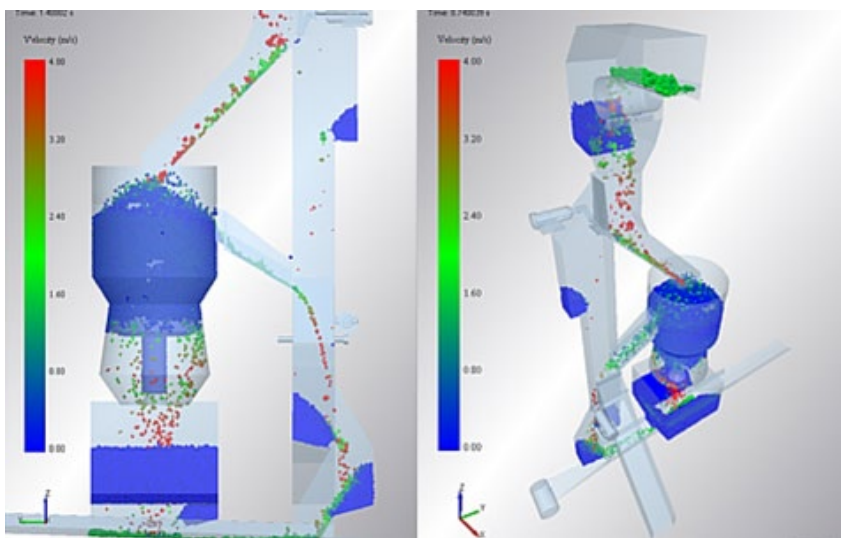


DRA DESIGNS COST-SAVING CONVEYOR-CRUSHER FEED TRANSFER STATION FOR ANGLOGOLD ASHANTI MINE IN GHANA

DRA Mineral Projects is a multinational design and project management company specializing in minerals processing plants and mining services, including the design of surface and underground bulk materials handling (BMH) equipment. BMH transfer stations are a significant part of this work.

DRA deployed Altair EDEM™ bulk materials engineering simulation software to design and virtually test prototype BMH equipment designs to provide pre-build flow assurance and performance optimization.



“DRA [used] EDEM as a design tool and employed two dedicated transfer chute designers experienced in EDEM discrete element modelling. EDEM [was] used in designing bulk transfers for surface and underground mining applications covering many minerals, including coal and hard rock. EDEM, as a predictive tool, contributed greatly to the design capabilities of DRA where major mining projects require careful analysis of bulk material transfers. More than 70 of these transfers have been modelled at DRA and we see continuing development of this methodology being of current and future importance.”

Challenge

Design a complex BMH conveyor transfer station, with four ore flow routes, including the feed to a crusher unit, for the AngloGold Ashanti mine in Ghana.

Ed Birtch, Manager Bulk Materials Handling, DRA Johannesburg

The client required a design with an initial conveyor transfer point feeding to either the crusher or a crusher bypass. Material flowing to the crusher needed to move either through the crusher, or out the crusher overflow, then on to either the crusher discharge conveyor or the discard stockpile.

A single transfer station would be the most cost-effective solution, providing that flow assurance could be achieved with a single unit design. The project required thorough design analysis, including testing of virtual prototypes using EDEM simulations, to identify the optimal design.

EDEM's Role

DRA Mineral Projects imported CAD models of prototype designs into EDEM and used calibrated material models for ore and crushed material. The virtual prototypes were then tested, and various design options were evaluated, with particle flow simulations carried out on each model.

Using EDEM simulation and analysis, material flow velocities and areas of high impact were examined. With this data DRA established optimal locations for dead boxes to minimize impacts from large rocks and selected suitable liner plates to protect areas of high wear. Further predictions of mass flow into the crusher were used to estimate critical crusher choke feed and overflow capacities.

Results

EDEM simulations showed that design requirements would be met with a single transfer station, resulting in client cost savings in steelwork and services. Virtual prototype testing ensured that material flow was free running, even with high moisture content. EDEM prediction of particle velocities and impact forces allowed accurate placement of dead boxes and liner plates, reducing impact and lowering overall plate wear characteristics.

Predictions of mass flow to the crusher provided better operational data to improve crusher performance. EDEM simulation results gave DRA engineers a high level of confidence to proceed with the final design, within the budget and time scale.



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