

Biomass

Dust and spillage
mitigation solutions
for your industry.



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Solutions for the Biomass Industry

Today's competing in bulk material handling industries requires you to outperform other services, speed, and efficiency facilities. In addition, optimal production depends on your ability to supply products without delays or complications.

During production, chipping operations, biomass sizing operations, conveyor systems, bins, storage silos, and dust collectors handling biomass and biomass dust need to work reliably while minimizing spillage and fugitive dust. In particular, dust generation from shredding operations, chipping operations, sizing and pelletizing operations, and dealing with dry feedstock must meet ever more stringent safety and environmental standards.

Benetech solutions for bulk material handling at pellet plants, central heat plants, bagasse cogeneration operations, and biomass waste incineration plants help prevent risks such as fires and explosions to increase output, reduce maintenance, and support a safer, cleaner process.

Material Handling Issues That Matter to You

Pellet plants, central heat plants, and industrial operations handling dry biomass often face a high risk of dust fires. To operate at acceptable levels, they need prudent management and controls.

Typical sizing and conveyor operations produce fugitive dust through spillage and carryback or from windblown dust during conveyance. The relatively low bulk density of the dust and its accumulation in the facility increase hazards that can halt operations.

As a biomass plant operator, you are primarily on alert for this fugitive dust throughout the plant. However, you also watch for worn components such as chutes, cleaners, belts, idlers, trackers, and ploughs that can likewise threaten production.

More Productive Biomass Storage and Conveying Systems

You succeed with Benetech because our engineers know your challenges and create solutions specifically for them. So whether getting the most from your conveyor belt or enhancing your biomass dust control, you better manage your material flow.

We provide:

- greater workplace safety
- less plant-mitigation labor
- reduced fugitive dust
- fewer plant maintenance costs
- increased belt life

Load Zone and 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.

