ASGCO® Point Cloud Scanning
3-DEM™ Analysis and Design
Flo-Control™ Chutes

ASGCO®
Complete Conveyor Solutions

Transfer Point Design and Fabrication





POINT CLOUD LASER SCANNING

ASGCO®'s **Point Cloud Laser Scanner** is a powerful high-speed Focus3D X 130 HDR 3D scanner, delivering realistic and true-to-detail scan results.

The laser technology is more accurate than traditional methods because it captures thousands of points along the clearance plane. The ultra-portable Point Cloud Laser Scanner enables fast, straightforward, and then a 360° view accurate measurements of facades, complex structures, production and supply facilities, accident sites, and any environment.

Rotating laser touches its surrounding to determine the coordinates and space.

Realistic And True-To-Detail Laser Scanning

The increased camera resolution of Focus3D X130 HDR delivers extraordinary color overlays for scanned point clouds. This improves the visualization of important details on site.

Benefits & Features:

- Distance accuracy up to ±2mm
- Range from 0.6m up to 130m
- Safe and fast as-built data capturing with superior color detail
- Reliable life-like visualization, even under extreme lighting conditions
- Reduced complexity by integrated scanning and imaging work-flow for all kinds of measurements even in challenging environments
- Allows models to be overlayed onto Cloud Point Scan to double check accuracy

Ensures Accuracy

ASGCO® Point Cloud Laser Scanner delivers extraordinary color overlays for scanned point clouds. This improves the visualization of important details on site. Our system can capture over 1 million points per second and can scan through 360° horizontally and vertically.

Once the chute and conveyor are modeled the image is overlaid into the cloud point scan to ensure there are no interferences and that all modeled equipment fits properly.

The increased camera resolution of Focus3D X130 HDR delivers extraordinary color overlays for scanned point clouds. This improves the visualization of important details on site.

HD Resolution

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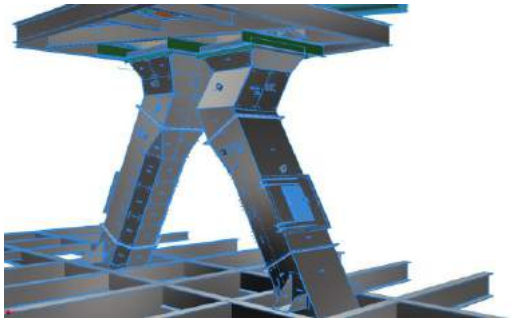
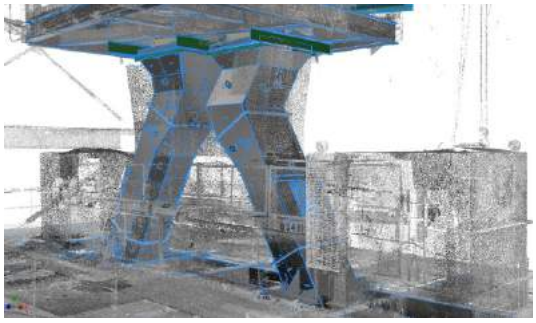


