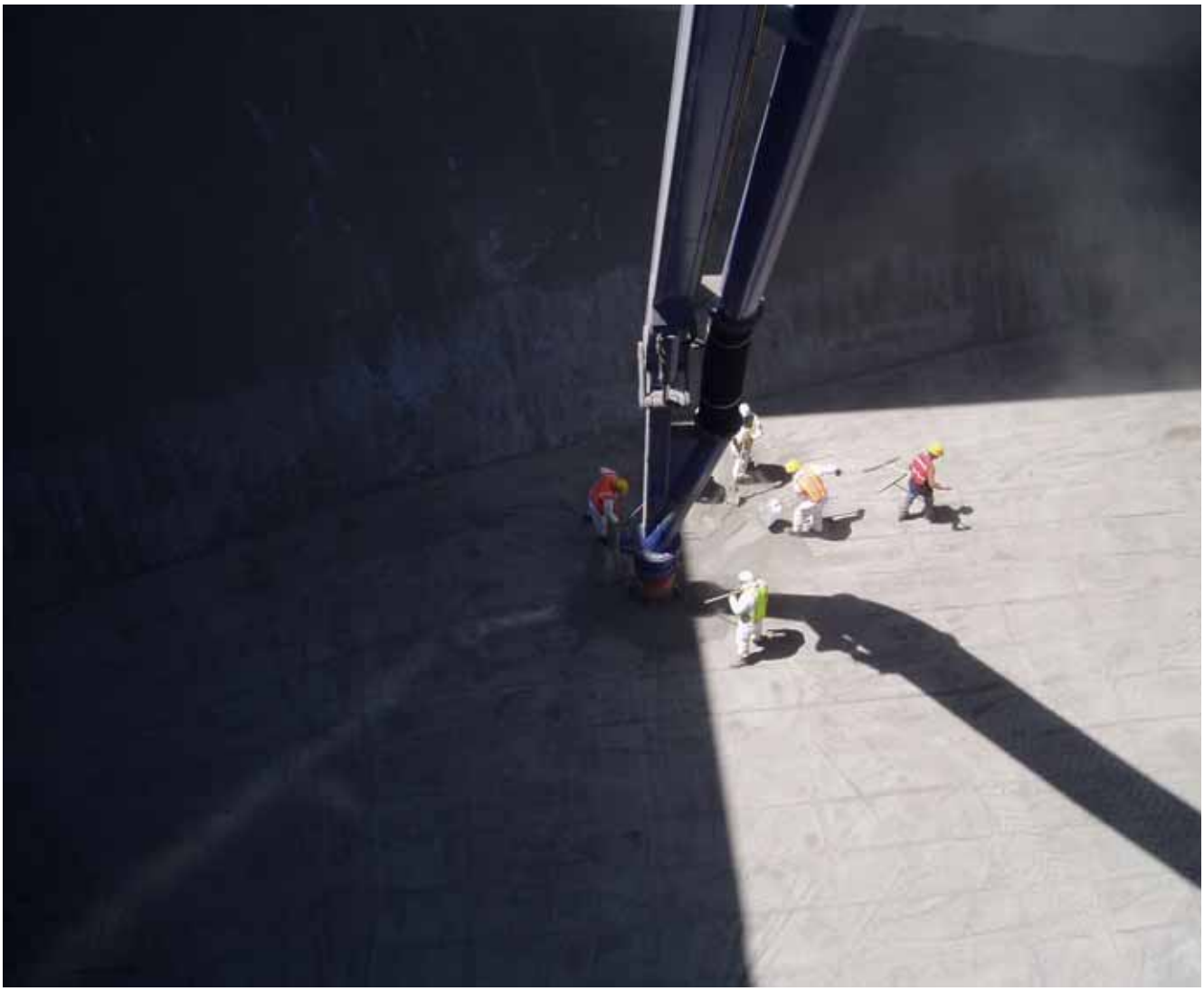
Van Aalst combines all the above factors, and combines them with the need for profit. Profit is the real drive and determining factor for the viability of companies, and their employees.

Van Aalst is always seeking to use less material, but material that is stronger and more durable. Durable is also very sustainable and, in addition, almost all the material used can be recycled. Other qualities that contribute to the profit of the end-users are the already mentioned low maintenance, lower power consumption and high level of reliability.

All this is achieved by customizing high-quality designs, that can be spray-painted with the customer's livery if required. When using real Van Aalst equipment, customers are guaranteed that a low carbon footprint, consideration for natural resources and an understanding of the need to make a profit all go hand-in-hand.

On top of that, Van Aalst equipment also offers excellent residual value. In the past, second-hand machines have been sold for almost half the initial purchase price. Van Aalst machines have been proven to be very reliable, and the aim is always to deliver the lowest costs of ownership for every customer.

In this way, Van Aalst is able to remain highly competitive. The company has a strong philosophy that it works for the planet, people and profit, for all our children and last but not least for its customers.



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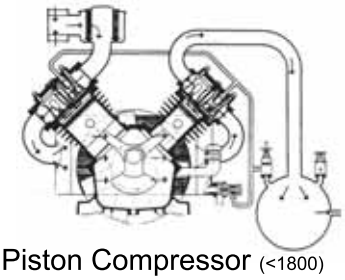


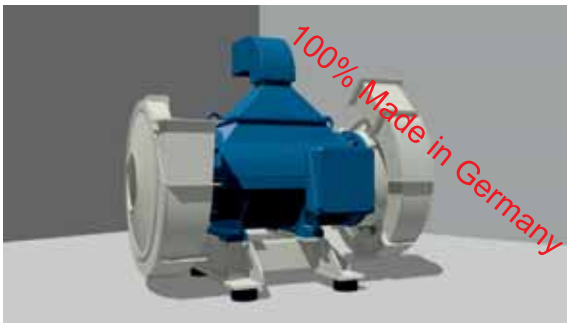
Piston Compressor (<1800)

Roots Blower (1900)

Fan with Air Flow Regulator (1960)

Fan with frequency inverter and automatic belt tension (2000)

TURBO POWER single stage (2009)



TURBO POWER double stage (2011)