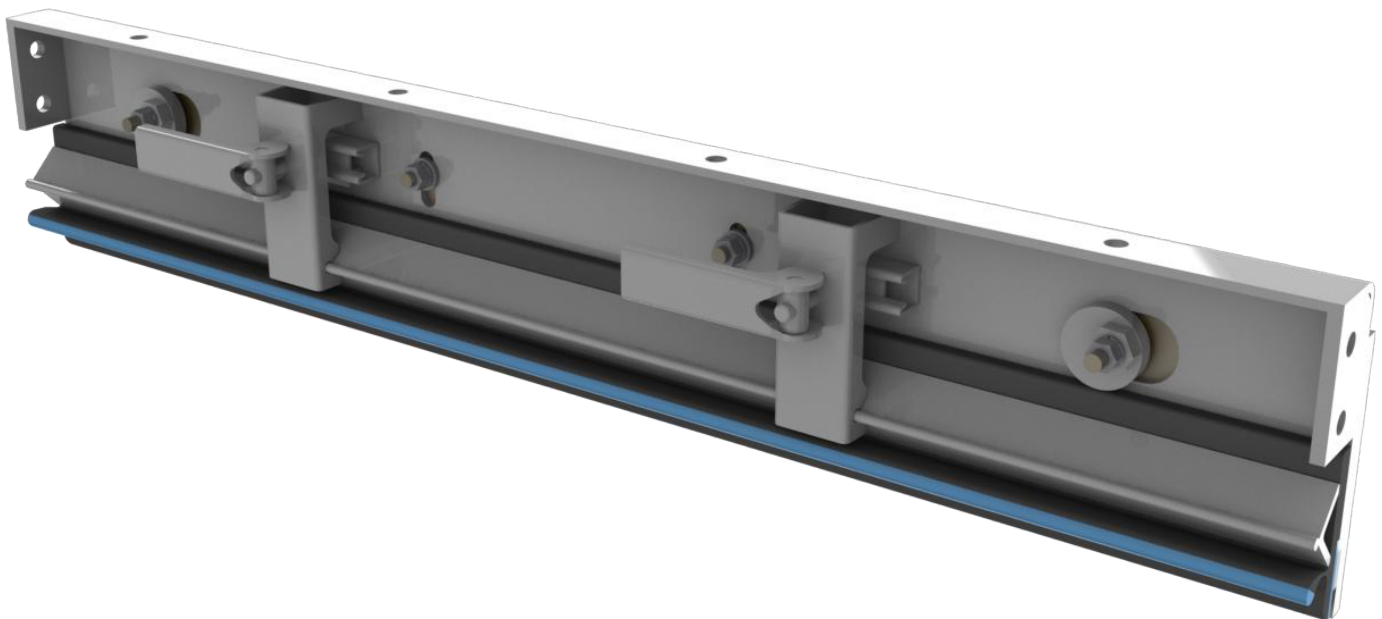
XN Liners

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



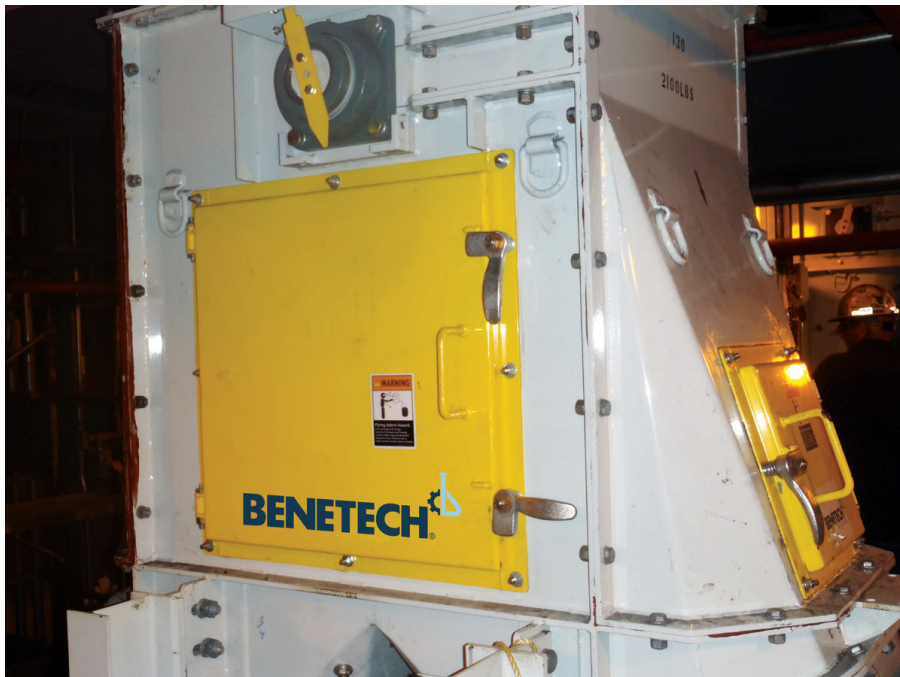
XN Liner

Load Zone and Containment

Inspection Doors



Before



After

XN Liners



Before



After

Load Zone and 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.

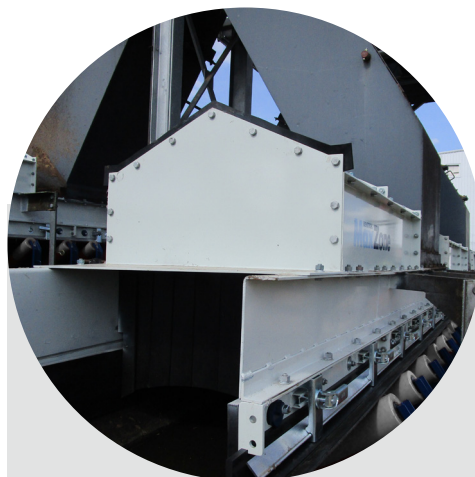
When budget and time constraints rule out a total system replacement, the MaxZone Modular Skirtboard and Belt Support System is your answer for an economic transfer point and load zone. With the system's modular design, you can replace components without special permits or extended shutdowns. In addition, 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



