BENETECH®

SAFE MATERIAL HANDLING SOLUTIONS

Mining

Dust and spillage mitigation solutions for your industry.

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BENETECH®

Solutions for the Mining Industry

Whether you are moving hard rock, coal, base, or precious metals, no matter if it is surface or underground mining, your operation relies on its material handling systems to get the material where it needs to go. Downtime costs you time and money, so your equipment must be durable and efficient. Fugitive dust and spillage result in loss of material which also affects your bottom line.

More importantly, it affects the safety of your workplace. Having properly tracked belts to keep material on the belt, properly contained load zones to control fugitive dust, properly designed belt cleaners to handle carry back issues, and adequately supported belts to keep your systems running is all an absolute necessity. Mining can be a challenge; Benetech's technologies can make this process easier and more efficient by preventing spillage, controlling fugitive dust, and improving safety.

Benetech manufactures Total Dust Management solutions designed to make sure your operation is running efficiently and safely while optimizing capacity. Our solutions keep your material flowing efficiently from the underground mine, surface mine, or quarry to the loading site. Our team of experts, along with our integrated solutions, will ensure a successful operation.

Our integrated solutions include:

- Engineered Transfer Chutes to control material flow
- Dust Suppression Systems to control fugitive dust
- Dust Collection systems to collect airborne dust
- Best in class Conveyor containment
- Belt Support and Cleaning components

The successful results our solutions provide:

- reduce fugitive dust
- increase wear liner life
- enhance safety
- reduce carryback
- control respirable dust

Belt Cleaners

The proper cleaning of conveyor belts is a significant problem in most plants. After the material has been discharged, particles adhering to the belt (carry-back) must be removed to prevent spillage along with the conveyor and build-up material on the return rollers. The material build-up will cause the belt to mistrack and eventually damage its edges. In addition, spillage around the conveyor will lead to extra maintenance and clean-up costs.

Benetech's conveyor belt cleaning solutions include primary, secondary, and specialty cleaners or belt scrapers that solve carry-back issues once and for all. Created to keep production moving and extend the life of your belt, our conveyor belt cleaning systems provide superb cleaning efficiency that minimizes maintenance.

Benetech's conveyor belt cleaning solutions are made for all transported material regardless of their hardness, shape, or abrasiveness. Your business can manage everything from wood chips, recycled paper, and garbage to iron pellets, coal, and crushed rock with our conveyor belt cleaning systems.

Primary Cleaner: BEP1 Quarry

- Easy to install and maintain
- Simple spring tensioner design
- Tension is easy to apply and adjust
- 48" belt widths and less only need one tensioner
- Abrasion resistant polyurethane blade
- Blade is a simple dual pin change out design

Secondary Cleaner: BES1

- Unparalleled Blade Holder Keeps the Center of the Blade on the Belt
- One Piece Rubber Blade with Tungsten Carbide Tips
- Low Profile Cleaner Design
- Torsion Arm Tensioning
- Modular design for quick and easy blade replacement

*Replacement Retrofit Blades Available

BEP1 Quarry

BES1 Cleaner

Belt Support & Alignment

Simple Slide Idlers

Benetech's Simple Slide Return Rollers allow for safe and simple installation and maintenance while providing optimal belt support between the discharge point and the tail pulley. In addition, the compact size of the frames allows for placement even in confined spaces.

Drop & Slide Idlers

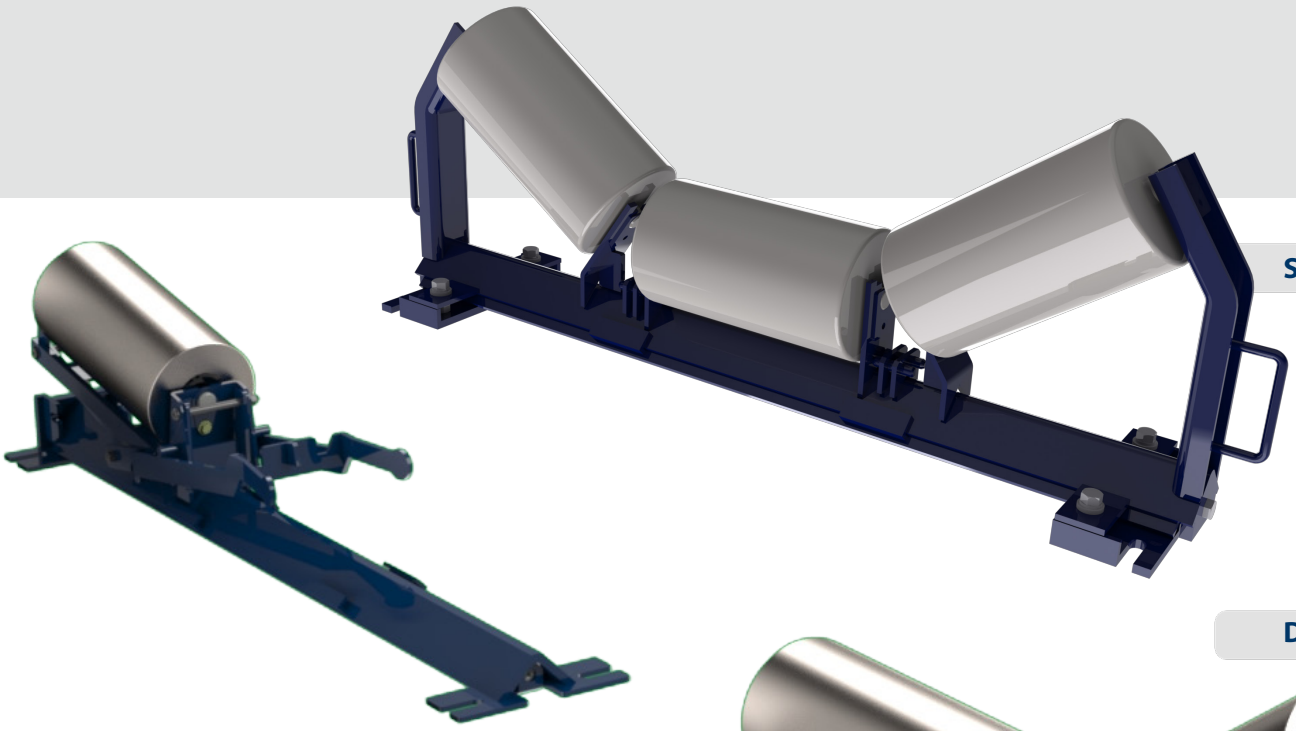
The Benetech Drop & Slide Idler can be completely dismantled, inspected, and serviced by one person from one side of the conveyor. When in the retracted position, the roller unit simply slides out from underneath the existing conveyor belt allowing for easy roller inspection or replacement.