Engineered 3D model drawing



Engineered 3D model drawing overlayed into cloud point scan

SOLUTION CASE STUDY

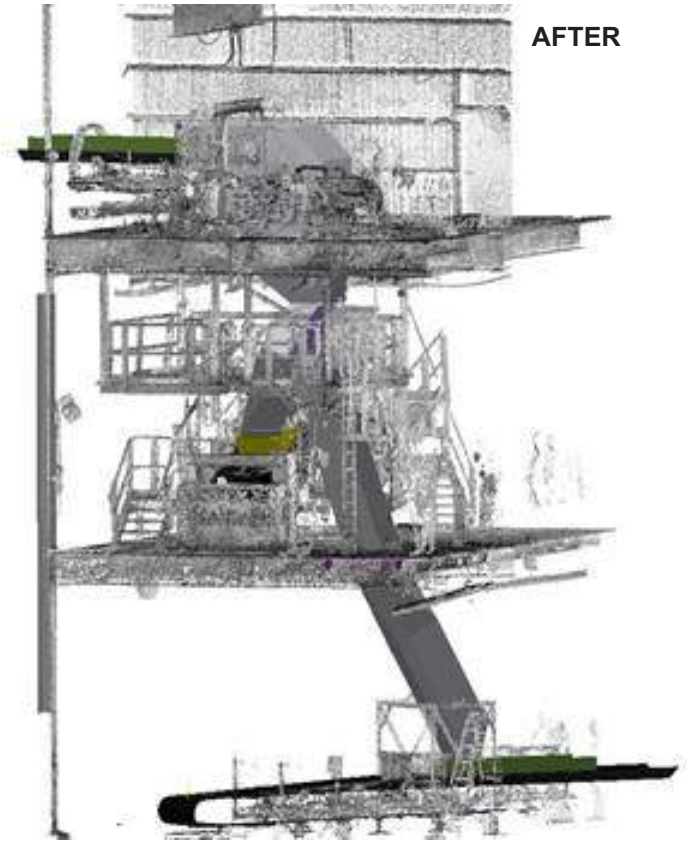
ASGCO® Solves Mid-Western Coal-Fired Power Plants' Conveyor Transfer Point Problems

Challenge: The existing round chutes were hard to align. The chutes had to penetrate two (2) different levels, each with existing openings and be able to line up so the material could flow without interference. To prevent chute pluggage and pre-mature wear while creating a flow within the chute and onto the belt. The incredibly heavy, thick and pasty material made it nearly impossible to convey and to flow through the chutes, causing continuous outages and downtime for maintenance.

Solution: ASGCO® technicians thoroughly inspected the failing system and proposed a redesign of the existing transfer chute using our 3-DEM® Transfer Point Simulation software and advanced Flo-Control® chute fabrication. With our Point Cloud Laser Scanning technology we can create realistic models using pinpoint accuracy to locate any obstructions and to hit the 2 existing openings on two different levels without any interference. Once the chute and conveyor are modeled the image is overlaid into the cloud point scan to ensure there are no interferences and that all modeled equipment fits properly. A combination of liners inside the chute would provide optimum sliding surface for the material handling.

Results: The new transfer point has been a big improvement. The existing chute used to plug up several times a shift due to constant plugging. They would have to shut everything down and send workers to shovel and wash it out to open it up again. *After the installation of the new chute, the maintenance and downtime has been reduced by 85%!*

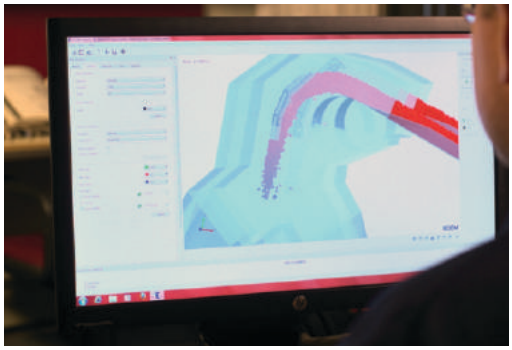
Flo-Control™ Chute Fabrication and Installation



3-DEM™ ANALYSIS AND DESIGN

The performance of transfer chutes is an essential part to the productivity of the conveyor belt systems in the bulk solids industry. Transfer point design, fabrication and installations utilizing ASGCO®'s 3-DEM™ (Discrete Element Methods) chute analysis program is a revolutionary way to handle granular and particulate material by streamlining the process from the point where material leaves the head pulley until it is deposited onto the receiving conveyor for a more deliberate control of the material as it flows from one conveyor to another. 3-DEM™ Transfer Point Design controls the dust by keeping the column of material together so that air does not become entrapped in the material flow, then forced back out of the flow carrying dust, when the material is loaded on the receiving belt.