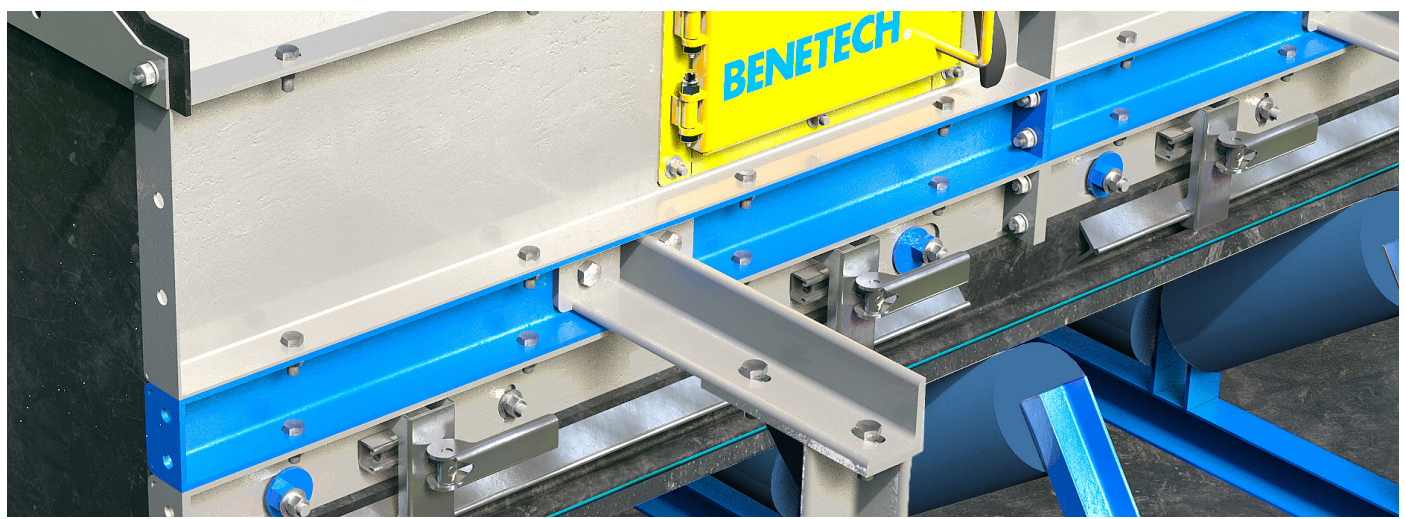
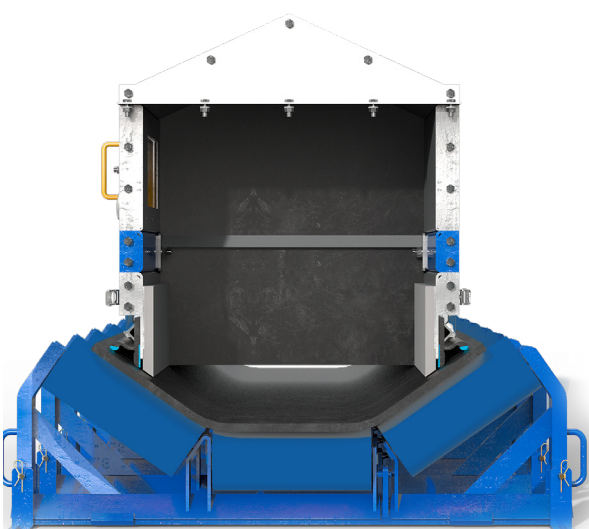
MaxZone®



MaxZone® with a peaked hood



MaxZone®



Load Zone and Containment

MaxZone® Plus

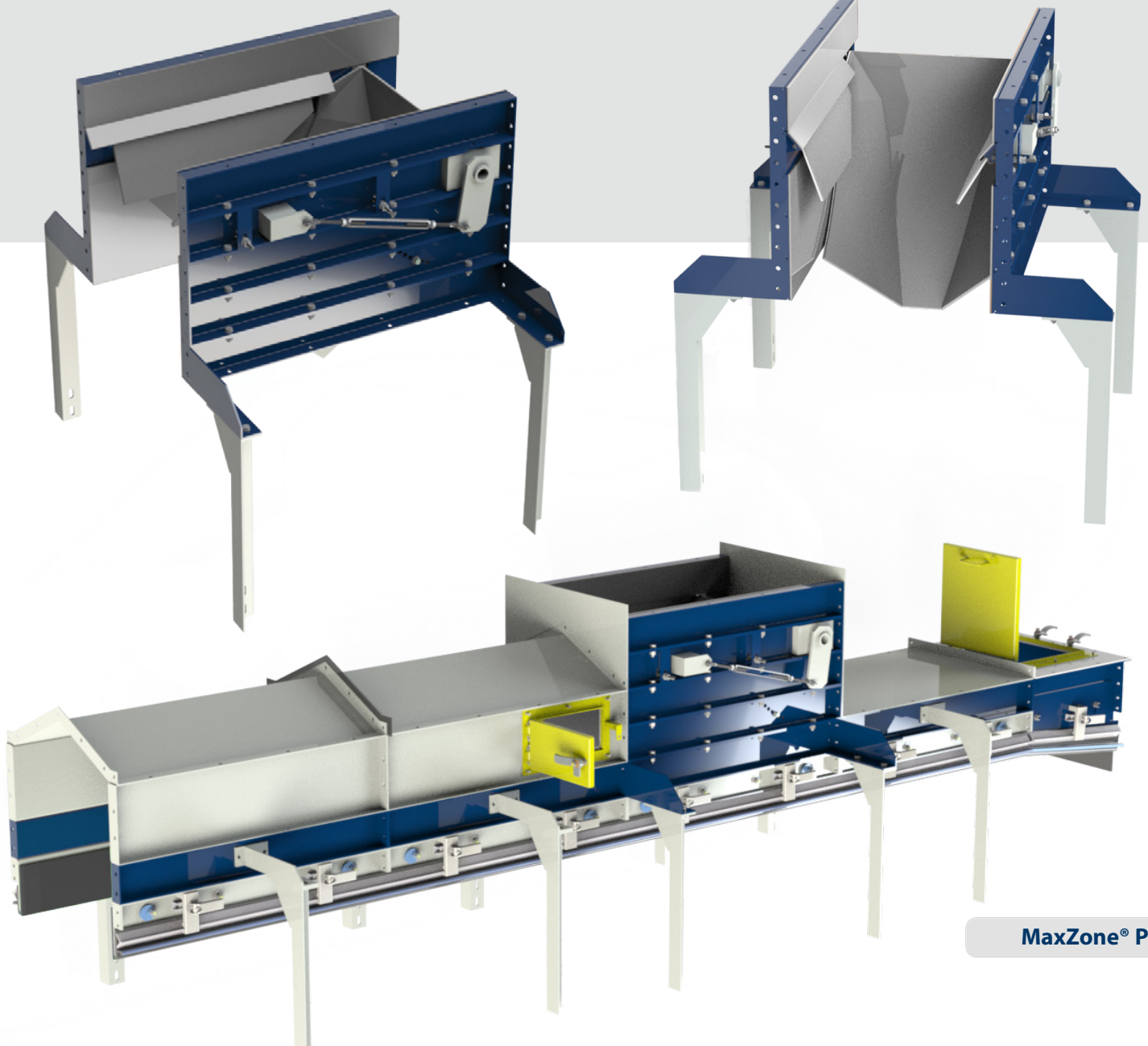
A low-cost solution to combat off-center conveyor loading without costly chute redesign.