Trackers

Benetech Training Idler responds instantly to the misalignment of the belt and does so without special modifications to the structure. Frame and guide rollers are often the cause of belt damage, which reduces the lifetime of the belt. The Benetech Training Idler requires no maintenance and fits into a standard drop bracket. The Benetech Training Idler can be manufactured to suit all belt sizes in operation in any country. Special design requirements, such as specific shaft dimensions and lengths, are possible at little or no additional charge.

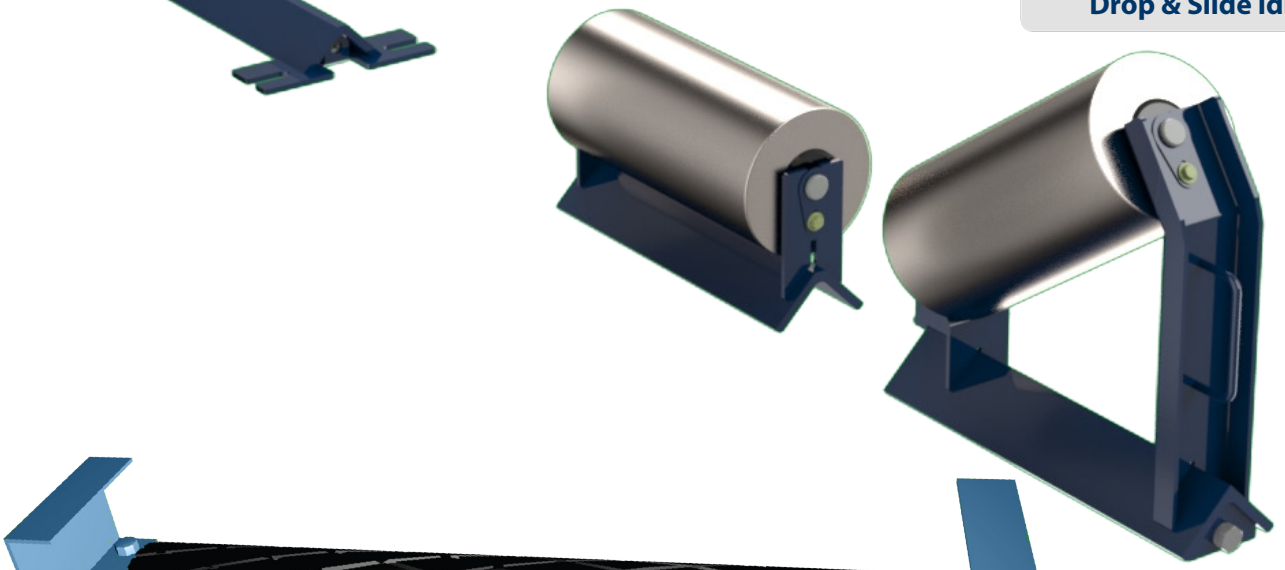
Impact Beds

The Warrior Impact Bed stabilizes and supports the conveyor belt during loading, defending it from damage. The stiff, rigid frame and soft rubber bars of the Warrior cushion the belt and absorb impact. The result is longer belt life, eliminated spillage, and decreased O&M costs.

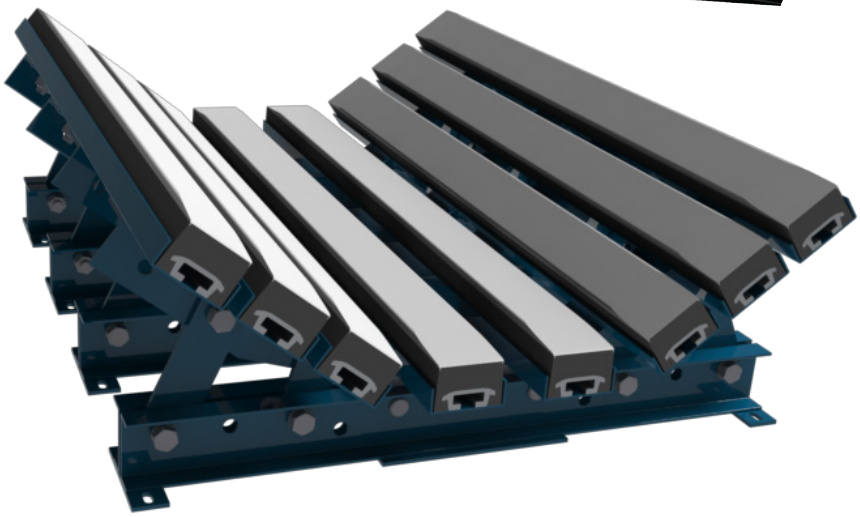


Simple Slide Idler

Drop & Slide Idler



Tracker



Impact Bed

Load Zone Containment

Inspection Doors

Benetech conveyor chute inspection doors let you achieve both necessary steps safely and efficiently. The doors' distinctive design and proven technology provide you with complete and easy access for service and maintenance, as well as a tight seal against airborne dust.