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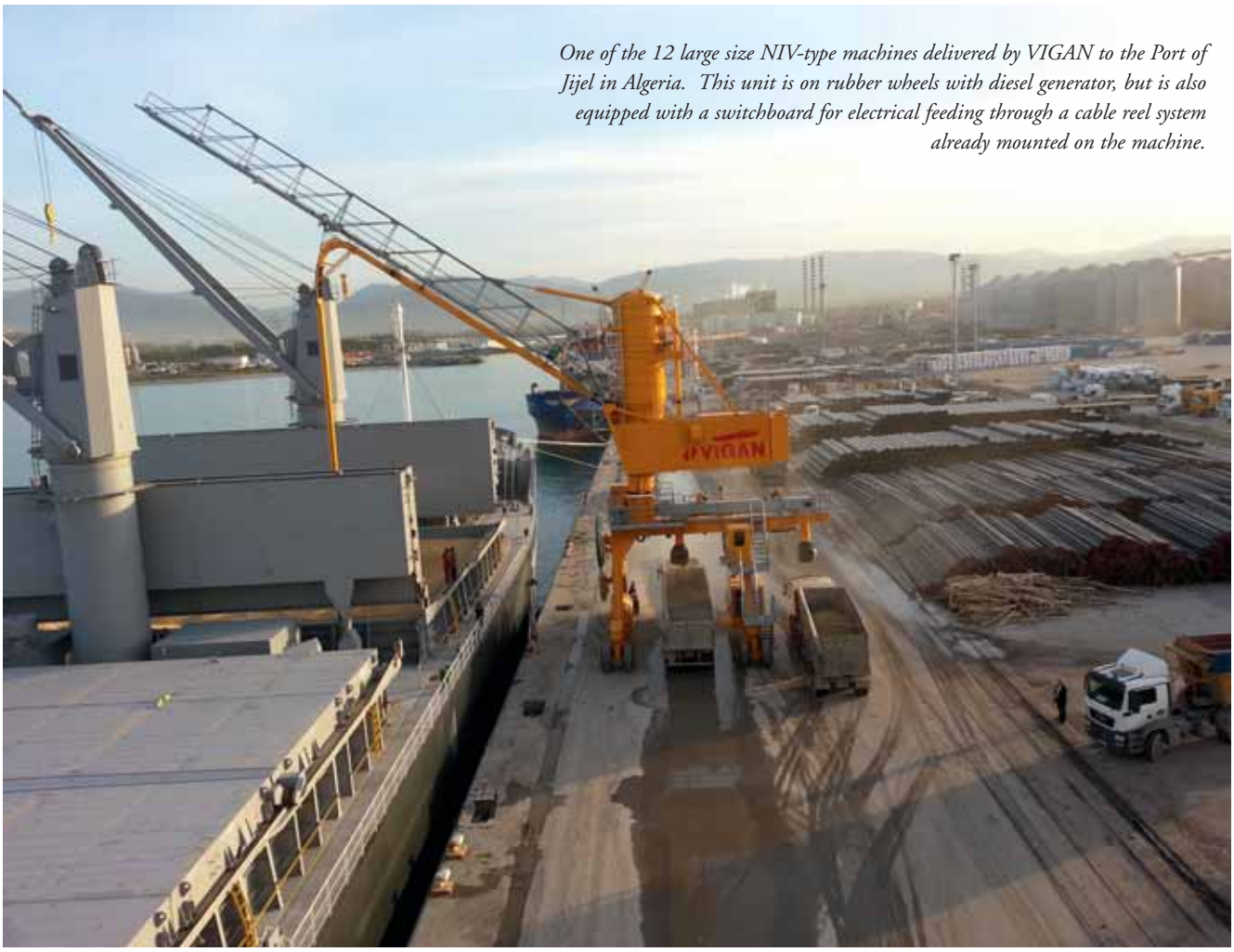
VIGAN: delivering reliability to its customers



One of the 12 large size NIV-type machines delivered by VIGAN to the Port of Jijel in Algeria. This unit is on rubber wheels with diesel generator, but is also equipped with a switchboard for electrical feeding through a cable reel system already mounted on the machine.

VIGAN Engineering S.A. is a Belgian company with its headquarters in the Nivelles industrial area about 30km south of Brussels at the heart of the European Community.

VIGAN manufactures a complete range of pneumatic & mechanical conveying systems for products in bulk. Not only does it manufacture and supply equipment, it also manages complete turnkey projects.

All the company activities take place on the same 10,000m² site which enables easy and very quick exchange of information among all departments including sales, engineering, manufacturing, quality control and after-sales technical assistance. VIGAN engineering department with 450m² space boasts latest software

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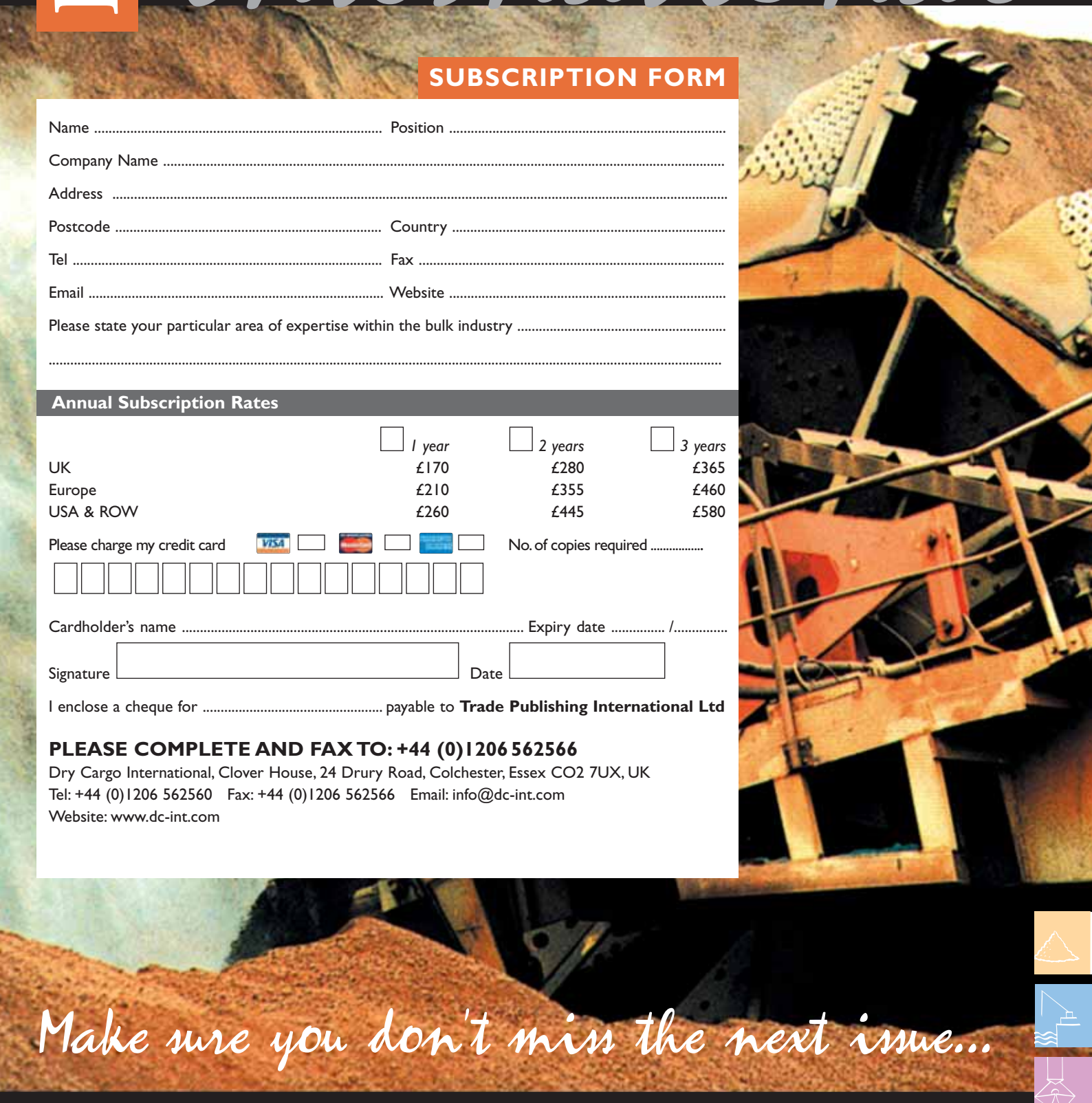

