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Weba Chute Systems Installs 16 Chutes For Conveying System
At Arcelor Mittal's Newcastle Blast Furnace Upgrade

Weba Chute Systems has successfully completed the installation of 16 chute systems at Arcelor Mittal's Newcastle works. The chutes form part of a conveying system attached to the upgrade of blast furnace Number 5 at the plant. "Weba Chute Systems was contracted by Howden for this particular project after being specified by Arcelor Mittal itself, which is a significant reference for us," Ted Cruickshank, Project Manager at Weba Chute Systems, says.

"Teamwork formed an important part of our success, right from the design stage through to final commissioning in the last quarter of 2014," Cruickshank says. A couple of the transfer points had excessive transfer heights of around 16 m to 18 m. "It was essential that this be taken into account at the design stage, because when material is transferred at such heights, it becomes more difficult to control the velocity through the transfer point. When material is not properly controlled during the handling process, it can lead to excessive wear, poor loading and excessive dust emissions."

It is far simpler to mitigate against such potential problems by means of upfront involvement. "Many of the issues associated with transfer points can be eliminated during the design stage. Consulting with us during this vital phase means that we can bring the experience and expertise we have gained during thousands of installations to bear on an individual project. It also eliminates the situation where transfer points need to be redesigned after installation because certain critical factors are not taken into account. One of the most common problems associated with conventional chute design is where the product drops from any height directly onto the belt.

"Such a basic design fault causes the most catastrophic damage and cost, as the impact of product falling directly onto the belt results in excessive wear and, in the worst-case scenario, can even result in tearing of the belt. In addition to the impact, excessive spillage also results in increased maintenance requirements. This has a direct bearing on both productivity and costs, due to unnecessary downtime and component replacement," Cruickshank says.

The common practice of installing skirting and a skirting box as a remedy to control spillage incurs an additional capital outlay and is not guaranteed to alleviate the problems associated with incorrect belt loading. Regardless of the direction or type of transfer, there are some design requirements that require specific attention, Cruickshank emphasises.

A major factor at the Arcelor Mittal project was the reduction or suppression of dust, which posed a particular challenge as the material conveyed is prone to dust generation when being transferred. “We had to look at containing the dust wherever possible and also suppressing the dust, which is vital from an environmental point of view,” Cruickshank says.

In addition, the contract was on a tight timeframe, which meant that Weba Chute Systems had to put steps in place to accelerate the engineering and fabrication process to ensure that the required deadline would be met. In terms of the exact specifications of this project, material is transferred from the chutes onto conveyor belts that are either 600 mm or 900 mm wide. The belts move at speeds ranging from 1.27 m/s to 1.96 m/s and the material density ranges from 0.6 to 1.8 tpm^3. The material throughput is an average of between 54 tph to 256 tph per hour.

This particular chute design was achieved using a sophisticated 3D Computer Aided Design (CAD) programme. The process begins with a thorough site visit whereby Weba Chute Systems ascertains the exact requirements of the client by means of interviews with its operational and engineering teams. Thus the optimum design is derived at and tested using a combination of sound engineering tools, substantial practical knowledge and Discrete Element Method (DEM) simulation as a verification tool.

“It is important to factor in the operation’s unique product specifications and data, belt width, belt speed, material sizes and shape and throughput as well as the plant layout, including the position of belt scrapers and dust suppression/extraction systems. We take a holistic approach towards chute design, which encapsulates both the entry and exit points, as well as the control of the flow, volume and velocity of the material being transferred at all times,” Cruickshank concludes.

ARCELOR MITTAL NEWCASTLE PIC 01 : Illustration of Weba Chute System which handles fines at Arcelor Mittal Newcastle.

ARCELOR MITTAL NEWCASTLE PIC 02 : Illustration of Weba Chute System supplied to Arcelor Mittal Newcastle which facilitates material transfer from conveyor to conveyor.

ARCELOR MITTAL NEWCASTLE PIC 03 : Illustration of Weba Chute System designed to transfer material into a bunker at Arcelor Mittal Newcastle.

ARCELOR MITTAL NEWCASTLE PIC 04 : Illustration of Weba Chute System which transfers material to a ground based conveyor at Arcelor Mittal Newcastle.

ARCELOR MITTAL NEWCASTLE PIC 05 : Material moving along a conveyor belt following transfer through a Weba Chute System at Arcelor Mittal Newcastle.

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