Product Offerings

- An innovative door-deflector panel for less material build-up on the door seal
- Grease fitting on pinned hinges for no play or locking up
- Resilient door seals are hidden in the groove for long-lasting service
- Ergonomic cam-action and never-seize closing latches with adjustable tension for suite operation requirements
- Heavy-duty handles that won't bend
- Easy installation with a simple cut-and-weld or bolt-on process

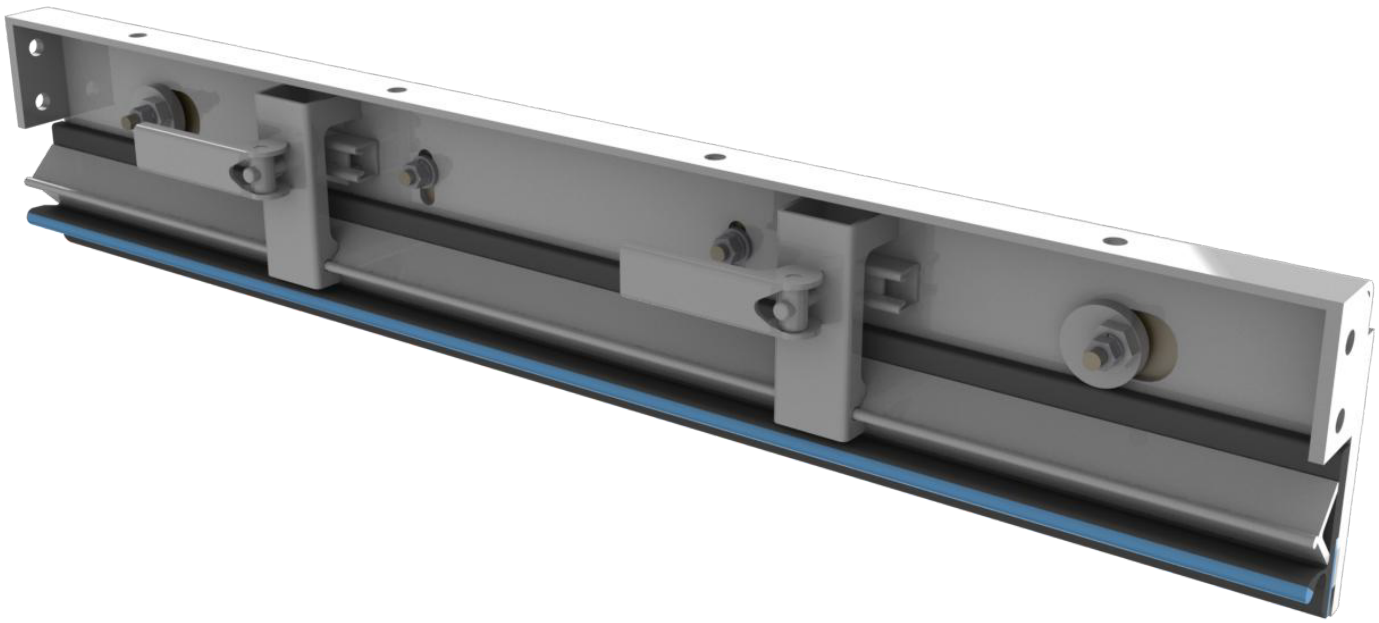
The standard Benetech conveyor chute inspection door is available in mild steel (safety yellow) with an unlined deflector panel.

XN Liners

The XN Externally Adjusted Internal Wear liner is placed in the conventional position inside the skirtboard while the adjusting mechanism can be accessed from the outside. As a result, you never need to enter the chute to remove the liner or make adjustments.

This patented technology gives you instant advantages, including quick, simple wear liner replacements; no confined entry requirements; easily visible adjustment with immediate performance results; reduced early wear and erosion of skirt rubber; extended life of usable steel/chrome; and no more cutting/welding of wear liners.

Inspection Doors



XN Liner

Load Zone Containment

Inspection Doors

Before

After

XN Liners

Before

After

Load Zone Containment

MaxZone®

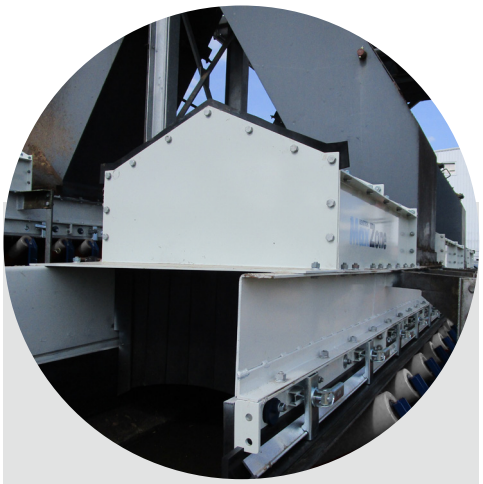
Benetech's patented MaxZone® Modular Skirtboard and Belt Support System seals your load zone to reduce airborne and fugitive dust, preventing product loss and spillage while improving material flow. This system also can be retrofitted to accommodate and enhance an existing system as an economical solution to sealing and protecting your load zone.

When budget and time constraints rule out a total system replacement, the MaxZone Modular Skirtboard and Belt Support System is your answer for an economic transfer point and load zone. With the system's modular design, you can replace components without special permits or extended shutdowns. In addition, installation is simple and affordable, and no welding is required.