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.

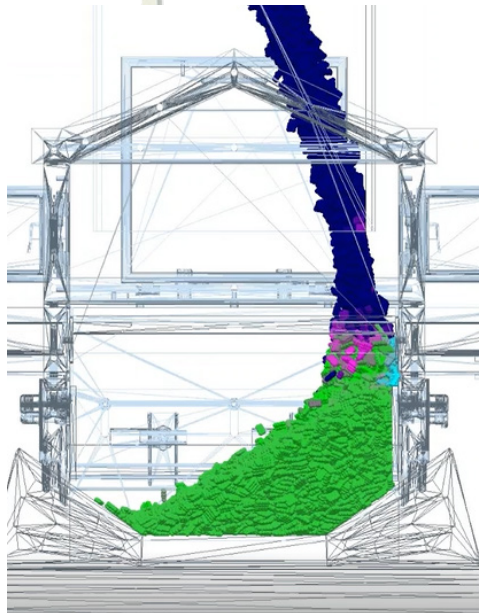
Improper or off-center loading can lead to several problems. First, when the material is loaded to either side of the belt, it creates excessive spillage and dust and threatens to mistrack it fully. Mistracking can then damage the conveyor; cause uneven wear; make the motor work harder, and even create 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.

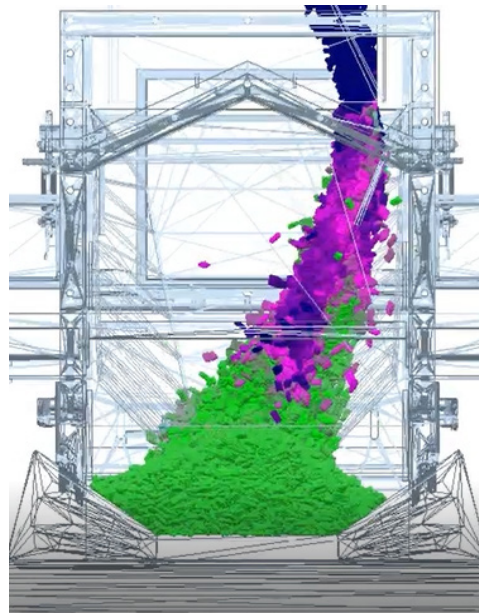
The adjustable side kicker plates and deflector moves material forward onto the conveyor belt to correctly center load the material for a smoother transition onto the moving belt. With 6" removable side panels to accommodate chute configuration, the MaxZone® Plus can be installed easily into an existing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