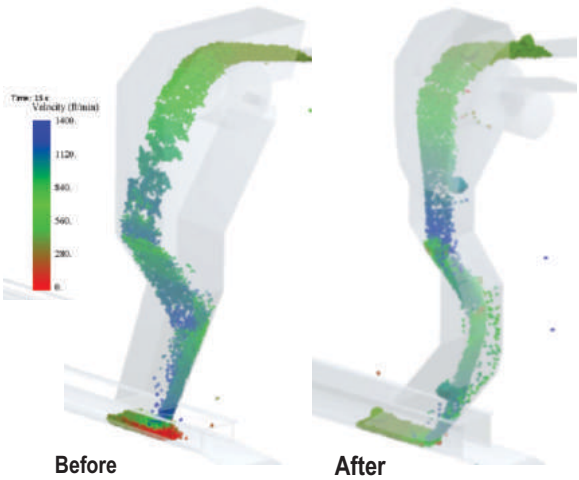
These techniques are easily applied to both existing and new installations, resulting in significant cost improvements and system efficiencies.



3-DEM™ Transfer Point Design

ASGCO®'s **3-DEM™ Complete Transfer Point Design and Fabrication**, is a revolutionary way to handle granular and particular material handling problems through computer simulation and 3-D CAD. Combined with our conveyor and material handling knowledge and engineering capabilities we are able to make transfer point problems a thing of the past.

- **Increase Production Capabilities** - by helping to eliminate spillage, chute plugging, 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 the 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 of soft loading design, maintain effective skirting, internal wear liners and dust curtains staggered throughout the loading area.



Before **After**

There are ten steps that need to be completed to have a trouble-free transfer point.

The complete conveying system needs to be evaluated and then a comprehensive design analysis provided to incorporate all of the necessary goals outlined by the customer along with the changes discussed to reduce the airborne dust while continuing to maintain full load capacity.

1. Take current drawings of existing transfer and render them accurately in 3-D CAD and fill out Data Sheet.
2. Identify chute geometry restriction and manufacturing limitations.
3. Identify customer project goals *(i.e. flow restrictions, dust emissions, optimize chute and belt life).*
4. Identify material properties and develop representative particle description.
5. Make design changes to chute geometry.
6. Simulate performance using 3-DEM™ Chute Design software.
7. Evaluate simulation results and choose the best design that meets the project goals.
8. Detail the new design for manufacturing.
9. Manufacture the new transfer point including other conveyor components.
10. Installation of the new transfer chute and other conveyor components *(i.e. belt cleaners, skirting systems and load zone beds or rollers)*.

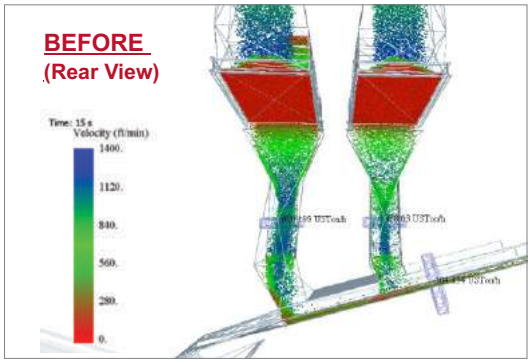
SOLUTION CASE STUDY

ASGCO® Solves Southwest Coal Fired Power Plant Rail Car Dump Transfer Point Problems

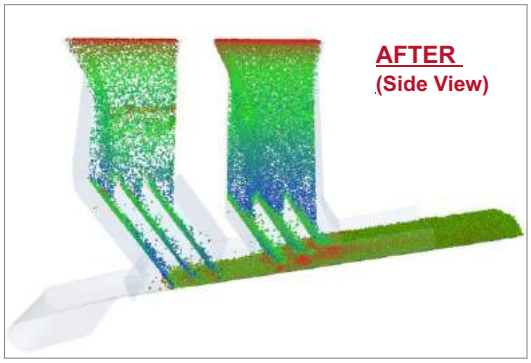
Challenge: After the material was dumped it went through a series of grizzly bars, then through all of the chute work below on 4 different levels. With the existing design the material was off-center loading which was pushing the belt to one side and causing the material to spill and wear the belt unevenly. They also had internal deflector plates installed at the bottom of the chutes to try to guide the material, but it wasn't working and they were wearing out. The chute needed to be re-designed to center the material flow onto the belt.