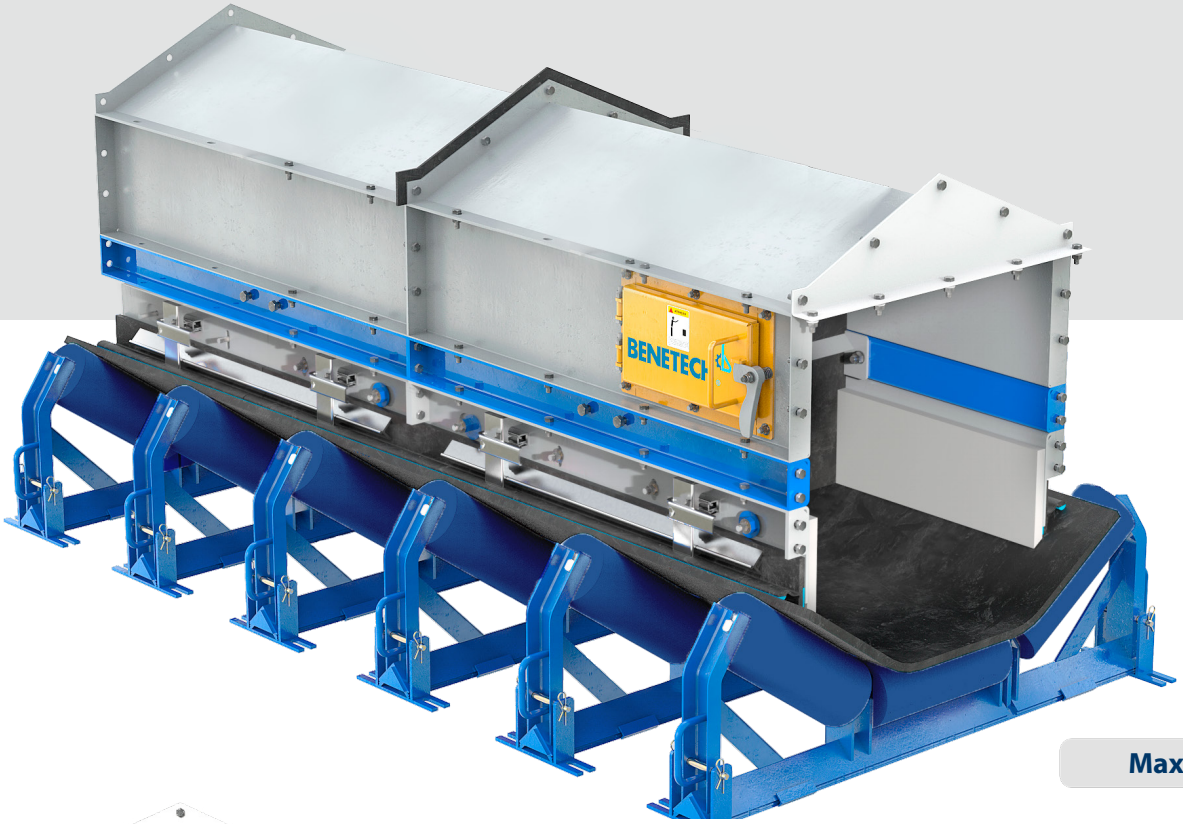
MaxZone® Bundled Kit

- 2' or 4' Tailbox
- 4ft Loading Section
- 4ft Full Height Sections
- Peaked or Flat Hoods
- Dust Curtains
- XN Wearliner
- Skirting Seal
- Dust Tight Inspection Door
- Warrior Impact Bed
- Simple Slide Idlers