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One of the eight small units delivered by VIGAN to a customer in Algeria earlier this year.

technologies (such as CAD–CAM types).

VIGAN has a major presence in the pneumatic bulk handling market. The pneumatic equipment principle is based on conveying products using air, which handles them inside the pipes and therefore behaves as the transport medium.

This means that at the suction nozzle, and thanks to the vacuum produced by the turbo blower(s), a certain amount of air is mixed with the free flowing products. The sufficient air speed in the pipes will maintain the products into the air flow and therefore they will be conveyed in the same way as the air.

In the central part of the equipment, at the arrival of the products inside the receiving cyclone or hopper, the air is sucked upwards into the turbine, while the products settle down into the hopper bottom or cyclone.

After being conveyed down by an airlock (rotary valve), the products are moved either pneumatically or mechanically to their final destination such as into trucks, railway cars, silos and/or storage warehouses.

VIGAN's pneumatic unloaders are suitable for any size of ship, because its mobile machines can be put on the deck of large vessels, while its large size unloaders can have a boom with suction pipes of up to 28 metres for post-Panamax vessels.

Recent contracts for VIGAN include the supply of CSU (continuous ship unloaders) to regions including Egypt and Bangladesh. Details of these deliveries can be found on p94 of the January 2014 issue of *Dry Cargo International*.

VIGAN has also had a few additional sales of its equipment to South East Asia, North and East Africa and Europe.

Currently VIGAN is delivering 12 large size NIV-type machines, with capacities from 250–300tph (tonnes per hour) to Algeria. One of the first machines delivered in the port of Jijel in Algeria is on rubber wheels with diesel generator, but is also equipped with a switchboard for electrical feeding through a cable reel system already mounted on the machine.

In Algeria, VIGAN has delivered eight small mobile machines during the first trimester of 2014.

There are also several interesting projects in the pipeline, the details of which remain confidential at the time of going to press.

VIGAN remains committed to its principles of innovation, reliability and customer service. DCi

One of the eight small units delivered by VIGAN to a customer in Algeria earlier this year.

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ASSOCIATED TERMINALS

Bulk afloat the

Lower Mississippi

Jay Venter

Associated Terminal: more than just midstream handling

Associated Terminals is widely known throughout the maritime community for its midstream cargo handling activities on the Lower Mississippi River, with its modern fleet of eight high-speed floating cranes and the eleven midstream berths at which the company operates. However, there are many more aspects to the services the company provides to its customers, making Associated Terminals one of the most diverse cargo handling and terminal operating companies in the United States.

The full list of services that Associated Terminals can provide to cargo shippers is unprecedented in its market:

- Associated Terminals operates the Myrtle Grove Midstream Terminal (MGMT), a floating grain elevator at mile 56 on the LMR, specializing in the transfer of grain and grain byproducts between barges and ocean vessels.
- Bulk cargo handling between ocean vessels and ground storage/surface transportation is a primary service offered by Associated Terminals. At the Port of St. Bernard's Chalmette Slip and the Port of South Louisiana's Globalplex Terminal, the company operates over 250,000 square feet (23,225.7m^2) of covered warehouse space for bulk cargoes, as well as over 18 acres of open storage space. Associated Terminals has the ability to load cargoes to trucks, railcars, or back to barges depending on the customer's requirements.
- At both the Chalmette Slip and Globalplex, Associated Terminals offers general cargo handling and storage, with all the equipment necessary to competitively move and store steel products, metals, and containers. These two facilities have combined covered storage of over 400,000ft^2 (37,161m^2) and hard surface laydown areas in excess of 200,000ft^2 (18,580.6m^2) square feet.
- In the Chalmette Slip, Associated Terminals offers a slackwater harbor that is perfect for project cargo transfers from ocean vessels to barges or to ground storage /

Chalmette slip.

transportation.

- At the Globalplex facility, the newly commissioned Finger Pier allows Associated Terminals to work two deep draft vessels simultaneously, and barges can be positioned and loaded directly from a vessel on the back side of the Finger Pier.
- At its Port Allen, LA terminal, the company provides over 45,000ft² (4,180.6m²) of warehouse storage, 130,000ft² (12,077m²) of outside storage, as well as the ability to load bulk cargoes from trucks via hopper/conveyor directly to barges.
- The company's In-Plant Services Division offers OSHA and MHSA certified personnel and equipment to handle its customers' cargoes safely and efficiently at their plant sites. The company has been providing this service at multiple barite plant locations in coastal Louisiana for over a decade.
- Finally, Associated's sister company, Turn Services, offers barge fleeting, shifting, and cleaning services at five locations on the LMR including Myrtle Grove (serving the MGMT) and Meraux, LA (serving Associated's midstream berths there). Turn operates 20 towboats and 6 crewboats.

If you can't beat 'em, join 'em!

With over a combined 150 years of vessel stevedoring and inland logistics experience, Cooper/Consolidated is a name that carries a lot of weight.

Prior to 2003, Cooper/T. Smith Stevedoring (CTS) and Consolidated Terminals and Logistics Company (CTLC), both Mississippi River stevedoring and logistics providers, were operating in a fiercely competitive market that was trending toward an overcapacity situation. While the two companies' bread and butter strengths may have been different, they shared many common approaches to business and their customers.