Solution: Part of the project was to replace the grizzly bars, along with four of the chutes, exactly as they were originally designed. The lower portions had to be re-designed to solve the off-center loading issue. ASGCO® engineers performed an on-site Point Cloud Laser Scanning survey to provide accurate measurements of the existing transfers. Then a 3-DEM® simulation was developed to validate that the flow would fall onto the center of the belt through the new chutes.

Results: Since it was coal and various sized material, the simulation process took several weeks to complete. We scanned it, designed it, detailed it, fabricated the chutes and delivered it all before the shutdown deadline. The project was installed with no issues and the material flow is center loading onto the belt. The customer is extremely happy. No spillage and everything is center loading.



3-DEM® Simulation - Original Conveyor Design (Rear View)

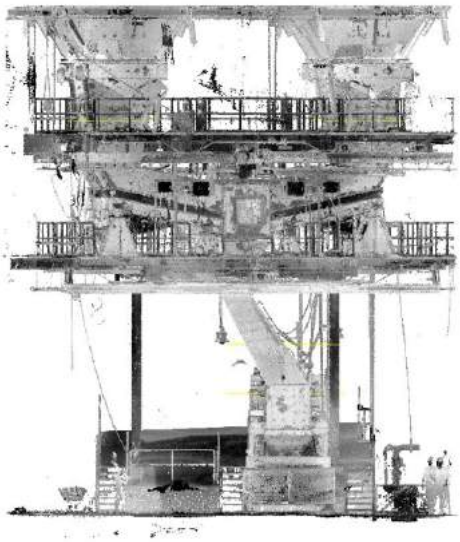


3-DEM® Simulation - Modified Conveyor Design (Side View)

ASGCO® Point Cloud Laser Scanning / 3-DEM® Transfer Point Design / Flo-Control™ Chutes

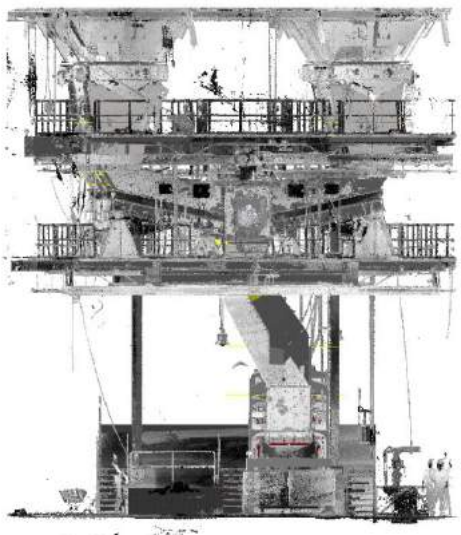
The objective at this coal fired power plant's transfer chute railcar dump was to replace the existing corroded, mild steel chutes with stainless steel and redesign the transfers to center the material on the receiving belt. ASGCO® used Point Cloud Laser Scanning technology to accurately measure the complex structure and the 3-DEM® Transfer Point Chute Analysis and Modeling software to re-design the failing chutes and to identify the optimal design to allow the coal flow to smoothly transfer from the supply conveyor to the center of the receiving conveyor.

The re-designed model was then overlaid into the Point Cloud Scan to double check the accuracy of the design. The Flo-Control® chutes were fabricated and installed, solving the material flow problems and eliminating the plugging and buildup, allowing for increased tonnage flows.



Point Cloud Scan of conveyor.

Model of conveyor.



Model overlaid into Point Cloud Scan

FLO-CONTROL CHUTES

ASGCO® Flo-Control® 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 we 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 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.