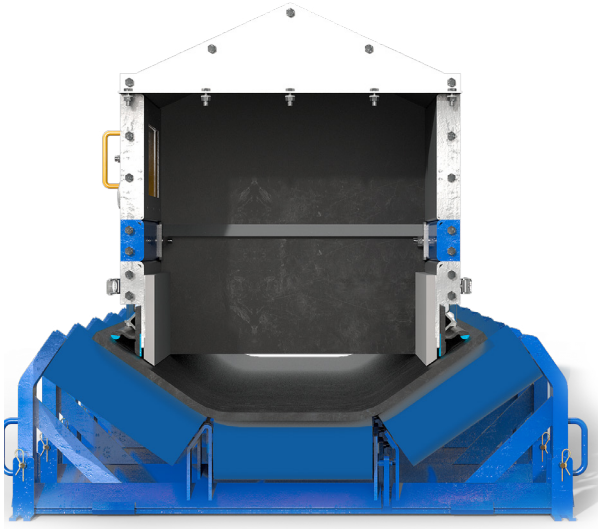
MaxZone®

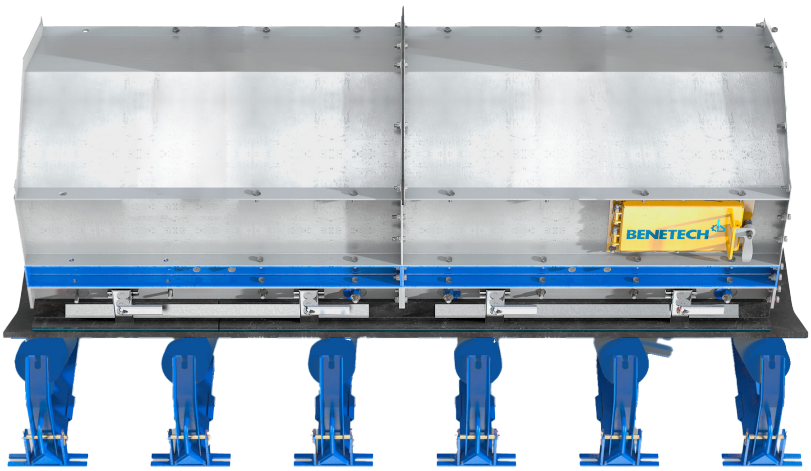


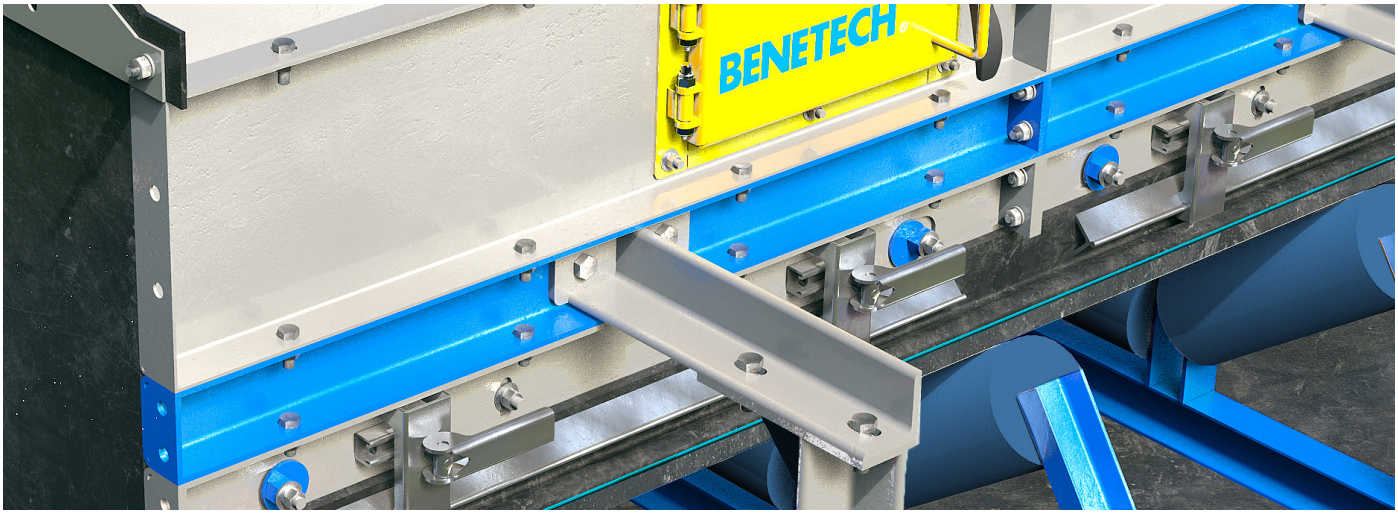
MaxZone® with a peaked hood



MaxZone®







Load Zone Containment

MaxZone® Plus

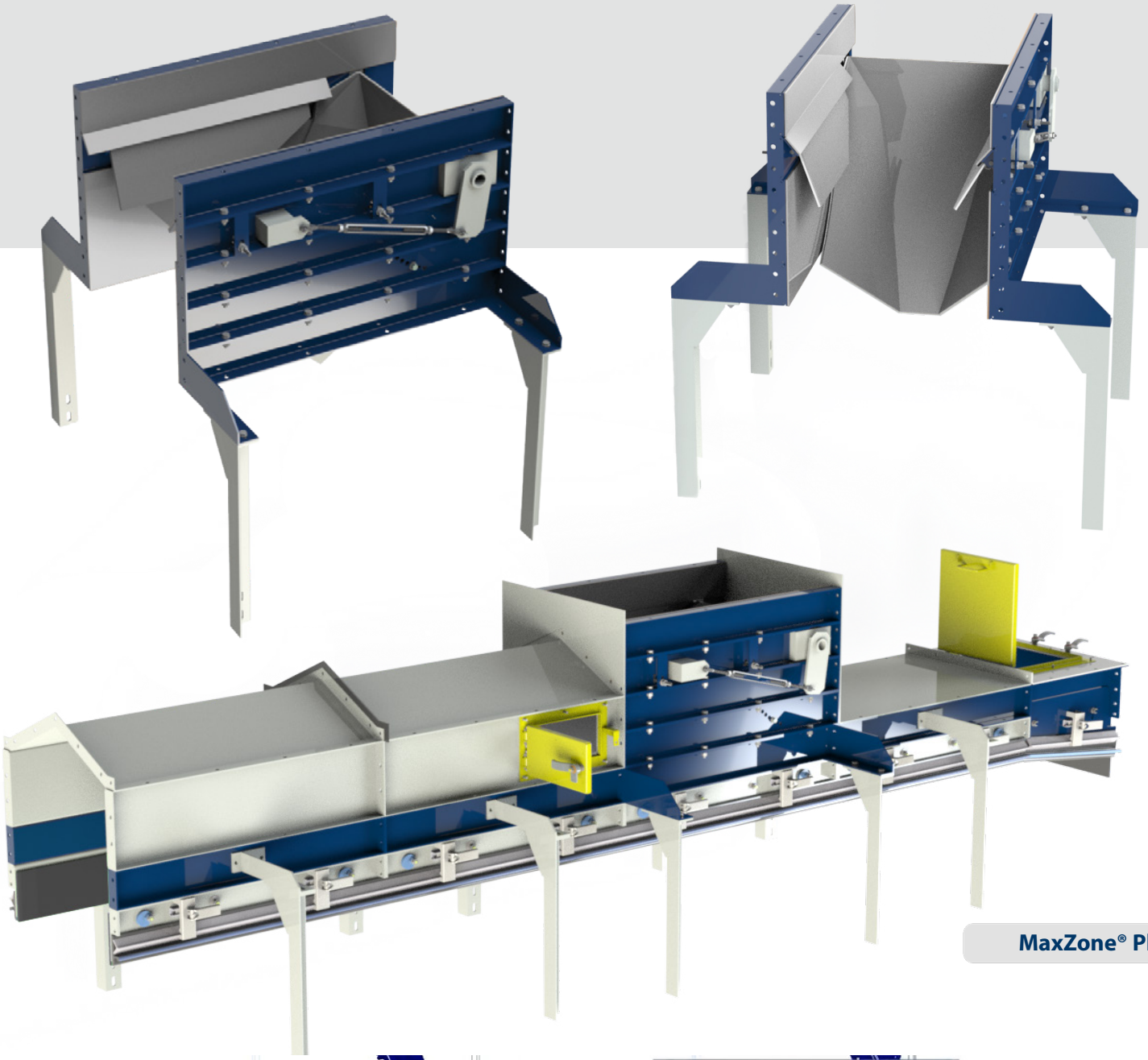
A low-cost solution to combat off-center conveyor loading without costly chute redesign.

Benetech understands the difficulties of fugitive dust and spillage from poorly designed transfer points and load zones. The underlying issue is often a misaligned transfer point chute creating a flawed material transition onto the receiving belt.

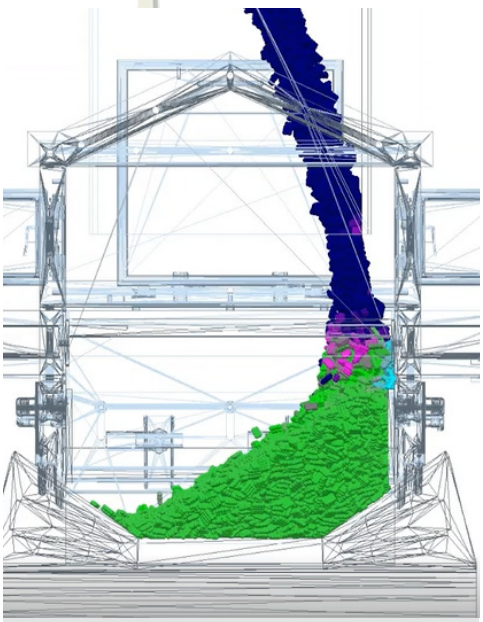
Improper or off-center loading can lead to several problems. First, when the material is loaded to either side of the belt, it creates excessive spillage and dust and threatens to mistrack it fully. Mistracking can then damage the conveyor; cause uneven wear; make the motor work harder, and even create safety issues. These potential downsides frequently result in costly maintenance, housekeeping, and material loss.

Although these problems should be addressed, time and budget constraints do not always allow for engineered load zone chute replacement, which is the best option to solve most conveyor material-flow issues. To overcome this, Benetech has developed a new low-cost solution to combat off-center conveyor loading without costly chute redesign: the MaxZone® Plus system.

