

Handling and storage of bulk materials using enclosed dust-free systems

With the increased stringency of environmental regulations across the world, there is growing pressure on operations to make use of enclosed storage systems for certain bulk materials, with the objective being to seamlessly connect bulk storage and materials handling solutions, says DemcoTECH Engineering GM Paul van de Vyver.

“While these eco-friendly storage solutions prevent dust emissions and the potential for runoff to affect the surrounding communities and the environment, enclosed storage is also the smart choice for many operations in terms of protecting the product.

“Systems such as warehouses, enclosed stockpiles, bins and silos prevent contamination of valuable product by the external environment, particularly as weather conditions such as rain, wind and fluctuating temperatures can have a severe and deleterious affect, depleting product inventories and affecting the raw materials’ composition,” adds van de Vyver.

Materials handling and niche process plant specialist, DemcoTECH Engineering provides a total solution to the storage of bulk materials, designing the storage as part of an overall system that includes the conveying into and removal of the raw material, as well as ancillary equipment such as dust suppression and control

DemcoTECH’s design and engineering skills are supported by a global track record that covers the mining, cement, fertilizer and power generation operations, with the supply of solutions customised to the client’s needs.

For example, DemcoTECH supplied Grindrod with a multi-product covered storage solution for their multi-product terminal at Richards Bay in South Africa. DemcoTECH was responsible for the entire materials handling scope of the terminal project, which was designed to handle in excess of 4mtpa (million tonnes per annum), predominantly coal, sulphur and rock phosphate.

“The bulk materials handling equipment utilised for the overall system included both belt and pipe conveyors to convey various materials, while the warehouse storage was provided with trippers inside the buildings,” comments van de Vyver.

Also for Grindrod, DemcoTECH provided a mobile ship offloading and warehouse distribution system for a fertilizer storage facility at its Maydon Wharf terminal in Durban, South Africa. The existing warehouses were modified to



40,000 tonne clinker silo for NPC-Intercement’s Simuma plant in KwaZulu-Natal, South Africa.

incorporate five reversible, multi-point discharge shuttle conveyors that feed individual bays. Fully sequenced automatic starting and stopping ensures a seamless operation, with no blockages or hang-ups, and the ability to handle different types and grades of fertilizer.

For the cement industry, DemcoTECH’s silo expertise has been applied for both clinker and flyash. Working in conjunction with Kantey & Templer Consulting Engineers, DemcoTECH supplied a 40,000 tonne clinker silo for NPC-Intercement’s Simuma plant in KwaZulu-Natal, South Africa. DemcoTECH provided the materials handling expertise for the project, which included the mechanical and electrical design, engineering and project execution, supply, installation and testing of the system.

DemcoTECH again applied its engineering expertise to the construction of a new fly ash silo for the Simuma plant. The 1,000 tonne steel fly ash silo was executed on a turnkey basis with DemcoTECH providing the detailed design and layout, as well as being responsible for the structural, mechanical, electrical, control and instrumentation engineering and supply for the facility.

“Screw conveyors were installed as a versatile, clean and cost-effective method for handling the dry fine fly ash in the execution of the ash silo contract due to its ability to transfer materials horizontally and also contain the particulates for such a dusty product,” adds van de Vyver.

The fly ash is removed from the silo using a rotary valve feed system and transported to a surge bin via two 20 tph tandem screw conveyors. As dust is generated at transfer points an effective



Steel 1,000 tonne fly ash silo for NPC-Intercement’s Simuma plant in KwaZulu-Natal, South Africa.

dust removal system was included.

DemcoTECH also recently completed a project for Idwala Carbonates, which, adjacent to the Simuma plant, is also located in the mountainous, environmentally sensitive Oribi Gorge area of South Africa. Designing and erecting the feed and discharge materials handling system for the newly installed Loesche Mill Plant, DemcoTECH made use of multiple air slides to convey material into enclosed bins.

The contract brief called for a system to convey a raw limestone feed of 90mm maximum particle size at 130 tonnes per hour, from an existing concrete silo, modified to provide a controlled discharge of the feed. The design of the milled

limestone handling system had to accommodate the two milled products of different size fractions, i.e. 40 µm and 15 µm respectively. The finely milled powders are distributed into one of four existing bins, according to the particle size fraction and further processing requirements. The system makes use of multiple air slides combined with a dust filter extraction system, in line with the client's and DemcoTECH's commitment to a clean environment and safe working area.

DecoTECH's comprehensive offering also positions it well to provide state-of-the-art open storage solutions, custom-designed for a wide range of materials. Most recently a turnkey project for the prestigious Petronas RAPID project included the materials handling for stockpiling sulphur for loading onto ships for export purposes, while, also in Malaysia, Vale's multimillion-dollar Teluk Rubiah maritime terminal project included an ore storage yard and a marine terminal with a 60 Mtpa capability. In Croatia, an import terminal project at the Port of Ploče covered the entire materials handling

system, handling the coal and iron ore from the ship unloaders through to the stockyards and the design of the standby stockpile facility, as well as the rapid rail loadout system. In South Africa, the expansion of a manganese export facility for Assmang at its Cato Ridge Alloys plant in South Africa included an 80,000 tonne stockpile with a series of conveyors from the tipplers to the stockpile and an elevated travelling tripper supported in a gallery, to discharge product onto the stockpile.

"For an operation to be profitable, the entire materials handling and storage system must be optimised and reliable, based on a thorough understanding of the interfaces between the various processes, as well as the specific material flow characteristics of the product to be conveyed and stored," says van de Vyver. "DemcoTECH offers access to a comprehensive suite of technologies for storage systems from trippers, through pan, screw and belt conveyors to air slides and feeders (including belt and vibratory feeders). This is supported by advanced

testing and modelling/simulation tools and thorough design and detailing of the plant, including the structure and equipment, to design efficient, fit-for-purpose handling systems."

"At any point where material is moved or transferred, dust is generated, and therefore all equipment we design and install complies with international environmental and safety standards."

ABOUT DEMCO TECH

DemcoTECH Engineering is a specialist bulk materials handling and niche process plant company, offering services to the power generation, cement, mining, metallurgical, manufacturing and port handling industries. Services include conceptual design, feasibility studies, design, engineering, procurement, expediting, construction and commissioning. 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.