CTS was a globally known stevedoring expert on all three US coasts with a variety of marine service companies in addition to its fleet of high-capacity cranes.

CTLC was a powerful force in the world of barge freight trading, barge fleets, inland terminals, trucking, rail assets, and logistics services which became the industry leader with a focus on value-added service packages.

So there were two terrific companies, both experts at what they did, and with the commitment to adapt to an ever changing landscape with a great focus on their customer's needs. This commitment to the industry, as well as to customers, was put into high gear on 1 January 2003 with the formation of Cooper/ Consolidated.

Fast forward to present day, when Cooper/Consolidated is really proving that some names carry a lot of weight. When it comes to stevedoring and inland logistics, here's where the rubber meets the road or what some may refer to as a little skin in the game…

Cooper/Consolidated

- one seamless journey — door-to-door, all-inclusive logistics packages;
- Mississippi River fleet of high capacity stevedoring cranes including next generation, American-made, electric floating cranes, meet the *High Tide, Bob Frane, Bayou Special,* and *Marylyn G*;
- only mid-stream coal facility with two-stage mechanical sampling, homogenous blending, metal separation, and high-speed shiploader, the LMO (Louisiana Mid-Stream One);
- only mid-stream catamaran style floating grain elevator with all the bells and whistles, meet the America;
- twelve mid-stream vessel anchorages, strategically located between mile 71.5 (Belle Chasse) and mile 180 (Darrow) ahp, Mississippi River. Berths at mile 71.5 include a Capesize berth;
- all ancillary services including barge switch, fleeting, cleaning and repairs; and
- barge stacking for export.

The affiliate companies at glance:

- Cooper Group of Companies;
- Cooper/T. Smith Stevedoring — US Gulf, US East and US West Coast operations;
- Crescent Towing harbour docking tugs;
- Cooper Mooring line handling services;
- Cooper Marine and Timberlands — tow boats and barges;
- Crimson Marine — ocean going tugs and barges;
- International Logistics Company — logistics; and
- Cooper Restaurants — Ruth Chris, Felix's, Blue Gill.

Consolidated Terminals and Logistics Company

- CGB Enterprises, Inc. — parent company with 80 plus grain originating facilities throughout the Midwest United States;
- CGB Marine — barge fleeting and repairs facilities;
- River Bend Transport and River Bend Brokerage, trucking companies;
- MG Rail — short line rail road in the Port of Indiana, Jeffersonville, IN;
- LMR — LMR – marketing of inland river barges;
- CGB Fertilizer — wholesale & retail fertilizer company; and
- Diversified Services — crop insurance.

Louisiana Mid-Stream One overcomes traditional mid-stream transfer quality issues

Louisiana Mid-Stream One (LMO) is a unique barge-mounted shiploading system operated by Louisiana Mid-Stream Terminals specifically designed to overcome the quality issues of traditional mid-stream transfers. The LMO provides coal and petroleum coke exporters utilizing the Mississippi River with the quality control features not found in other mid-stream loading operations, such as a magnet, a mechanical sampling system, a belt scale, and a system for water drainage and collection. Working in tandem with a separate barge-mounted feeder crane alongside the vessel, products from barge are directly fed into the LMO's receiving hoppers, up a series of conveyors to a retractable loading boom with a rotational spout which feeds the vessel.

Operating on the Mississippi River (Mile Marker 134) at Cooper/Consolidated's mid-stream buoy system in LaPlace, Louisiana, the LMO allows for the continuous collection of mechanical samples from the entire cargo loading to the vessel, whereas traditional crane-only transfers allow sampling for only a portion of the barge cargo. Located after the receiving hoppers, the LMO's two-stage mechanical sampler (James A. Redding) collects a full stream cut primary increment from the LMO's C2 conveyor belt. These primary increments are then processed through a crusher and a secondary sampler to produce the final laboratory-ready samples. This sampling system conforms to the ASTM D7430 standard for mechanical sampling and provides a representative sample throughout the cargo and not just from a portion and/or top of a barge. The system is operated and maintained by the independent third party sampling and testing company, SAI Gulf.

The LMO can simultaneously feed and combine product from multiple barges to meet rigorous quality specifications, greatly enhancing the uniformity of export cargo. LMO's two main receiving hoppers have four variable speed feeders that can homogenously combine different qualities. The two main receiving hoppers have grizzly screens on top to prevent oversized product or large contaminants from entering the system. The hoppers can also provide for water drainage of excessively wet cargo, which is collected and disposed through a pump and collection system. The rotation spout provides the ability to trim vessel hatches without delays and eliminates placing mobile equipment in the holds.

Another value-added service provided by the LMO is tramp metal collection. A self-cleaning magnet is mounted before the mechanical sampler on the C2 conveyor. This magnet removes tramp metal from the conveyor as the product passes under it, thereby reducing contamination and potential damage to the customer's receiving systems.

These unique features of the Louisiana Mid-Stream One greatly enhance the control of quality for mid-stream loaded cargoes by providing more homogeneous combinations of coal qualities, control of moisture, contamination prevention, and the accurate measurement of the true cargo quality when customers specify an ASTM D7430-Part A-Condition B Mechanical Sampling requirement.

Mondi launches the Touch Bag with embossed logo

Under the slogan 'Take your brand in your hand', Mondi has launched the Touch Bag — an industrial paper bag with an embossed element such as a logo or another visual. The embossed element not only draws attention to the brand; it also gives the packaging an emotional touch and presents an obstacle to product counterfeiters. "We are excited to offer this new feature to our customers," says Thomas Ott, Chief Operational Officer Mondi Industrial Bags. "Fillers can now further reinforce their brand on the packaging, and not only convey it in print but also through an emotional touch," he adds.

How does it work?

Embossing is a technique for creating a raised pattern on material such as paper, metal or wood. To produce the Touch Bag, sack kraft paper is run between a backing roll and an embossing drum with a pattern defined by the customer. The high pressure applied by the drums creates the raised element, which has a unique look and feel that customers are sure to find memorable.

Increased brand visibility

By combining the visual appeal of print with the tactile experience of embossing, the Touch Bag ensures that the customer brand lingers in the end customers' minds. Customers can give their brand the importance it deserves with the Touch Bag.

Emotional touch

Branding works well when it works on the emotions. The Touch Bag's embossing uses the power of the haptic to create positive associations with a customer brand.