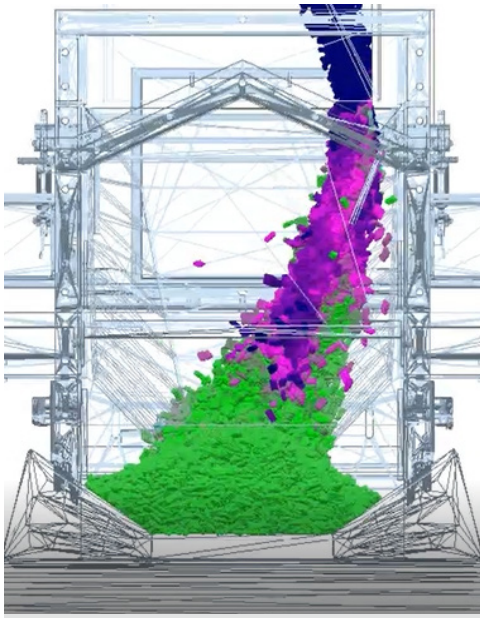
The adjustable side kicker plates and deflector moves material forward onto the conveyor belt to correctly center load the material for a smoother transition onto the moving belt. With 6" removable side panels to accommodate chute configuration, the MaxZone® Plus can be installed easily into an existing Benetech MaxZone® and retrofitted to other containment systems.



MaxZone® Plus



Before
DEM Off-Center Loading



After
MaxZone® Plus DEM Center Loading

Material Flow

Clean Sweep AC

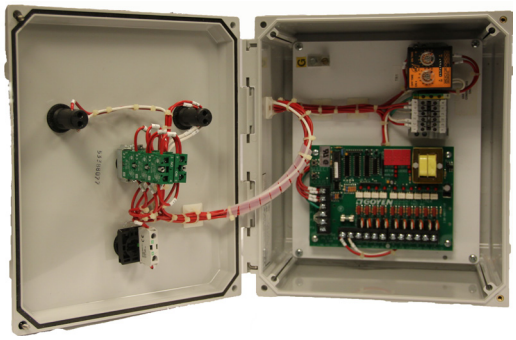
Distinctly designed for bulk materials, the radial Clean Sweep AC automatic cleaning system uses standard plant compressed air at 80–100 PSIG to prevent pluggage and eliminate build-up in transfer chutes, bins, hoppers, silos, and bunkers.

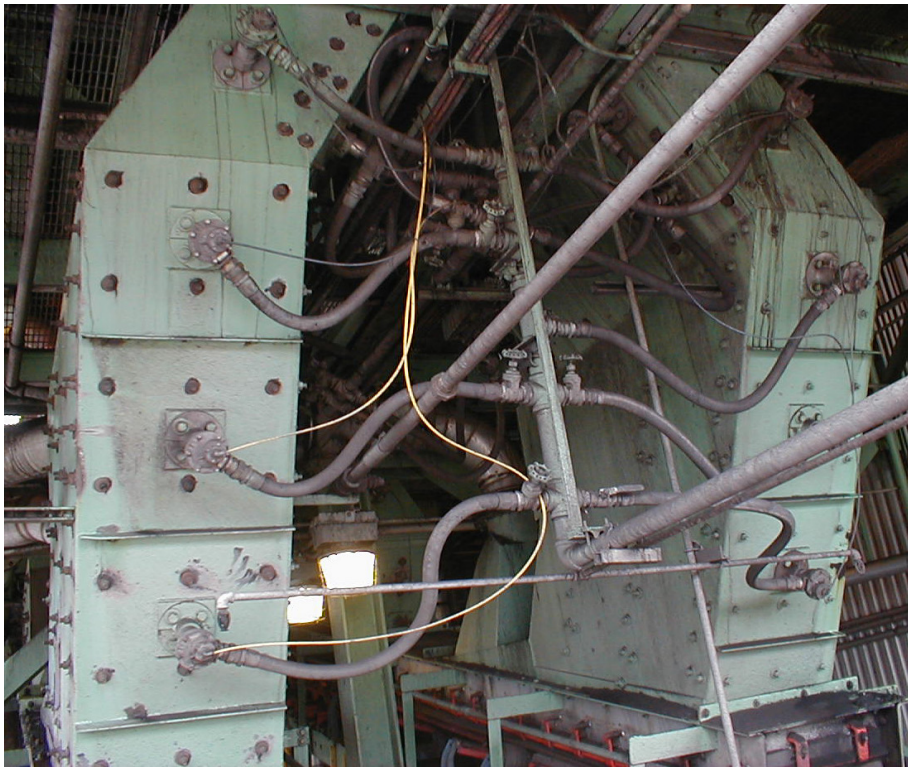
Easy to install and maintain, Clean Sweep AC is your trouble-free answer to ensuring uninterrupted material flow, especially for wet and sticky substances such as sand and cement. Clean Sweep AC is the only radial, pneumatic cleaning system created for bulk material handling and designed not to damage ceramic-lined chutes.

The system's automatic electronic controls trigger wear-resistant nozzles that sequentially fire precise bursts of plant air supplied through a quick-open/close solenoid valve to achieve less waste and maintenance. Each nozzle directs the air 360°, approximately two feet for 0.1 seconds along the surface of the chute work. In doing so, Clean Sweep AC impedes material from crusting or layering – rather, it dislodges and breaks up any potential accumulations for easy flushing by gravity and flowing material. Clean Sweep AC includes a remote air tank and control station for convenient ground-level access. As a result, there is no need to worry about installing large compressed air tanks on chutes, silos, or bunkers.

In addition, the Clean Sweep AC control panel and sequence timers can be located in an area convenient to operations, allowing personnel to make any adjustments needed for changing air pressure and rate of sequencing. Timing sequence and firing rates can be expanded (supporting up to 45 different nozzles) to accommodate a range of chute configuration changes.

Plus, unlike air lancing, which can result in injury and insufficient cleaning, Clean Sweep AC cleans automatically and does not require confined-space permits.





Engineered Transfer Chutes

With over 500+ engineered chute designs worldwide, Benetech, Inc. applies advanced engineering technologies and years of experience to design material handling systems that upgrade your efficiency and improve safety.

By adeptly improving material flow issues, Benetech engineered transfer chutes to minimize production problems. This includes pluggage or choked flow; help eliminate spillage and airborne dust; and reduce high-impact areas, optimize belt life, and create longer intervals between service and maintenance.