MaxZone® Plus



**Before
DEM Off-Center Loading**



**After
MaxZone® Plus DEM Center Loading**

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

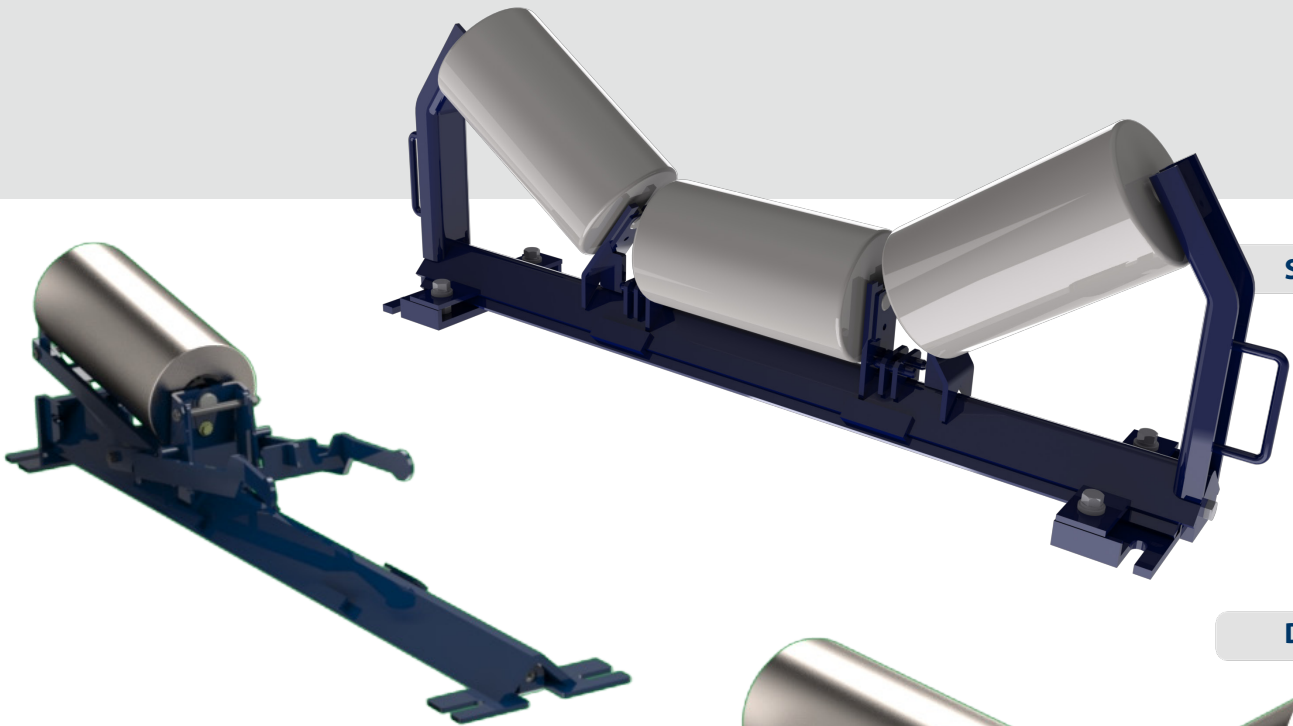
The Benetech Drop & Slide Idler can be completely dismantled, inspected, and serviced by one person from one side of the conveyor. When in the retracted position, the roller unit simply slides out from underneath the existing conveyor belt allowing for easy roller inspection or replacement.

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.



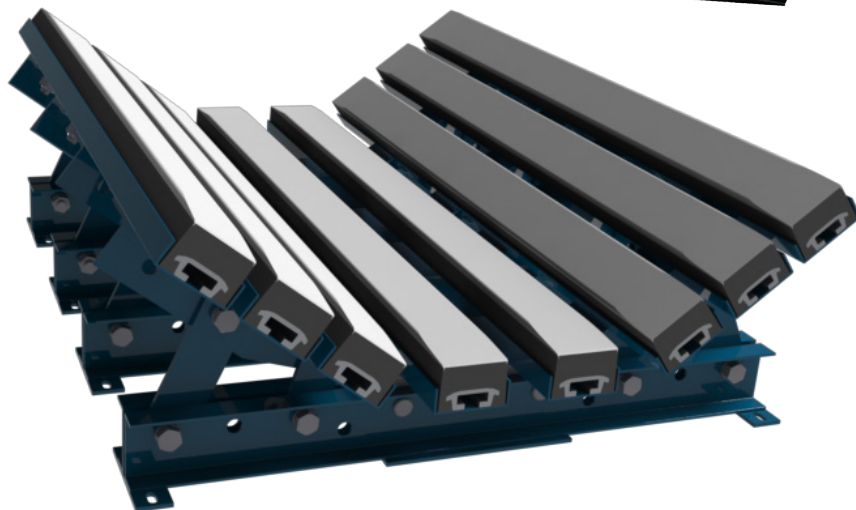
Simple Slide Idler



Drop & Slide Idler



Tracker



Impact Bed

Material Flow

Clean Sweep AC

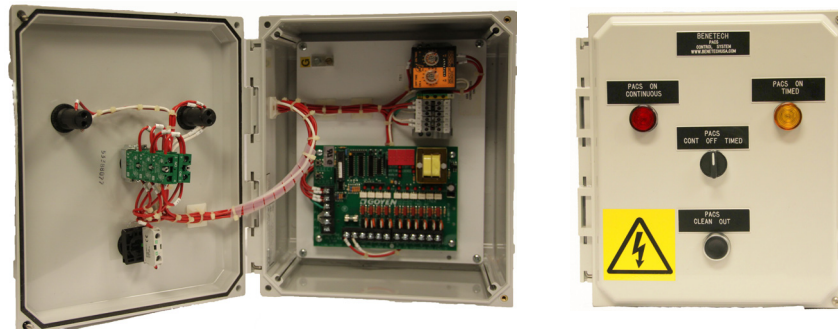
Distinctly designed for bulk materials, the radial Clean Sweep AC automatic cleaning system uses standard plant compressed air at 80–100 PSIG to prevent pluggage and eliminate build-up in transfer chutes, bins, hoppers, silos, and bunkers.