Standing out from the competition

In today's markets, there is strong competition in all fields. In order to be successful, fillers have to focus on their own customers' benefits and differentiate themselves from other suppliers by offering a service that is not only exclusive, but sought after by a specific group of consumers. Packaging can underline this differentiation very strongly. The Touch Bag works with the customer brand and reinforces its image. A company that is proud of its brand shows it in every way possible — for example by letting it stand out on the packaging.

Product safety

Product piracy is a growing challenge in many markets. Counterfeiters who hijack a valuable brand create risks for unwary customers and jeopardize the integrity of the brand. "Consumers are led to believe that they buy a high-quality product, but in reality they risk being harmed by the inferior quality of a counterfeited product. The more sophisticated the packaging of each product, the more difficult it will be to fake," states Thomas Ott.

The methods used to produce the Touch Bag are sophisticated, making it significantly more difficult for counterfeiters to gain the upper hand.

About Mondi Industrial Bags

Mondi Industrial Bags, a business segment of Mondi's Europe & International Division, is the leading international producer of industrial paper bags1, selling around 4 billion bags per year. Thanks to its broad range of bag specifications, Mondi Industrial Bags serves major industries including cement and building materials, chemicals, food, feed and seed. The business segment operates a dense sales and service network, the specialized filling equipment department Natro Tech, as well as its Bag Application Centre, where researchers develop and test innovative packaging solutions.

About Mondi

Mondi is an international packaging and paper Group, employing around 24,000 people in production facilities across 30 countries. In 2013, Mondi had revenues of €6.5 billion and a ROCE of 15.3%. The Group"s key operations are located in central Europe, Russia, the Americas and South Africa. The Mondi Group is fully integrated across the packaging and paper value chain — from the management of its own forests and the production of pulp and paper (packaging paper and uncoated fine paper), to the conversion of packaging paper into corrugated packaging, industrial bags, extrusion coatings and release liner. Mondi is also a supplier of innovative consumer packaging solutions, advanced films and hygiene products components.

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Bagging for bulk

Jay Venter

Containerizing bulk equipment with Nectar

Nectar Group provides innovative and cost-effective solutions for handling bulk commodities worldwide, and has pioneered mobile, high speed bagging systems for use in ports. From the development of its mobile bagging machines called Compac series, which can bag free-flowing cargo at a rate of 140tph (tonnes per hour), to projects involving lightening and discharging vessels in port, to providing a complete consultation process with clients to build the most efficient cargo handling facilities, Nectar Group has the experience to assist in all aspects of bulk handling throughout the world.

The flexibility of Compac mobile bagging equipment allows bagging operations to be carried out not only at the quayside but also in closed spaces with limited height such as warehouses or at silos and terminal storage facilities.

In addition to Nectar's bagging equipment, the group also owns and operates a fleet of bulk materials handling equipment such as grabs and pneumatic dischargers (vacuvators). This equipment can be used for bulk discharge and lightening operations. The vacuvators have the capacity to discharge cargo at speeds of up to 100tph (per unit). Several units can be combined to reach a discharge speed of 7,000 metric tonnes to 10,000 metric tonnes per day.

Nectar Group can also provide independent advice on:

- bulk handling terminal renovation projects;
- capacity improvement projects;
- identification and selection of suitable cargo handling equipment for the customer's facility;
- preparation and execution of tenders on behalf of clients and evaluation of results leading to independent advice on suitable solutions; and
- monitoring performance of projects during implementation up to installation and commissioning of equipment.

Nectar Modular Bulk Hopper

The Nectar Group, which has pioneered mobile, high speed bagging systems for use in ports, has once again gone back to the drawing board to discover what new and innovative equipment could benefit the bulk handling industry.

The Group, which operates largely in developing ports, has found a desire to make essential port equipment within the port more flexible and mobile with the use of ISO containers. The company originally designed the first bagging equipment that is wholly contained within just two standard ISO 20ft containers — meaning that the units can be shipped and trucked easily around the world to ports where they are needed for spot cargoes. The concept of full mobility was then stamped onto the

other products to come out of the Nectar factory – mobile big bag machines and 10ft mini bagging machines followed suit. The company's latest development to be introduced into the port sector to mimic the level of mobility is the revolutionary 'Modular Bulk Hopper' (UK Patent Application Number 1406035.4) that consists of 2 x 20ft ISO containers and 1 x 40ft ISO container to create a fully functioning Large Bulk Hopper for standard use with most free flowing bulk commodities. The entire assembly can be erected on the quayside in under an hour by Nectar trained personnel and a single forklift truck, reach stacker or container crane can be used to assemble the equipment with relative ease making it suitable for use in most locations where the equipment is required.

The advantages of containerizing port equipment may not be immediately obvious. However, Nectar has discovered that by increasing the mobility of bulk handling equipment this increases the number of locations that can benefit from the utilization of the equipment. Bulk hoppers are often seen lingering on quaysides waiting for their next opportunity to be used taking up increasingly valuable space within the port. With containerized hoppers, the equipment can be broken down swiftly and trucked to storage areas outside of the port for convenient storage until they are required again. Alternatively they can be containerized and lifted onto the vessel with standard container lifting equipment or the vessel's gear and shipped to the next port of call where they can be set up and used in the same way.

The multiple conveniences provided by Nectar's novel Bulk Hopper do not compromise the standards of safety and structural integrity. The hopper frame, made from SS400 Steel, works as a standard Large Bulk Hopper with the integrated valve mechanisms manufactured from high grade stainless steel and Teflon lined blade guides for increased control of discharge. The Hopper allows trucks with a maximum height of four metres to be loaded with cargo that has been discharged into the hoppers directly from the ship's holds with grabs.

Nectar's new 'Modular Bulk Hopper', a fully functioning Large Bulk Hopper for standard use with most free flowing bulk commodities.

There are of course particular ports around the world that will benefit from such developments as the lesser developed ports often lack the investment of infrastructure needed to handle bulk cargoes. By providing this opportunity Nectar is opening up the potential of these ports to easily handle such commodities without the restrictions usually associated with Bulk hoppers.

Barrier Foil FIBC Liners provide total protection from elemental volatiles

Barrier foils are a flexible barrier with the lowest known water vapour and oxygen transmission rates. Polythene liners let water vapour and aggressive gasses seep through allowing deterioration of product to occur, but this can be eliminated by the use of a barrier foil liner.

Barrier foil liners manufactured by Protective Packaging Limited are designed to provide total protection for dried products that have sensitivity to moisture, oxygen and other climatic and biological volatiles, and can also prevent odour transfer either into or out of the product.

