

# Coal-Fired Power Plant Reduces Dust and Spillage Using 3-DEM Design

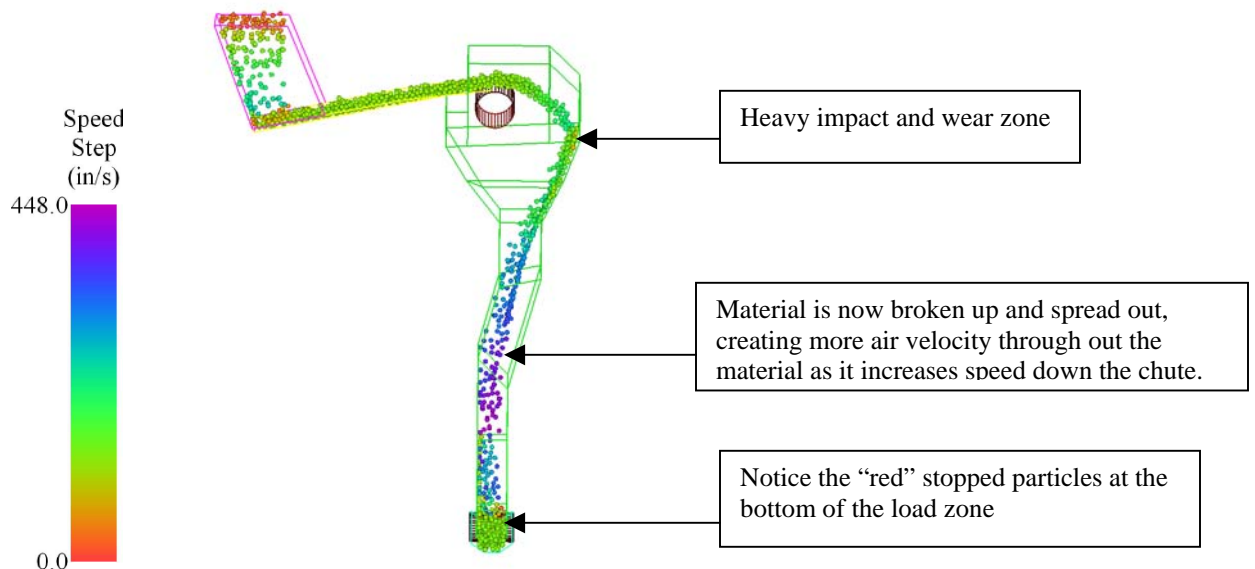
<b>Industry</b>	Coal Fired Power Plant in the Southeast United States
<b>Application</b>	Coal Transfer Point handling 2” minus Powder River Basin (PRB) coal
<b>Product</b>	3-DEM Chute Design
<b>Objective</b>	Reduce the dust and spillage from one conveyor to another
<b>Conveyor Detail</b>	Conveyor #1A is 30” wide at 566 FPM at 500 TPH. The receiving conveyor #2A is 36” wide at 566 FPM at 500 TPH and is traveling up a 16-degree incline.

