

Concrete evidence of progress

Beumer of Beckum, Germany, recently won an order to supply the world's tallest belt bucket elevator to India's Ambuja Cement, part of the Swiss Holcim Group. With a capacity of 650t/h the elevator will have a centre to centre distance of 158m and will be installed at the new 8500t/day capacity cement plant currently under construction at Bhatapara.

Here the preheater will be fed with raw meal by the new elevator which at 1250mm wide is also claimed to set a new world record in terms of lateral dimensions. Working in close association with its local subsidiary Mumbai-based Beumer Technology India Pvt Ltd, the German manufacturer is scheduled to deliver the machine in early 2008.

Handling and storage plant employed by the cement industry needs not only to be sufficiently robust to cope with the abrasive nature of the end product as well as associated raw materials and by-products, but also to meet customers' expectations for enhanced energy efficiency and reduced maintenance requirements. We report on recent technical developments and several current projects

Although this is believed to be the largest belt bucket elevator ever built, Beumer is confident that by applying the same technology it will in future be able to build even taller and higher-capacity units.

Meanwhile following a major order won last September from India's Grasim Cement, Beumer is currently supplying a total of 47 bucket elevators for installation in three new cement plants each with a design capacity of 3.5mt/yr. The order comprises

high-capacity belt bucket elevators and central chain bucket elevators of various sizes and capacities, including six units which rate among the world's tallest with centre distances of 145.65m. With a bucket width of 1000mm these machines, fitted with high-strength steel cord belts having cable-free zones, will be capable of handling about 550t/h of raw meal.

Better by air?

In the field of pneumatic conveying, Air-Tec System, the

leading Italian supplier of pneumatic conveying technology, reports that it recently delivered six transporters for handling cement as part of the Karun IV dam construction project in Iran. Cement is transferred over a distance of 90m and each transporter provides a flow rate of 40t/h.

Dynamic Air of St. Paul, MN, has recently developed an innovative system called the Dense Phase Full Line Concept which is well suited for the needs of the cement industry. When combined



Temcor 78m diameter aluminium dome for limestone storage at the new GCC cement plant in Pueblo, Colorado

with the company's new DC-5 Air Saver technology, providing a means by which compressed air is automatically injected along the conveying pipe in small amounts in response to the conditions inside the conveying pipe, it reduces air consumption to an absolute minimum.

Dramatic saving

Traditionally cement has been handled by medium-phase pneumatic conveying systems such as impeller screw pumps. These systems, however, are plagued with problems such as high maintenance and high air consumption. The impeller screw pump requires two motors to deliver cement: the screw drive motor and the air compressor motor.

For example, in the case of a 100t/h capacity pipeline of 200m length, the screw drive motor requires about 93kW and the air compressor motor about 186kW. It can therefore be seen that the screw motor consumes one third of the system's total power, or 50% of the power of the air compressor.

Consequently if a pneumatic conveying system can be employed that eliminates the screw motor, the result is a dramatic saving in power

consumption. The latest Dynamic Air development achieves this objective.

Similarly Clyde Materials Handling of the UK has recently developed solutions that utilise ultra-dense-phase pneumatic conveying technologies to move material in an energy-efficient manner over long distances at tonnage rates typically over 150t/h and within a single pipeline. These systems are self-optimising, which means that the conveying air is only used when a full batch of material is ready to be transferred.

Within the past 18 months Clyde has commissioned several materials handling systems for the cement industry, ranging from full turn-key projects to specific items of equipment and control instrumentation. All these systems are said to be easily extendable and have the versatility to transport a range of materials with differing physical characteristics.

For example, a major cement plant in the Ukraine is employing Clyde's dense phase technology to transport OPC from mills to silos at a rate of 150t/h over a distance of 350m. The order was secured against a competitive bid from a screw pump manu-

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3 of 10 120m coal storage domes, Formosa Plastics, Mai Liao, Taiwan



Typical dome construction using Temcor's erection tower method

Air-Tec System pneumatic conveying transporters at the construction site of the Karun IV dam in Iran



facturer, based on Clyde's ability to demonstrate low energy consumption (less than 50% compared to the competition), low maintenance and system simplicity.