Combined with a barrier foil liner, FIBCs can be used to pack bulk products which previously had to be shipped in sealed containers such as steel, plastic or fibreboard drums due the FIBCs' inability to provide complete climatic protection for very hygroscopic and oxygen sensitive materials. Not only does the barrier foil liner with FIBC offer a material cost saving but shipping space efficiency can be improved by up to 40% over drums.

All liners are tailor-made to suit the dimensions and style of the FIBC. They can be made open topped with flat base or with filling and/or discharge spouts, thus ensuring safe filling and emptying of the FIBC. These liners can also be fitted with valves that facilitate gas flushing of the liner allowing residual oxygen to be displaced, vacuuming of the liner and taking samples of the residual air in the liners for analysis, all without the need to open up the hermetically sealed liner.

Industries include pharmaceuticals, foodstuffs, chemicals and polymers, or any product which may be susceptible to moisture.

FIBCs made of PET fabric: New possibilities in bulk material logistics on show at Interpack

Starlinger & Co GmbH and SABIC will show an FIBC (Flexible Intermediate Bulk Container) made of PET tape fabric at this year's Interpack in Düsseldorf, on 8–14 May.

Starlinger and SABIC have developed the technology for the production of fabric made of PET tapes. PET tapes stand out for their high tenacity and high creep modulus as well as low thermal shrinkage, providing fabric and articles produced out of it with exceptionally high strength and long-term form stability.

A bulk packaging application, where these characteristics are especially important, is FIBCs, also called big bags. FIBCs made of PET tape fabric have superior dimensional stability due to their higher rigidity and higher creep modulus, compared with existing polypropylene FIBCs. They maintain shape and circumference during long storage periods and in hot weather. PET FIBCs can be used for packaging of bulk materials with slippery characteristics — for example, expandable polystyrene beads and polymer chips with slip additives. Such materials cannot be packaged in polypropylene FIBCs as they would be prone to tilting and bulging.

Being dimensionally stable, PET tape FIBCs offer a better alternative to more expensive packaging such as cardboard octabins which are used for bulk materials with high flow tendency. PET FIBCs are also easier to fit into sea containers due to better shape retention.

About the Companies

SABIC ranks among the world's top petrochemical companies, and is among the world's market leaders in the production of polyethylene, polypropylene and other advanced thermoplastics, glycols, methanol and fertilizers. SABIC has significant research resources with 19 dedicated Technology & Innovation facilities around the world.

Starlinger & Co. GmbH is a renowned supplier of machinery and process technology for woven plastic packaging production. The product range of Starlinger textile packaging covers all types of machinery for the production of tape fabric for modern woven sacks, geo- and agrotextiles, heavy duty fabrics and FIBCs.

Quayside bulk handling solutions by Rapidpack Corporation

Handling bulk cargoes at the quayside of inland destinations is a complex operation. Technical acumen, relevant industry experience and above all the right equipment determine the overall profitability of operation. A cost-effective solution tailored to the efficient discharge and bagging of bulk commodity is a vital ingredient to the success of an operation. Over the last 15 years, Rapidpack Corporation™ has been partnering with leading shipping companies, importers as well as port terminals, providing the world's most cost-effective and efficient solutions for bulk discharge besides packaging. Rapidpack equipment is engineered in Canada and based on years of practical experience, working in diverse conditions with a variety of cargoes. The company's Mobile Bulk Bagging Machine is manufactured to be totally self-contained, technically advanced as well as easy to operate with limited training. Housed in two 20ft Lloyds-certified containers, Rapidpack's bagging system is designed to operate around the clock.

"In handling bulk ships regularly, ports see a substantial financial gain in offering bagging services," says Omran Alikhan, CEO of Rapidpack. "With mobile bagging systems like the Rapidpack system, ports can service bulk ships at numerous berths. Bagging at a speed of up to 140tph (metric tonnes per hour), a single Rapidpack machine can discharge up to 3,300 metric tonnes per 24-hour day — across two bagging lines. With discharge speeds like this, the port can turn around ships faster thus accommodating more ships. Additionally ports increase revenue streams through offering bagging services to bulk ships charging on a rate per tonne basis." Each unit contains built-in scales, certified in accordance to international standards enabling us to guarantee accurately weighed bags and detailed records of delivered and received cargo quantities.

Because of the equipment's mobility and versatility, the usage can be customized to meet the different requirements of each client; thus making logistics and transportation most economical. All parts as well as ancillary equipment are solid state and manufactured to the highest standards and supplied by renowned North American, European and Japanese specialist manufacturers.

Installed on the shipside, at a rail terminal or in a factory, the Rapidpack machine is fed by ship grab, ship unloaders or a feed pipe from a silo or an inclined belt conveyor. The machinery enables customers to set up and operate a bagging terminal within days; it does not require special foundations or building works.

The Rapidpack bagging units can bag up to 140tph, with weight values ranging from 25kg to 100kg. The units are capable of weighing open-mouth bags, valve bags, form/fill/seal packages and IBCs. To ensure complete accuracy in weighing, all units are equipped with gravity-fed automatic net bagging weighers and industrial weighing systems. World renowned and tested scales produce bags with most accurate weight.

Rapidpack Corporation™ has also developed a unit capable of filling 1,000kg FIBC bags for grains, pulses, sugar, fertilizer etc. These units are designed for working in harsh climates and conditions.

Rapidpack's contributions have helped shape this technology and positively impacted companies across many industry lines. Rapidpack bagging equipment provide an efficient means to fill and securely close a bag to prevent the contents from leaking or sifting out once it has been filled. The bags are totally sealed on all sides prior to filling except for an open sleeve located in a corner to allow introduction of material that is to be held within. Expert engineers equipped with the latest engineering tools to expedite the work and to limit to the minimum possible errors design all the company's products. An electronic load-cell technology is utilized to efficiently maintain accurate weighing results. The compact-designed with a minimum space serves to improve packing work and to save labour costs.

Rapidpack's expertise in handling the full range of commodities is reflected by its specialist team, which works with skilled representatives at loading and discharge ports to ensure that the needs of ship-owners, receivers, charterers and traders are met safely and efficiently. The bulk freight market is expected to make a modest recovery by late this year, or the beginning of 2015, on the back of a gradual levelling out of the current tonnage supply and demand imbalance. With its global coverage spanning all major bulk locations, Rapidpack is able to act as both load port and disport agent for the same voyage hence ensuring smooth, seamless operations from origin to destination. The bagging service can be provided to the customer on lease, sale or as part of a larger full turnkey solution. The equipment is customized specifically to project requirements. To complement its bagging equipment, Rapidpack also manufactures the following:

- mobile bulk bagging machines (ship side or warehouse portable bagging machines);
- pneumatic conveyors (vac-u-vators);
- ship loading telescopic conveyors (loading ships at up to 1,500tph each);
- grabs;
- shiploaders;
- filling equipment;
- pusher equipment; and
- bulk discharge hoppers (to feed trucks, rails, cars, etc).

