Specialist technologies overcome cement materials handling challenges

"Many players in the industry are justifiably asking whether the cement industry is the next 'hot' industry in Africa, given that this continent needs to expand and build its infrastructure if its full economic potential is to be unlocked", says Paul van de Vyver, General Manager of materials handling and niche process plant specialist, DemcoTECH Engineering.

There is increased buoyancy in the cement industry with producers looking to increase capacity, but cautious because of the general world economic climate," he adds.

DemcoTECH completed a contract for a new 40,000-tonne capacity, multi-discharge clinker silo working in joint venture with Kantey & Templer Engineers of South Africa. DemcoTECH was contracted as part of an expansion drive by NPC-Cimpor, a leading manufacturer and distributor of cement, concrete and aggregate products to the hardware retail, ready-mix, concrete product and construction industries.

The expansion included a new, second cement kiln, for its Simuma Plant in Port Shepstone in South Africa's KwaZulu-Natal Province. Cement kilns are used to manufacture an intermediate cement product known as clinker, the primary ingredient in cement. The second cement kiln required an additional silo for storage of the increased clinker production.

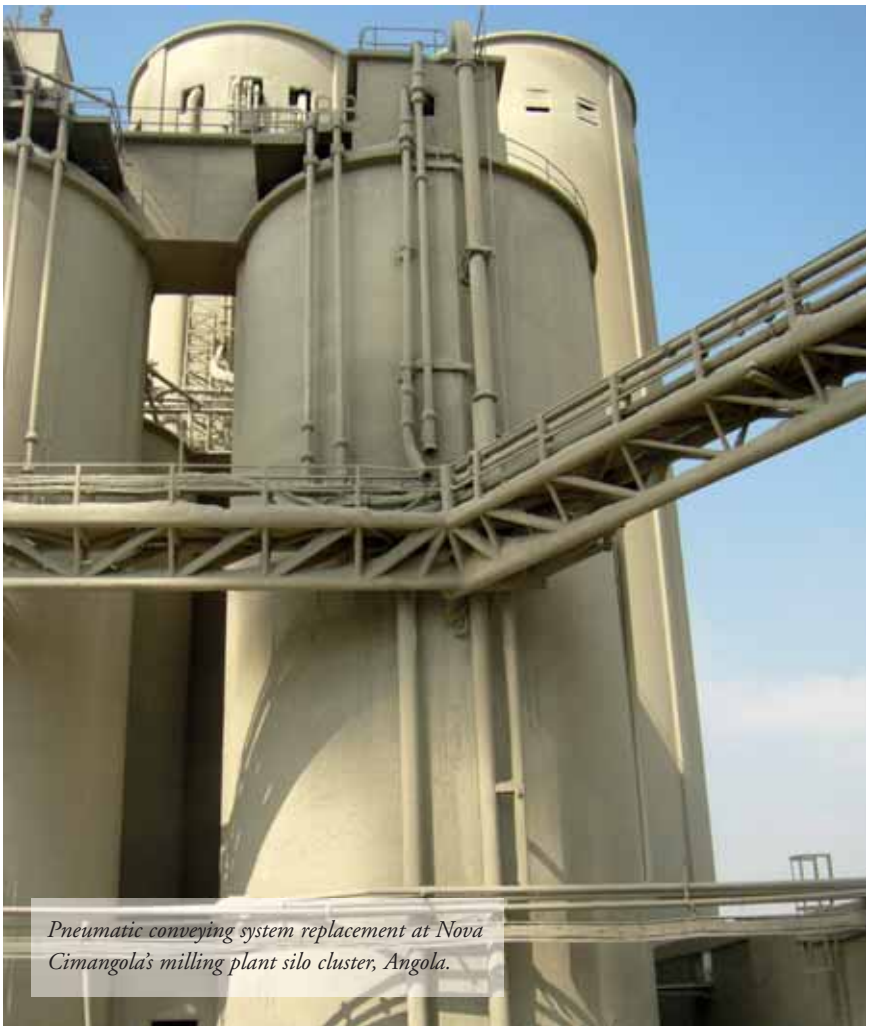
"The contract had a number of design and construction challenges, including the need to complete it within 15 months, the ability to handle hot clinker up to 205°C and to feed clinker to either the new or existing silo, alongside which it is positioned.