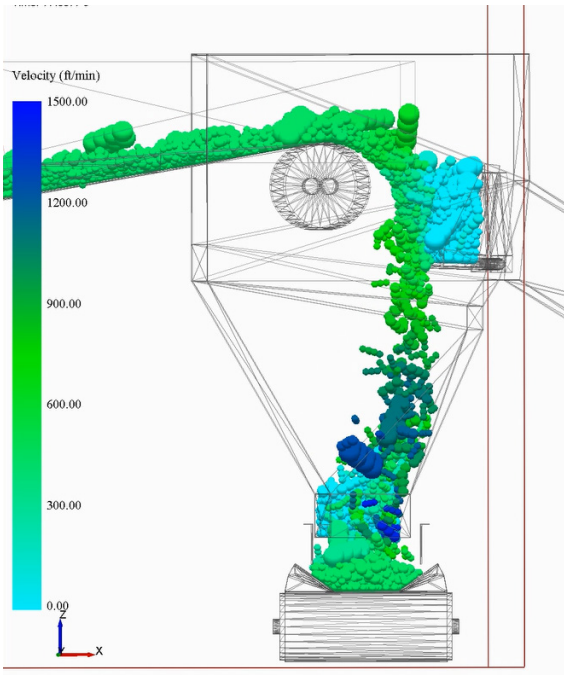
Discrete Element Modeling (DEM) Flow Analysis

Benetech uses state-of-the-art DEM analysis to evaluate and optimize each material handling transfer point design in developing advanced transfer chutes. This pre-installation computer-modeling process anticipates your plant's potential downstream material flow problems and solves them before expensive mistakes interfere.

DEM chute designs are performed in-house by Benetech's highly trained and experienced chute engineers. All computer modeling also includes the latest multi-phase material flow and airflow engineering analysis based on Conveyor Equipment Manufacturers Association (CEMA) criteria. This enables precisely defined and controlled material movement from the head of the belt conveyor through discharge to the receiving conveyors.

Before

After



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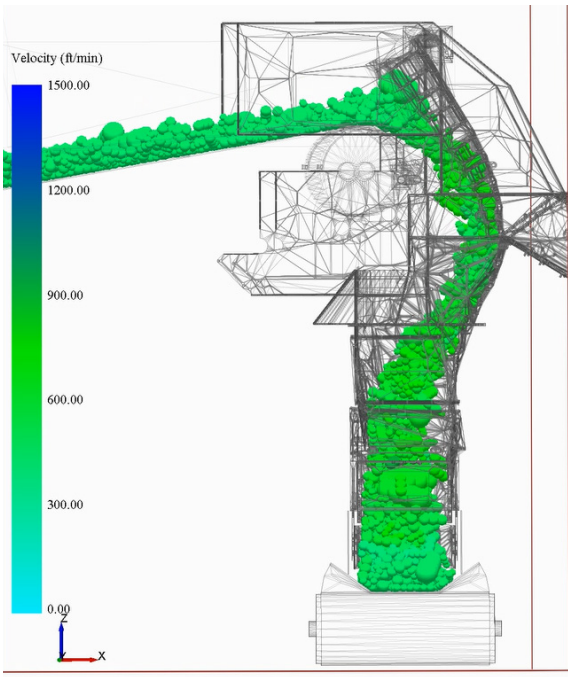

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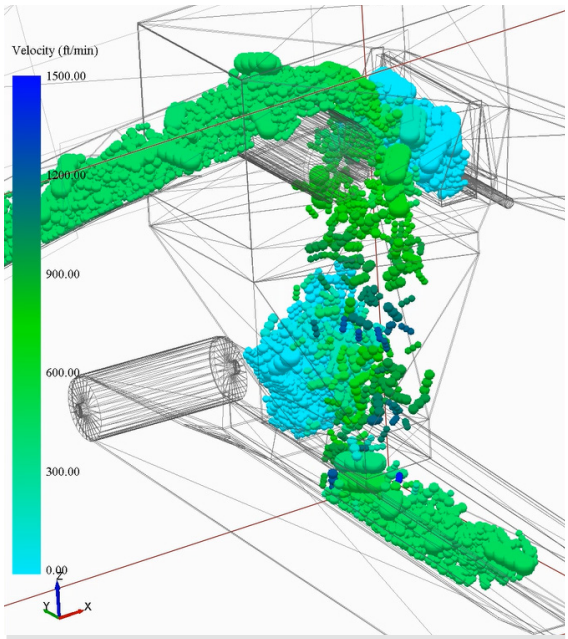

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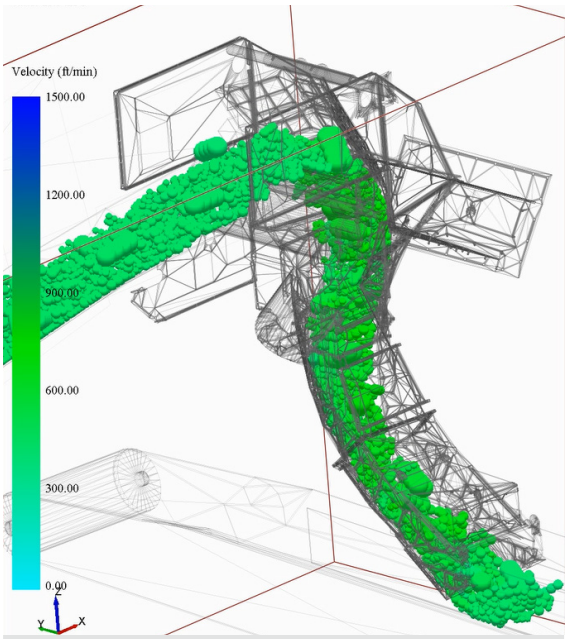

After

Dust Suppression

Chemical

At Benetech, we know dust control goes beyond using a chemical. It also calls for your program that applies methods based on premium support and technology.

Our engineers specialize in designing, fabricating, and installing custom dust suppression systems. That includes managing hydrophobic materials (those that try to repel water from the surface). Benetech dust suppression lowers the water's surface tension to a value closer to the material being treated, letting the water droplets capture more dust particles.