Rapidpack Corporation™ continues to grow moving into 2015. With its Global Sales Center based in Dubai (UAE), technical consultants/engineers are a short distance from many of the leading ports of the world.

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IMGS (bulk cargo handling expert) offers customized port handling solutions

Maritime ports are getting busier, ships are getting larger, and the bulk cargo being transported is becoming more diverse. These increased demands for port infrastructure and services are also

causing ports to run out of land, requiring them to dredge deeper harbours and waterways and to invest in expensive shipment-handling technology. Ports that are unable to adapt to these changing demands for port infrastructure and services will lose out to competitor ports for cargo throughput. IMGS has been assisting ports, importers and traders address these issues by providing innovative and economical cargo handling solutions globally since 1980 at a variety of ports throughout Africa, Middle East and North America. Operating for over 30 years in the most diverse geographic and operational conditions, IMGS' teams are experienced and offer customized solutions for all cargo handling issues. IMGS is active globally with up to date information and solutions for boosting the integrity of port operations, increasing bulk throughput.

The lack of adequate mechanization at many ports requires the manual handling of large cargoes, as well as the manual loading of conveyances and trucks, which significantly reduces the efficiency of operations and requires the onward transportation of cargoes to off-site storage locations. Adding to this situation is the growing role of global logistics service providers who have considerable strength in dealing with both shipping companies and terminal operators. IMGS has experience with portable mobile bagging, shiploading and discharging equipment that can be easily adapted to working with any existing infrastructure. "IMGS handles the entire cycle from initial survey to discharging bulk cargo with related machinery — bagging on to trucks or into the warehouse and finally delivery to inland destinations," explains Mr Alikhan. "Above all, this is an economical model for ports as they simply

outsource the entire operation for bulk cargoes, ensuring that the operation is being run effectively to global best standards – all the while offering financial gain to the port." The bagging system is housed in two 20 foot Lloyds certified containers, with the lower unit housing the bagging, weighing and stitching machines, while the upper unit forms the hopper.

IMGS also runs full turnkey day-to-day operations of Terminals. Automating the loading operations, it allows complete and easy integration with any administration and business systems. Being a terminal operator providing cargo support, inland and terminal development services; terminal operations become simpler, safer, and more secure, with increased customer satisfaction to third party users. An effective terminal management system includes the terminal automation for process controls and business administration to facilitate the enterprise operation. Alikhan, chief executive officer of IMGS, says that because cargo volumes through ports are increasing across the globe, this has led to ports reconsidering their existing infrastructure and modernizing capabilities to meet tonnage demands of importers and exporters. "Ports will always act as vital gateway for trade. However, the future will dictate how well the ports adapt to the changing requirements of its customers and it is this that will dictate which ports will lead where others follow." IMGS offers the complete solutions from receiving products through to storage and delivery from locations. The company supervises the logistical planning and implementation of operations, while complying with safety and quality standards, and managing multi-disciplinary gangs.

Outsourcing bagging operations to third party contractors is becoming more popular for ports. The 21st century will see changes in the business base underlying port operations. Innovative systems and new technology will radically change requirements for port infrastructure and increase the degree of specialization, raising the financial stakes of port investments and the need for a highly specialized workforce. The challenge is for IMGS to relate to the needs of customers and assist them in improving competitive positions by providing low-cost, efficient port services. To complement its bagging units; IMGS also leases and rents an extensive fleet of equipment such as shiploading, inland transportation and mobile pneumatic unloaders, including Neuero's model as well as VIGAN's dual boom Mobile Vacuvators. Each machine is equipped with an ancillary equipment to support site operations.

EFIBCA-Q and Code of Conduct – two initiatives to help FIBC users make a better informed choice

When choosing an FIBC supplier, focusing on price alone can be costly — quality and business ethics are equally important factors.

The European market for Flexible Intermediate Bulk Containers (FIBCs) is more competitive and globalized than ever, with the majority of FIBCs imports originating from India, Turkey and China. On the one hand, consumers of FIBC are cost conscious with an eye on the bottom line. On the other hand, compromising on safety or ethical principles is no solution. Users who make poorly informed decisions when sourcing FIBCs put their company and personnel at risk — non-conforming FIBCs can pose risks to health, the environment, company reputation and not least, financial risks. To aid FIBC consumers in making well-informed decisions, the European Flexible Intermediate Bulk Container Association (EFIBCA) has started two new initiatives: the EFIBCA-Q Quality Pledge and the EFIBCA Code of Conduct.

High standards for quality and safety of FIBCs used in material handling have been a key topic at EFIBCA since the founding of the association in 1983. In fact, EFIBCA developed the first internationally recognized quality standards for FIBC in 1985. These served as the foundation for the ISO 21898 standard which followed. Since then, further regulations have emerged for the transport of food, hygienic products and dangerous goods in FIBCs and minimizing the risk of electrostatic charge.

However, conformance with quality standards is not a given in a price driven market. Practice shows that safety is still a concern — avoidable accidents with FIBC occur too often. A poorly constructed FIBC — or one not fit for intended use — can tear, puncture or burst, putting operators in considerable danger. Furthermore, human health and the environment can come to harm if inferior quality or not-fit-for-purpose FIBCs are used for dangerous goods. Similarly, quality and static protective standards must be upheld in potentially explosive environments and with powdery, dusty filling material. The consequences of accidents and incidents through non-conforming FIBCs can be great and the financial losses significant.

Quality and safety are highly regulated areas and difficult to navigate for those not immersed in the subject. Many end-users of FIBCs lack this specialized knowledge. EFIBCA-Q aims to raise awareness amongst users of FIBCs about quality and safety standards relevant for different types of FIBCs. The initiative consists of a voluntary pledge by FIBC manufacturers and suppliers to conform with the EFIBCA-Q Quality Criteria, a list of specifications and requirements relevant for different types of FIBCs. Subscribers to EFIBCA-Q furthermore commit to provide their customers with detailed information on all quality requirements and to provide evidence of compliance on request. The EFIBCA-Q Quality Criteria as well as evidence can be requested from the FIBC supplier and are also made transparent to FIBC users through publication on EFIBCA's homepage. Users of FIBCs are encouraged to engage with their FIBC supplier on the EFIBCA-Q Quality Criteria and to include these criteria in their supplier audits.