"In addition, the Simuma Cement Plant is located adjacent to the limestone source in the mountainous, environmentally sensitive Oribi Gorge area of KwaZulu-Natal and ensuring control of dust emissions from the plant are controlled well below regulatory requirements was an absolute priority," says van de Vyver. "Dust extraction filters were included on the silo and at all the transfer points to ensure the dust emissions comply with the safety and health regulatory limits."

Kantey & Templer was responsible for the civil and structural design, engineering and project execution of the silo — a 40,000-tonne free capacity, reinforced, pre-stressed structure with a 30m internal diameter and 55m height. The clinker silo was designed with two reclaiming tunnels and a precast concrete conical roof.

The silo is founded on a full raft foundation, 36m in diameter and 1.3m thick, which, in turn, is founded on an engineered fill layer, extending 4m below the natural ground level.

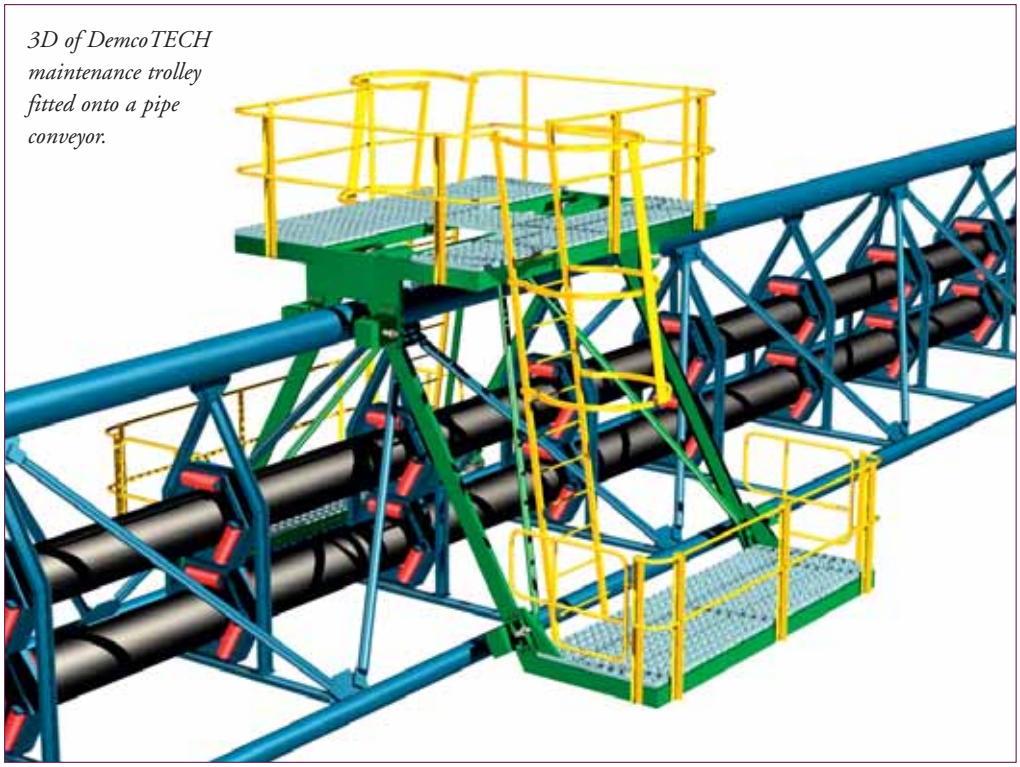
"DemcoTECH provided the materials handling expertise for the project, which included the mechanical and electrical design, engineering and project execution of the system," notes van de Vyver.



Pneumatic conveying system replacement at Nova Cimangola's milling plant silo cluster, Angola.

NPC pipe conveyor, South Africa.