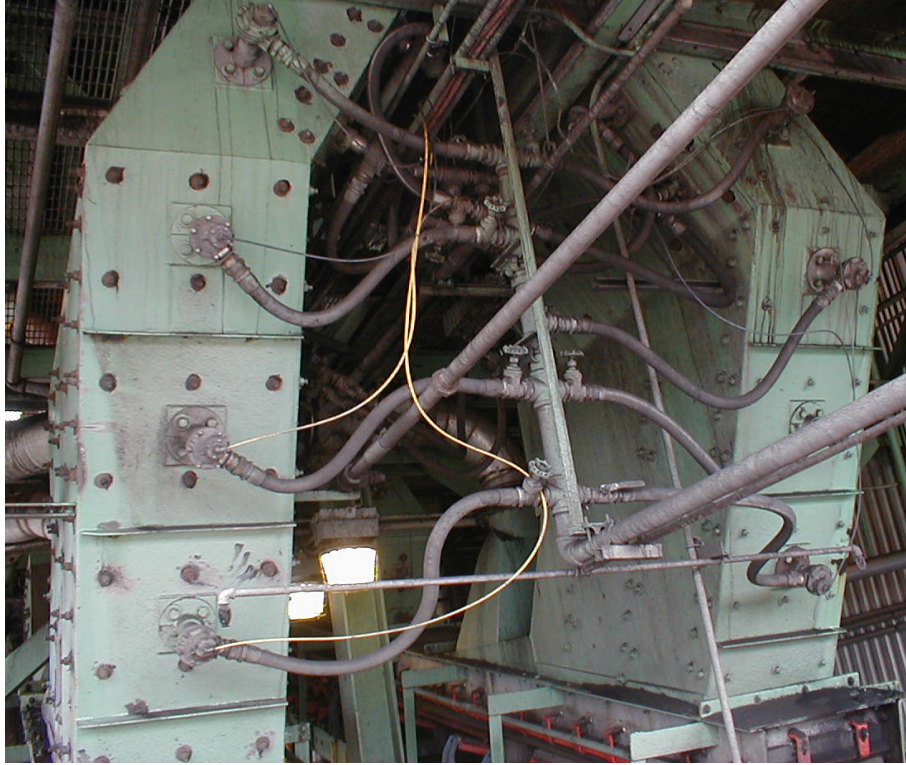
Easy to install and maintain, Clean Sweep AC is your trouble-free answer to ensuring uninterrupted material flow, especially for wet and sticky substances such as sand and cement. Clean Sweep AC is the only radial, pneumatic cleaning system created for bulk material handling and designed not to damage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





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

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.