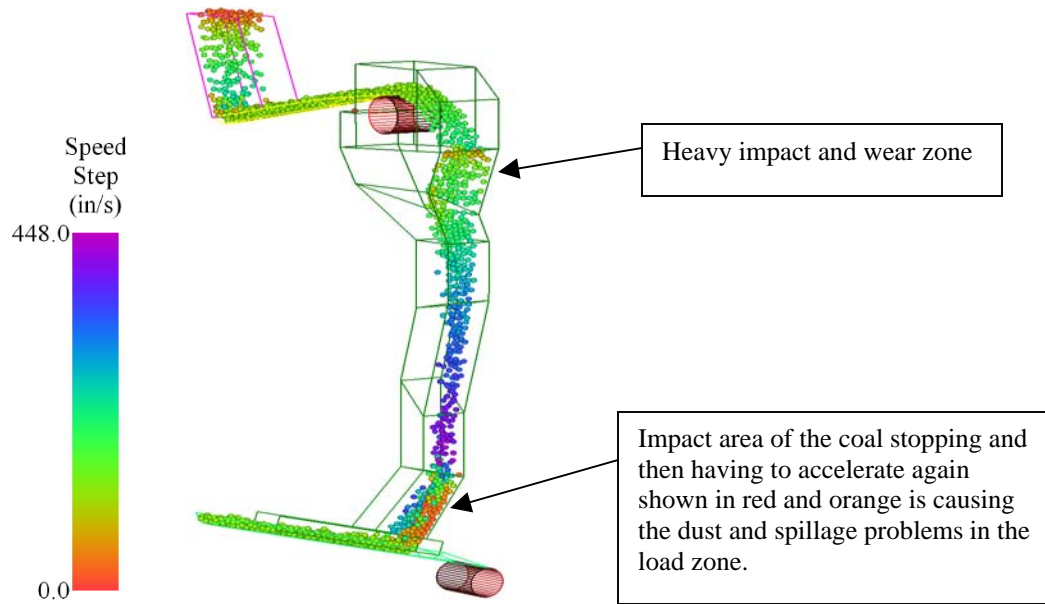


## Challenge

The transfer point at this major coal fired utility was a major dust, spillage and cleanup problem for this plant. It was designed for handling 400 TPH and is currently handling over 500 TPH of Powder River Basin (PRB) coal. The top of the transfer chute had a wear area problem from the coal hitting directly onto the steel chute then coming down the chute at a high rate of speed on the bottom conveyor.

## Existing Transfer Point Configuration





Existing chute with a straight drop from 5A conveyor to 6A



Coal fines and dust building up in between the idlers

The coal transferring down the chute onto the 2A conveyor was actually loading at a negative angle causing the material to have to stop and then change direction to go up along the belt. This caused a variety of problems including a major dust and spillage issue from the coal impacting the belt and becoming separated. The coal fines and dust were then escaping through the gaps in the idlers and building up on the conveyor deck, creating the troughing impact idlers to run in the coal dust

and fines. The spillage also built up on the floor and around the tail pulley. Over time this will have a negative impact on the bearings of the idlers and tail pulley, shortening their life on the system. Lastly, the impact and abrasion on the conveyor belt is also affected due to the direct impact of the coal on the top cover of the belt, combined with the abrasion due to the material stopping and then sliding along the conveyor belt till the material gets settled.



Old and inadequate top half the chute and transfer point.



Notice the high volume of dust in the air as the material is loaded on the receiving belt.

## Solution

Plant personnel decided to go with ASGCO MANUFACTURING, INC. based in Allentown, PA because of their knowledge and experience in solving material handling problems in coal fired power plants. ASGCO provides a single source approach; from engineering design, fabrication, installation and start-up training and maintenance program. ASGCO's engineering department used its 3-DEM Chute Design program to correctly analyze the material flow characteristics of the transfer point as well as review the entire conveyor system to identify any transfer or conveyor problems. They measured and studied the speeds of the conveyor belts, current design of existing transfer chutes, air movement through the transfer point and the PRB coal characteristics, including moisture content, weight, particle size and flow-ability of the material.

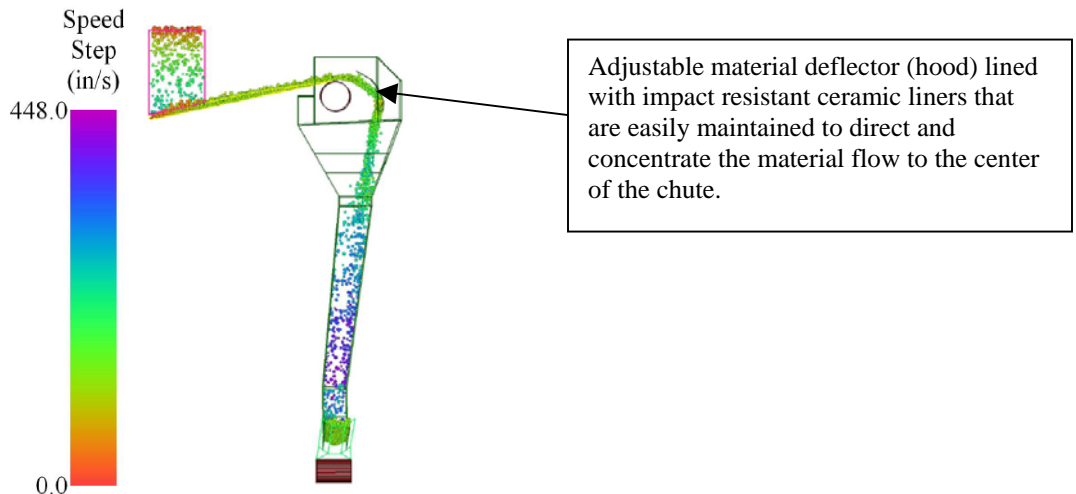
ASGCO's 3-DEM (Discrete Element Methods) is a revolutionary way to handle granular and particular material handling problems through computer simulation and 3-D CAD for complete transfer point design and fabrication. Combined with our conveyor and material handling knowledge, engineering capabilities and 3-DEM Chute Design software, we are able to make transfer point problems a thing of the past.