Repeat orders for three further systems are currently being manufactured for the same customer for installation at Russian cement plants. Similar OPC conveying systems have also been brought on stream at several UK plants as well as those in Italy and Slovakia.

A cement plant in Poland has installed a Clyde dense phase conveying system to transfer PFA from a silo to a hopper above a mill at a rate of 100t/h over a distance of 150m. Clyde's dense phase systems have also been selected for blending plants where three materials have been blended and transported within the process centre of a leading UK cement producer. Originally, bucket elevators and airslides had been recommended for this application but would have occupied too large a footprint within the existing site. Clyde provided a compact solution that could transport the material over 50m at 75t/h, which optimised both air usage and compressor size.

Ingenious feature

One manufacturer which has successfully combined its expertise in pneumatic conveying with intermodal tank containers is InBulk Technologies of the UK. This has resulted in ISO-Veyor, a mode of transport which has proved popular for cement, fly ash, ferrous sulphate and related products. Indeed, the dense phase pneumatic transfer technology incorporated in the ISO-Veyor was initially developed by Clyde Materials Handling.

The ISO-Veyor tank container consists of a cylindrical vessel constructed within the frame dimensions of a 20ft or 30ft ISO unit. It can be transported exactly as a standard ISO container, utilising currently available trailer chassis and railcar rolling stock. It can be filled at source and remain sealed until the point of delivery, thereby removing the need for intermediate handling or storage of the contents.

An ingenious feature is that the ISO-Veyor's fluidisation membrane is designed to follow the curvature of the tank barrel, avoiding the need for space-consuming cones, thus allowing superior payloads and discharge performance in terms of both time and the small quantity of residual cargo. With the simple addition of an air supply (and without tipping) the ISO-Veyor discharges its contents in less than 30 minutes. Recent customers have included Cemex, Lafarge UK and Lafarge North America.

Domes to the fore

When it comes to storage of cement raw materials, domes are increasingly being preferred to traditional

vertical silos. They are quicker to construct, can provide a dustfree, weather-protection cover for stockpiling and blending operations and allow easy access for belt conveyors and trucks.

Temcor of Gardena, CA, is the world's foremost manufacturer of aluminium storage domes. It recently completed construction of a 78m diameter structure for limestone storage at the new GCC cement plant in Pueblo, CO. The dome stands 24m high at its centre and has been fitted with a conveyor opening, eight skylights, a gravity vent, two galvanised steel roll-up doors and a galvanised man door. Despite a series of unex-

pected blizzards, construction was completed in just 13 weeks using on average a crew of no more than six men.

Other Temcor aluminium domes currently under construction for cement industry applications include a 93m diameter structure for limestone storage ordered by Italcementi for its Essroc Cement Corp. plant in Martinsburg, WV; a 105m diameter limestone storage dome for the Platin works of Irish Cement at Drogheda near Dublin; an 88m diameter limestone dome being built at Festus, MO, for Buzzi Unicem; and two domes of 114 and 90m diameter for storage of limestone and

coal respectively, at Holcim USA's new St. Genevieve plant in Bloomsdale, MO.

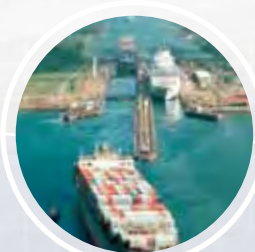
The company is currently making final preparations for construction of a 90.5m diameter clinker storage dome for installation at Riverside Cement's Oro Grande, CA, plant. This structure will incorporate an Aumund clinker reclaim system called the Mole, which allows for maximum use of the storage capacity because the reclaim Mole is completely buried. □

Giant Beumer belt bucket elevator recently installed at an Indian cement plant



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ISO-Veyor tank containers from InBulk Technologies are increasingly used for transporting cement



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