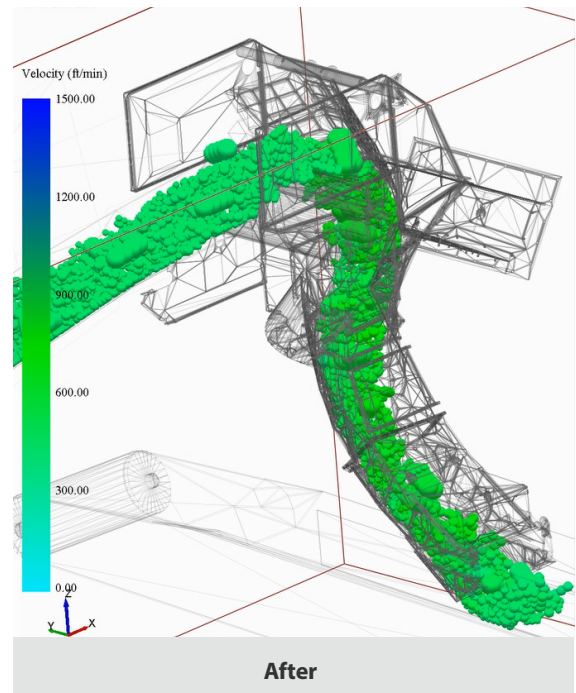
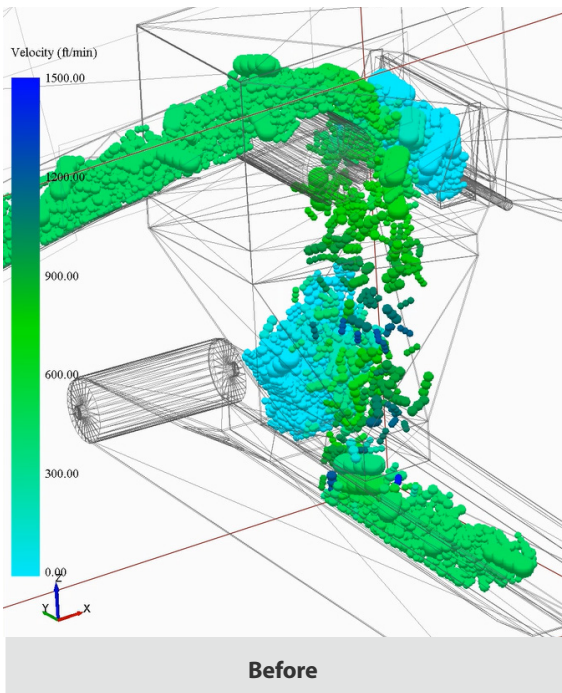
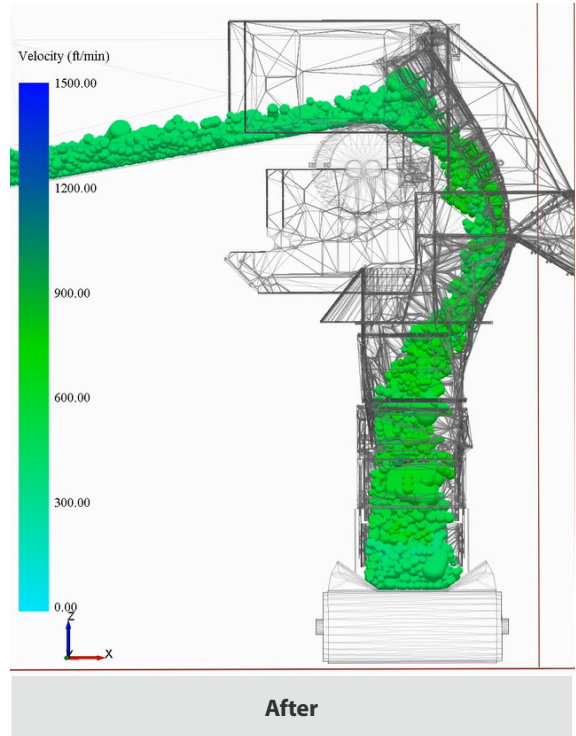
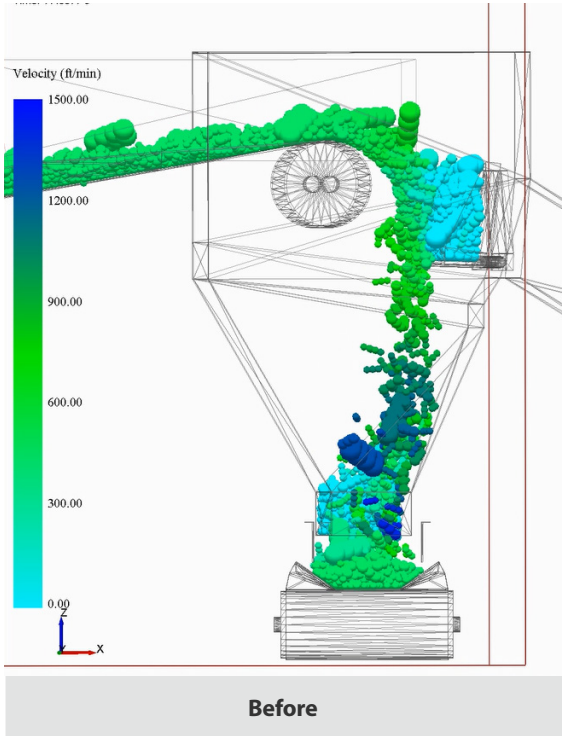
DEM chute designs are performed in-house by Benetech's highly trained and experienced chute engineers. All computer modeling also includes the latest multi-phase material flow and airflow engineering analysis based on Conveyor Equipment Manufacturers Association (CEMA) criteria. This enables precisely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



