Dust controlled loading from Cleveland Cascades

Controlling dust emissions during loading has been a perennial challenge for the dry bulk industry. The advance in dry bulk material handling technology has had to balance the drive for ever greater efficiency and increased speed of loading on the one hand, with the increased pressure for protection from air born environmental emissions on the other hand. Dust emissions during loading are not only a health & safety issue for the workers in the port or storage & handling facility, but they are also a potential issue for neighbouring businesses or residents, as well as the local natural environment. Controlling dust emissions during loading has become an issue worldwide and while the advanced economies were the first to demand controls, the requirement is now widespread in developing economies. Most applications nowadays have a requirement to effectively control dust emissions during handling and it is no-longer just the luxury of the developed economies.

Cleveland Cascades identified this trend early and has built the company's business on world leading dust controlled loading technology. The essence of the technology is to control the flow of the dry bulk to prevent the creation of dust, rather than alternative technologies, which often focus on controlling & confining the dust once it has been created. The Cascade chute loads material through a series of oppositely inclined cones, which controls the flow at low velocity, yet high volume. During its descent, the material is supported through the full length of the chute, ensuring a soft delivery from the outlet to the material pile, for every load. It therefore arrives at the load pile at a controlled speed with minimal dust creation or material degradation.

The controlled descent of the material prevents air separating the particles and largely eliminates dust generation at source. The shape of the cone holds the dry bulk in such a way that prevents particulate separation and minimizes material degradation. The significantly reduced product velocity creates a "mass flow". A stream of material moving as a single mass through the chute and onto a stockpile with minimized segregation. By using this technology, dust generation is practically eliminated at source, without the need for expensive, energy-intensive and high maintenance, dust extraction and filtration systems. The Cascade system can reduce dust emission levels to as low as 5mg/m^3.

The Cascade chute is capable of handling a vast range of materials which are prone to dust during loading, but Potash and Alumina good examples of materials which are both difficult materials to handle and are particularly prone to dust emissions. Cleveland Cascades has developed a strong global market position in chutes handling both materials.

The dry bulk terminal at Teesport, UK, is a dedicated distribution center for products mined from Cleveland Potash's Boulby mine. The materials arrive by train and are held in a silo storage shed before onward distribution by vessel. The terminal handles over 1 million tonnes per annum of Potash & Polyhalite, with shipments sailing to export markets around the world, as well as the home market.

For Cleveland Cascades Ltd this is where it all began. The original idea for a cascade cone loading chute, capable of controlling dust emissions during loading, was conceived here. The company was originally a division of Cleveland Potash Ltd, who diversified in to manufacturing loading chutes when they needed a high capacity loading chute which effectively controlled dust pollution. The innovative solution they conceived was the

Cascade Chute Loading Potash at Teesport, UK.

Cascade concept, which utilized a series of inclined cones to control the velocity and flow of their Potash.

Cleveland Potash, now known as ICL UK, is the oldest customer and over the years has bought numerous chutes for a variety of applications at the mine and the port. The parent company, Israel Chemicals Ltd (ICL) is also a long term user of Cleveland Cascades Loading Chutes at their Dead Sea Works operations in Israel.

The system can load up to 500 tonnes per hour through a chute which can extend to 15m in length in fully extended mode. Potash is highly corrosive, so to ensure a long service life, stainless steel fixings are used throughout and the GRP cones are protected with a 4mm UMHW PE liner.

In order to extend the operating life of one of the chutes at the port, even further beyond 24 years, the chute is about to have an upgrade, with the installation of a new shroud and carrier section.

Cleveland Cascades recently won a contract to supply REEL Alesa with an Alumina ship loading chute for Ma'aden in Saudia Arabia. The chute has been designed to interface with REEL Alesa's luffing boom conveyor system.

Alumina is a fine, free flowing material which can create dust pollution if loading is uncontrolled, so the Cascade chute is an ideal solution. The controlled descent of the material through the inclined cones of the Cascade system, prevents air separating the particles and largely eliminates dust generation at source.

Alumina is also highly abrasive and requires the cones to be lined with 4mm ceramic tiles to prolong service life. With a 20m chute length, covered by a durable, retractable shroud, the port will load 1,200,000 tonnes of Alumina per annum, using the chute.

Cascade Chute Loading Alumina.