ASGCO's transfer point solutions solve the problems of material flow from the discharge pulley, through the chute until it reaches the receiving belt conveyor. After analyzing the flow of the material they incorporate a "Hood" deflector as the material leaves the discharge pulley. This "Hood" deflector with adjustment control allows for fine-tuning of the material stream to direct the material for the optimum flow. The "Hood" enclosure is lined with impact resistant ceramic liners that can be easily changed as they wear. ASGCO's "Hood" significantly helps in minimizing dust creation and material separation as it enters and flows down the chute.



New stainless steel head chute box with the enclosed adjustable ceramic material deflector "Hood".

### New Transfer Point Configuration and Solution

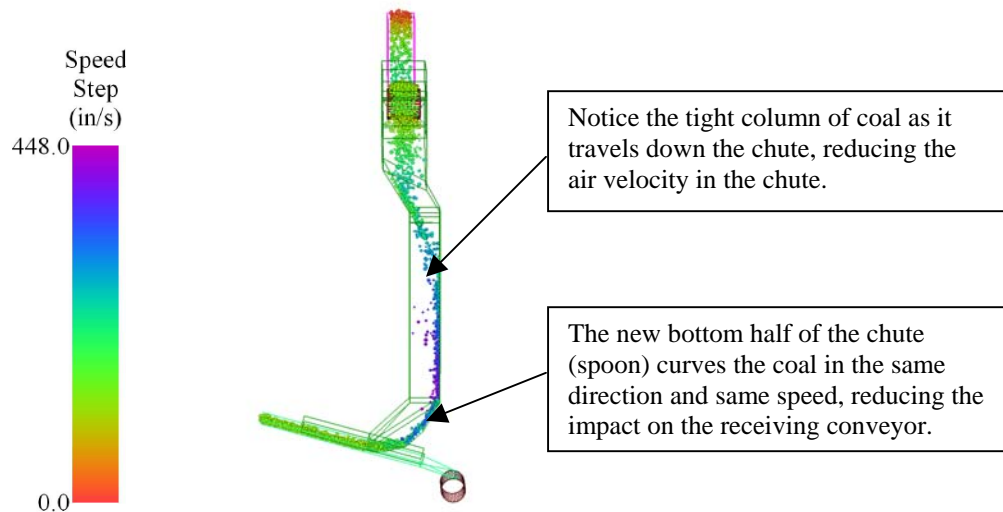


The receiving end or bottom end of the conveyor, ASGCO utilizes a “Spoon” design to ensure uniform direction of the material without impact to the chute or the receiving conveyor belt. This stainless steel ceramic lined “Spoon” bottom chute ensures that the material is “soft-loaded” at approximately the same speed as the receiving conveyor, is also properly center loaded on the conveyor, as well as designed to eliminate any flow restrictions that would cause the potential for buildup.



New stainless steel, ceramic lined, “Spooned” for soft loading of the coal in the same direction of belt travel.

### New Transfer Point Configuration and Solution



**The objectives and benefits of using this type of design program are:**

- **Increase Production Capabilities** - by helping to eliminate spillage, chute plugging, conveyor belt wear, dust control and noise.
- **Optimize Life on Conveyor Belt and Components** - by minimizing impact and top cover wear by using a soft or curved chute loading design.
- **Minimize Material Spillage** - in the design by center loading the material, load the material at a uniform rate and optimize the material flow in direction of travel after the belt is fully troughed.
- **Reduce the Need for Dust Control and Suppression** - by minimizing the dust through loading the material at a uniform rate through a curved soft loading design, maintaining effective skirting, internal wear liners and dust curtains staggered throughout the loading area provides the goal of a “dust-free” environment.



## **Results**

The final results were a success for the plant. ASGCO has significantly reduced the dust and spillage problems the plant was having in this load zone transfer point, as seen in the above pictures and is currently considering other areas for improvements. ASGCO recognizes that all transfer points are different and provides a custom, single source approach to solving almost any bulk material handling problem and is committed to providing dust-free **“Complete Conveyor Solutions”**.