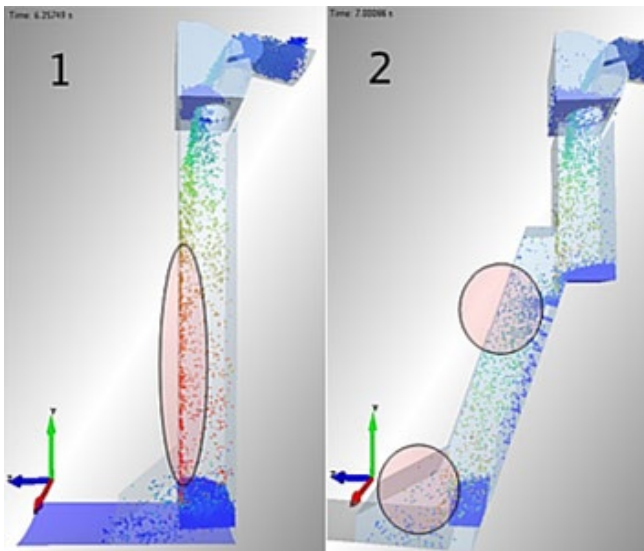


CONVEYOR TRANSFER POINT REDESIGN AT ASTEC, INC.

Astec, Inc. designs and manufactures a complete line of continuous- and batch-process hot-mix asphalt facilities and soil remediation equipment. Astec routinely employs Altair EDEM™ software in both R&D and in the design process. EDEM virtual prototypes help Astec develop innovative new products, improve equipment performance, troubleshoot customer challenges, virtually test design options, and improve customers' productivity.



“Using EDEM to analyze the flow path and velocities of aggregate rock through both head chute designs, we quickly realized that the chute itself was incorrectly aligned and was contributing to the wear of the vertical wall. Not only did realigning the chute solve the problem, the modification to the existing design, rather than the complete redesign, was, in fact, the more cost-effective solution of the two. The complete redesign would have cost us significantly more, in both time and money.”

1. Original chute design: Traditional vertical chute with shelf at bottom. Note particles impacting left wall of chute. **2. Proposed solution:** Sloping chute with rock ladder added. Note some particles still fall directly onto the conveyor.

Andrew Hobbs, Chief CFD/DEM Engineer, Astec, Inc.

Challenge

An aggregate rock transfer point with a vertical drop was wearing excessively. Rock was impacting a vertical chute wall and falling directly onto the conveyor, causing excessive wall and belt wear. A new design involving a sloping chute and “rock ladder” had been proposed. However, the retrofit would be expensive. There were also performance concerns. Might the proposed design lead to blockage? Astec engineers needed to test and evaluate it. Would the wear problem be resolved by the new design? Was blockage still likely? Was this a cost-effective design?

EDEM's Role

Using standard EDEM tools, Astec engineers imported 3D CAD models of the proposed transfer chute design. They then accurately modeled the aggregate particles and set up and ran simulations to replicate bulk flow characteristics. The engineers quickly realized that the new design didn't work as planned — it didn't prevent all the rock from falling directly onto the belt. Back at square one, they returned to the original design. Using EDEM visualization and analysis tools to examine the flow in the existing design, they found that the wear problems were resolved by simply realigning the head chute — a very cost-effective solution.

Results

EDEM's virtual field testing quickly identified key flow patterns, which led to the design of a simple solution. Adjusting the head chute trajectory remedied excessive wear of the chute wall and belt. It was a less expensive fix, quicker to implement, and it resulted in less downtime. Astec avoided the costs of field testing an ineffective design and the expense of subsequent redesigns. EDEM reaffirmed its value to Astec by securing the redesign contract, providing design assurance, streamlining the design process, and lowering costs.