The new chute can incorporate a new hood insert or a complete remodeling of the entire top and bottom of the transfer point. The head chute which will direct the material down through a lower Spoon section that will direct the flow in the direction of belt travel and centered on the belt.

The ideal transfer point design would need to take into account the following:

- Center load the material
- Load material at a uniform rate
- Load in the direction of belt travel
- Load at the same speed the belt is moving
- Load material with minimum impact

Transfer point structure prevent:

- Plugging
- Chute wear and belt wear
- Dust creation
- Material spillage

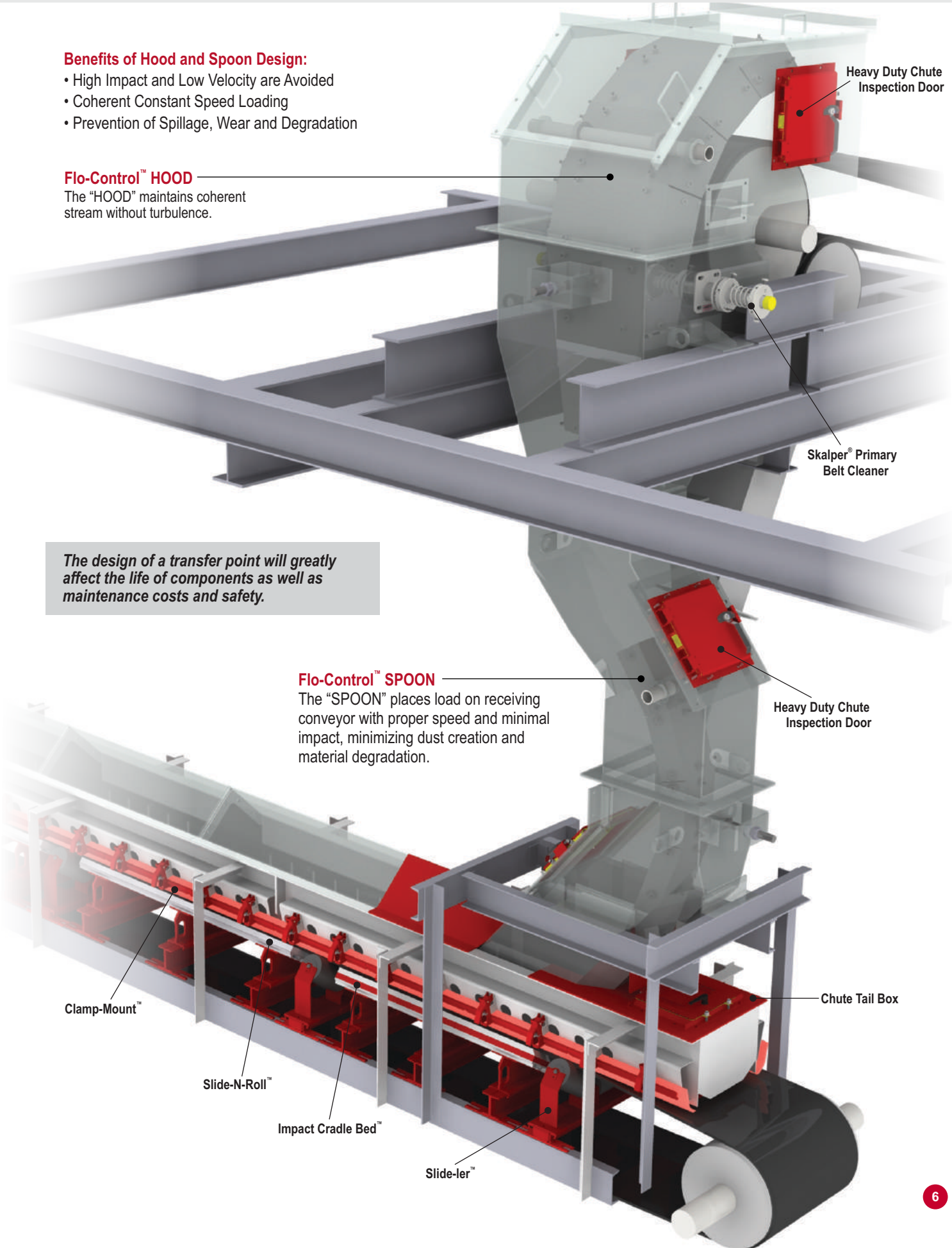
Benefits of Hood and Spoon Design:

- High Impact and Low Velocity are Avoided
- Coherent Constant Speed Loading
- Prevention of Spillage, Wear and Degradation

Flo-Control™ HOOD
The "HOOD" maintains coherent stream without turbulence.

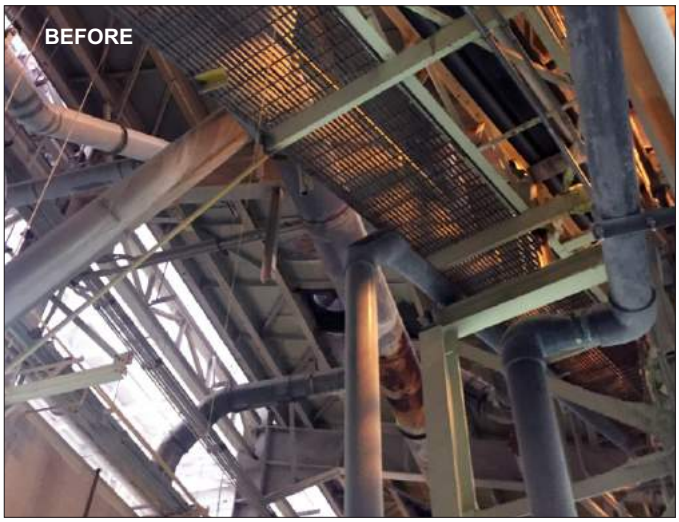
The design of a transfer point will greatly affect the life of components as well as maintenance costs and safety.

Flo-Control™ SPOON
The "SPOON" places load on receiving conveyor with proper speed and minimal impact, minimizing dust creation and material degradation.



After-market epoxy compound was needed to help seal the holes in the chutes.

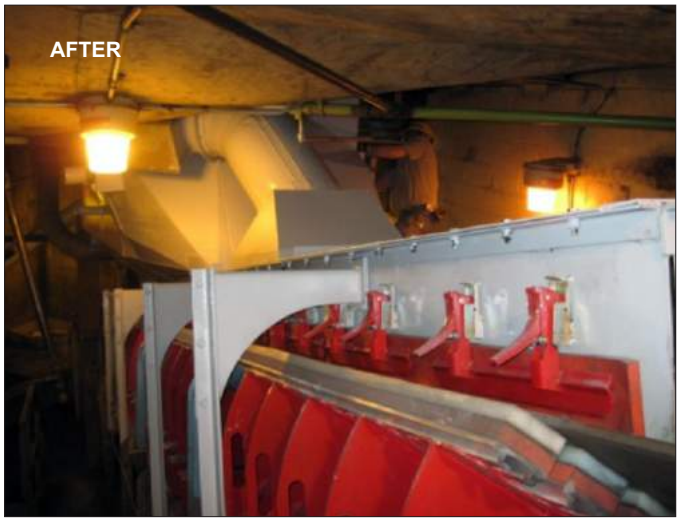
Newly designed chutes with standard boltable liners.



The relationship of these two conveyors made the design of the chute difficult.

ASGCO® fabricated chutes installed after a comprehensive Point Cloud Laser Scan, 3-DEM™ chute analysis and model design.

Due to the angle of discharge onto the 60” receiving conveyor, off center loading caused serious belt mis-tracking and constant spillage.



This new design eliminated the off center loading conditions due to the varying coal load which cause belt mis-tracking and material spillage.