Benetech's chemical agents also are non-flammable, non-toxic, non-explosive, and biodegradable.

Benetech dust suppression allows you to reduce and control fugitive dust throughout your facility:

- Stockpiles
- Transloading hoppers
- Haul roads
- Stackouts
- Transfer points
- Rail and truck dumps
- Pugmills
- Ship-loaders

Our chemicals and applications solve challenges for diverse businesses, including:

- Aggregate operations
- Cement plants
- Ports and terminals
- Refineries
- Biomass power plants
- Mines/Quarries
- Pulp and paper mills
- Steel mills and coking facilities
- Coal-fired power plants
- Pet coke power plants
- Recycling facilities
- Waste transfer facilities

Application Systems

Benetech designs, engineers, and installs complete dust suppression systems. Our dust suppression methods produce powerful dust control for millions of tons of material each year. With custom systems in force worldwide, we provide the technologies that solve even the toughest material handling challenges.

Our systems serve a wide range of dust control applications:

- Anti-oxidizers
- Rail car unloading
- Conveying systems
- Slope encrusting
- Haul road
- Stackout suppression
- Pile sealant
- Transfer points suppression
- Rail car topper
- Truck top sealants
- We offer several state-of-the-art design options for superior results.

Before

After

Project Profile

Clean Sweep AC (Air Control)

This Iron Ore plant was having pluggage issues in one of their main chutes. The chute handles 400 TPH of 400 mesh particle size refined iron at 9% moisture. To help keep the material moving, the plant had installed three pneumatic impacting vibrators.

Unfortunately, the vibrators were not handling the problem as the chute continually plugged. In addition, the strong vibration of the vibrators was wreaking havoc on the chute, causing cracks and other damage to the chute walls.

Existing Problems:

- Plugged chute
- Strong vibration of the vibrators
- Cracks on chute walls

Vibrators were originally installed on back side of chute.

Vibrators were removed and four Clean Sweep AC nozzles were installed on side wall.

The Benetech Solution

Distinctly designed for bulk materials, the radial Clean Sweep AC automatic cleaning system uses standard plant compressed air at 80–100 PSIG to prevent pluggage and eliminate build-up in transfer chutes, bins, hoppers, silos, and bunkers. Clean Sweep AC is the only radial, pneumatic cleaning system created for bulk material handling and designed not to damage ceramic-lined chutes.

Benetech installed four Clean Sweep AC nozzles directly in the area that the buildup was occurring and causing pluggage issues. The positive results were immediate. The plant has seen a 98% reduction in build-up and plugging issues with no negative side effects in terms of damage to the chute.

Successful Results:

- 98% reduction in build-up
- No damage to the chute
- No negative side effects

Nozzles Installed-Outside of Chute

Nozzles Installed-Inside of Chute

Project Profile

Mining Facility: Taconite Pellet Handling System Upgrades

The transfer chute from conveyor 3 to conveyor 4 had reached end of life and needed to be replaced. The extended wear and aging had resulted in a spillage and fugitive dust issue that needed to be addressed. With safety top of mind, Benetech was called upon to assess the situation and provide an engineered solution that would control the material flow and contain the material to prevent spillage and ensure a reduction in fugitive dust.

Exisiting Problems

- High level of manpower required to maintain/clean system
- Continuous and increasing maintenance and housekeeping costs
- High dust emissions from transfers
- Extreme spillage issues

Design Specifications

- **Belt Width:** 48”
- **Belt Speeds:** C3-560 FPM, C4-575 FPM
- **Tonnage:** 5000 TPH
- **Material:** Taconite Pellets 150 lbs/cubic feet
- **Drop:** 15 ft

Head Chute Before

Head Chute After

Inside of Head Box

Showing adjustable material flow deflector.

Looking Down Load Chute

Looking down Load Chute showing how material is center loaded.

Transition Chute Before

Transition/Dribble Chute After

Project Profile

Mining Facility: Taconite Pellet Handling System Upgrades *(continued)*

Project Scope

After assessing the situation, Benetech utilized its experience with material handling and transfer point design to engineer and supply an Advanced Flow Transfer System along with a MaxZone Modular Skirtboard System.

Head Chute

An all access head chute design incorporates the top half of the existing head chute to reduce cost. In addition, large inspection doors allow for easy inspection of the chute surfaces and belt cleaners. An adjustable material flow deflector, with bolt-in white iron liners mounted in the head chute, optimizes flow through the transfer, greatly reducing impact and dusting.

Transition Chute

A transition chute was installed below the head chute and fitted to our Advanced Flow load chute. Bolted on ¾ inch white iron wear liners are utilized in material flow areas to provide best in class wear life. A dribble chute to capture dribble from Benetech installed belt cleaners was installed to feed onto the receiving belt to further reduce dusting and spillage.

Load Chute and MaxZone Skirtboards

A Benetech Advanced Flow load chute, equipped with white iron wear liners, was installed to gently center load the pellets on the receiving belt, matching the speed and direction of travel of the receiving conveyor- further minimizing dusting, material spillage, belt cover wear and liner wear. A Benetech MaxZone skirtboard system, incorporating Benetech's patented XN Liner system, was installed to further contain dust and material spillage. A tail box with a lockable inspection door and Benetech B-Plus skirting seals held by Benetech Quick Clamps are included on this system. Multiple dust curtains are included in each enclosure section to control air movement. The XN liner, which is externally adjustable, was fitted with easily replaceable whit iron liners for best in class wear life.

The Benetech Solution

After assessing the situation, Benetech utilized its experience with material handling and transfer point design to engineer and supply an Advanced Flow Transfer System along with a MaxZone Modular Skirtboard System.

Successful Results

- Material flow is now controlled, drastically reducing dust generation.
- Material now center loads on receiving belt in direction of travel, eliminating belt tracking issues in the load zone.
- Material loads in the direction of receiving belt, increasing belt wear cover life.
- Material spillage on both floors has been eliminated.
- Material plugs in the chute have been eliminated.
- Discharge belt carry back is drastically reduced and returned to material flow.
- Noise levels in transfer house have been drastically reduced.
- Ease of maintenance and safety of the system has been improved.
- O & M costs of this transfer are reduced.

Load Zone Before

Load Zone After

MaxZone Modular Skirtboard System

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