The silo receives clinker from the kiln, via a silo feed steel pan conveyor. DemcoTECH then supplied and installed an additional Aumund Pan conveyor feeding from the existing pan conveyor to the new silo. This modification included the design and replacement of the transfer chute. Two DemcoTECH-designed reclaim belts with heat resistant belting are in turn used to feed the existing plant or rail loading system. The silo discharges at 250tph (tonnes per hour) onto each of the two reclaim conveyor belts.



3D of DemcoTECH maintenance trolley fitted onto a pipe conveyor.

"The award of the contract for the Simuma plant was part of a good working relationship we have enjoyed over past years with NPC-Cimpor, which has ranged from project execution to studies such as a concept study for a new limestone handling and processing project."

Advanced technologies

With the poor flow characteristics of the raw materials handled at a cement plant, producers are always looking for new improved technologies that can cope with dusty, very abrasive materials that are also prone to build up in chutes and on conveyor belts, explains van de Vyver.

"Our range of specialist conveying technologies, which includes AeroConveyors™, pipe conveyors and pneumatic conveying systems fully satisfy this requirement. And, as maintaining a clean environment is a priority, all equipment we design and install complies with international environmental and safety standards."

DemcoTECH Engineering supplied, in conjunction with Claudius Peters, a 150tph pneumatic transport system to convey cement from the kiln to multiple storage silos at a new milling plant at Nova Cimangola's cement plant in Luanda, Angola.

The system has a conveying distance of 300m and, as a brownfield project, had to be designed to follow a tortuous route to fit into the existing plant and include a number of discharge points into the multiple silos. As an operating plant, the downtime needed to be minimized during tie-in so as not to negatively impact on production.

DemcoTECH was subcontracted for the upgrade to the plant and also to provide four travelling maintenance trolleys to NOVA Cimangola for the pipe conveyor at its Luanda plant. The trolleys were fully equipped with maintenance tools and maintenance power sockets and designed to negotiate an incline of up to 15°, which presented a number of challenges.

A DemcoTECH design, the trolleys were manufactured and pretested in South Africa at a 15° inclination, before being containerized for transport to site. The trolleys are self-propelled by an on-board generator and include hydraulically driven travel mechanisms for a high level of control. The trolleys feature a number of safety features, including being fully enclosed and equipped with emergency brake facilities and heavy duty traction control.

Specializing in pipe conveyors, DemcoTECH has supplied this technology to a number of cement producers, both in Africa and in India, as well as for other commodities.

The pipe conveyors comprise both fabric and steel cord belting, have up to 2,250tph conveying capacity and are up to 500mm in diameter. They can be engineered as two-way, multiple curve and distributed drive pipe conveyors. In addition, DemcoTECH pipe conveyors can be designed using a triangular tubular gantry fitted with a mobile maintenance trolley.

"Pipe conveyors are ideally suited to the cement industry as the material transported by a pipe conveyor is enclosed by the conveyor belt for most of its travel length. This obviates problems of material spillage on the carrying and return sides, belt training, limitations to the angle of incline and horizontal curves and the need for multiple transfer points, often associated with conventional conveyors," says van de Vyver.

About DemcoTECH

DemcoTECH is a leading specialist in the bulk materials handling field, offering its clients a range of services from conveyor design to turnkey niche process plants, from concept to full, turnkey project completion. DemcoTECH has carried out the design and engineering for large import/export port facilities, gold plants, diamond tailings disposal systems, manganese storage and export facilities, sampling plants and a wide range of other projects.

"Our services include concept design, feasibility studies, detail design, engineering, procurement, expediting, construction and commissioning. In addition to the cement sector, our clients come from a wide range of industries, including the power generation, mining, metallurgy and manufacturing industries, as well as port facilities," states van de Vyver.

Materials handling products offered by DemcoTECH include troughed conveyors, pipe conveyors, air-assisted AeroConveyors™, rail-mounted slewing stackers, pivot-boom conveyors and mobile conveyors. These systems include all structural, mechanical, electrical and control systems.