Legal compliance and corporate social responsibility are also areas of concern for users and suppliers of FIBCs alike. Conformity with fundamental legal requirements in the fields of competition and antitrust law as well as internationally accepted ethical principles are a prerequisite for doing business with many companies. A Code of Conduct is an efficient means for users to determine which business partners are committed to basic ethical principles. In dialogue with its members, EFIBCA has developed a code of conduct for its member companies to uphold in their business dealings.

The EFIBCA Code of Conduct is a voluntary agreement, through which EFIBCA member companies guarantee the observance of globally recognized principles of ethical behaviour as well as the standards of proper business conduct in the areas of competition and antitrust law. This also means promoting fair and sustainable standards dealing with suppliers, customers and with company personnel as well. Respect for human rights and protection of the environment are at the heart of Corporate Social Responsibility. Subscribers to the Code of Conduct also commit to take reasonable action to provide employee training with regard to the contents of the Code of Conduct, create accountability and internal procedures, where necessary, and aim for affiliates, subcontractors and other business partners to also accept the standards set in the Code of Conduct. In order to obtain a certification, subscribers must take part in a regular survey taken every two years.

Business partners may sometimes expect other companies to accept their code of conduct when a contract is concluded. If a company agrees to this, the business partner's code will form part of the civil law relationship between the parties. This may also involve consequences under liability law and should therefore be avoided. If both contracting parties have their own codes of conduct, the problem can be solved by way of mutual recognition. As a branch codex, the acceptance of the EFIBCA Code of Conduct on the market may be higher than of individual company codes.

EFIBCA-Q and the EFIBCA Code of Conduct are voluntary company commitments. No audits are performed by EFIBCA to guarantee that these commitments are adhered to *per se*, however non-conformance can result in exclusion or annulment of certification respectively. Both initiatives are intended to increase consumer awareness and transparency. EFIBCA strongly encourages all FIBC users to engage with their suppliers on these issues and to integrate the relevant standards in their supplier audits (*see figure 1*).

Basic quality and ethical standards referred to by EFIBCA-Q and the EFIBCA Code of Conduct:

SUBSCRIBERS OF EFIBCA-Q COMMIT TO ADHERE TO:

- Basic requirements, i.e. European Packaging and Packaging Waste Directive 94/62/EC and related harmonized CEN standards EN 13427 to 13432, product liability insurance and REACH regulation (EC) No 1907/2006
- Requirements for All Non-Dangerous Goods FIBC, i.e. ISO 21898:2004 and internal quality assurance programmes per ISO 9001:2008 or 22000:2005
- Requirements for FIBCs for the Transport of Dangerous Goods (UN Requirements), i.e. ADR, RID and IMDG
- Requirements for Static Protective Bags, i.e. IEC 61340-4-4:2012 (Ed. 2.0): Electrostatics Part 4-4

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Speakers

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- Requirements for Hygiene Bags, i.e. EN 15593:2008-05 or other globally recognized hygiene standards
- Requirements for Food Contact Bags, i.e. Framework Regulation (EC) No 1935/2004, Regulation (EC) No 2023/2006, Regulation (EU) No 10/2011 and amendments, European Directive 82/711/EEC and amendments, European Directive 85/572/EEC and amendments

Subscribers of the EFIBCA Code of Conduct commit to:

- General provisions, i.e. observance of the law and general ethic values and principles, such as integrity, fairness and honesty and preservation of trade secrets
- Antitrust and competition law requirements
- Global Conventions, such as the UN Human Rights Charter and ILO labour conventions regarding child labour, forced labour, wages, working hours, health and employment protection as well as environmental protection
- Ethical and social principles at work, i.e. non-discrimination, non-molestation, freedom of opinion and privacy
- Take reasonable action to provide employee training with regard to the contents of the Code of Conduct, create accountability and internal procedures where necessary, and aim for affiliates, subcontractors and other business partners to also accept the standards set in the Code of Conduct.

Fig 1: EFIBCA-Q and EFIBCA Code of Conduct – Mode of Work.

HAVER Southern Africa offers complete HAVER & BOECKER-product range

With a comprehensive stock of spare parts, HAVER's South African subsidiary assures reliable service when it comes to maintenance and service.

Fulfilling customer requirements dependably and rapidly: that's the target which HAVER & BOECKER has made its top priority. Working out of Johannesburg HAVER Southern Africa has been active on the African market for the company group already since 2008 and is always in close proximity to customers. Since the company has moved into its new offices in the South African metropolis last year, the HAVER subsidiary not only has offices and meeting rooms which are outfitted with the latest equipment, it also has a comprehensive stock that ensures customers get reliable and quick support when it comes to maintenance and service.

Last year was marked by rapid development. The number of employees more than doubled. Additional service technicians and sales staff have rounded out the team.

"Foremost it was the takeover of the packing technology in 2012 that brought us to a whole new level," said managing director Joachim Hoppe. Previously HAVER Southern Africa had provided products and services from the Mineral Processing and Wire Weaving Divisions. Now the subsidiary company has the full product portfolio of the entire HAVER & BOECKER Group in its product range.

"The infrastructure is in place and we are now able to address all the needs of the staff with the daily work," Hoppe is pleased to say. "Now we are at the stage where we can specifically target the South African market and to focus even more on the needs of the customers."

The HAVER Southern Africa team in front of its new offices: Additional service technicians and sales staff have rounded out the team. With a comprehensive stock of spare parts, HAVER's South African subsidiary assures reliable service when it comes to maintenance and service.

About HAVER & BOECKER

HAVER & BOECKER is a traditional family-managed, mid-size company with headquarters in Oelde, Westphalia, Germany. Under the umbrella of HAVER & BOECKER OHG, one finds the Wire Weaving and Machinery Divisions. Together with over 50 subsidiary companies on all five continents, they make up the HAVER Group which has 2,870 employees and 150 representatives. In 2013 the HAVER Group posted a sales turnover of €470 million.

The Wire Weaving Division produces woven wire mesh and processes it into engineered woven wire products. They are used for screening and filtration by the chemical, plastics, automotive, aviation, aerospace, electronics, foodstuffs and feed industries, as well as for architectural applications and analysis sieves.

The Machinery Division specializes in packing and weighing technology. It develops, produces and markets systems and plants for filling and processing loose, bulk materials of every type. The product range includes packing and loading systems for powder-type and granulated materials, packing machines for filling food and animal feed, as well as filling stations and complete filling lines for liquid and pasty products. The product range is supplemented by screening machines, machines for washing, pelletizing plates, agitators, mixers, palletizing and loading systems, silos, ship loading and unloading equipment. DCi

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