Before



After



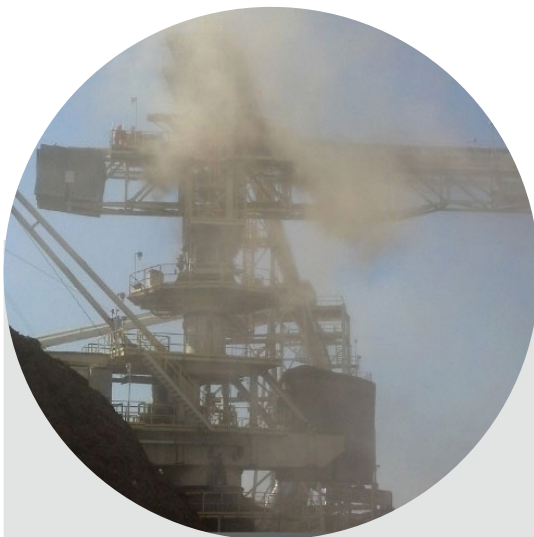
Project Profile

Biomass Facility: Dust Suppression System Upgrade

This 44 MW Biomass Power Station in California, USA, was experiencing excessive fugitive dusting during off-loading of biomass fuel trucks to the boom stackout conveyor. The plant used water sprays at five locations in the conveying process to try to control dusting, with unacceptable results. As the plant is committed to safety and focused on ensuring environmental compliance, they needed a solution to address this unacceptable condition. Under these extremely dusty conditions, they were adding 10-12% moisture (by weight) to try to control the dust.

Existing Problems

- Unacceptable fugitive dust emissions
- Excessive water usage
- Ineffective dust control
- Increased moisture reduces heat rate for power generation
- Degradation/fouling of material during storage
- Belt tracking issues due to wet conveyor belts
- Excessive carryback and build-up in the conveying system
- High maintenance with clogged nozzles in difficult to reach areas



Before

Operation with existing water sprays showing excessive dust generation.



After

Operation with Benetech's BT-205W Suppression System

The Benetech Solution

The new Benetech Engineered Dust Suppression System improved and simplified application to one location at grade, providing ease of maintenance. This new system lowered the moisture addition to less than 2% by weight by incorporating a Benetech Dust Suppression agent. The system utilized Benetech's BT-205W, blended at a high dilution ratio with low BT-205W usage rates. This high-quality surfactant blend works by providing a means of rapid wetting of hard to control dust particles, then agglomerating the dust to the larger particles and keeping it from getting airborne in the first place. The solution was applied at the truck dump feeders and maintained its residual effects to control dust through the conveying process and to stackout on the pile. The system lowered water usage, improved application, and lowered maintenance of the spray system and cleanup in the conveying system. From the time it was installed, it continues to provide a drastic reduction in dust emissions. As noted by personnel at the site, the difference was "night and day!"

Successful Results

- Dust levels reduced by over 90%
- Eliminated need for existing hard to maintain spray system
- Reduced moisture addition to less than 2%
- Improved access for maintenance
- Reduced moisture addition improved heat rate
- Reduced maintenance issues with build-up



Before



After

Project Profile

Biomass Facility: Bark and Chip Conveyor Load Zone Upgrades

This southeast United States biomass plant had severe spillage and dusting issues with their Primary Bark and Primary Chip conveyors. Efficiency of their operation was greatly affected as maintenance and housekeeping surrounding the conveyors had gotten excessive. In addition, concern for a safe and compliant workplace was top of mind. Benetech partnered with the plant to assess the current situation and came up with an economical solution that provided ease of maintenance, improved the material flow and greatly reduced their fugitive dust and spillage problems at the transfer points.

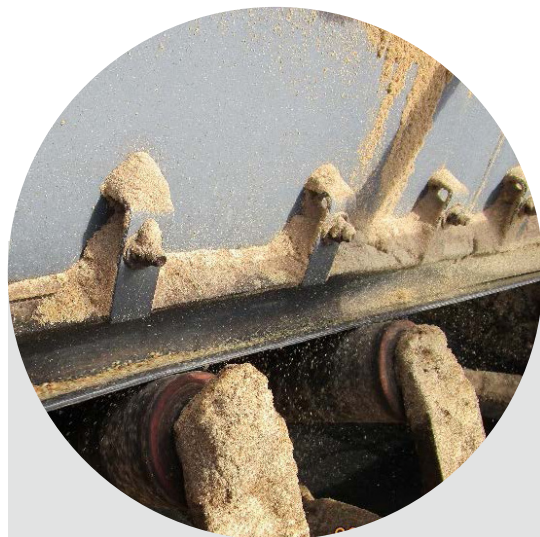
Existing Problems

The two Primary Bark and two Chip conveyors were located side by side with pant leg chutes loading material from the truck dump onto one belt and the residual material onto the other belt. The systems for the four chutes were not tied together causing spillage and dusting between the chutes. In addition, the skirtboards did not have internal wearliners and were uneven.



Before

Gap and height difference between residual and truck dump skirtboxes.



Before

Dust and spillage was a serious problem.

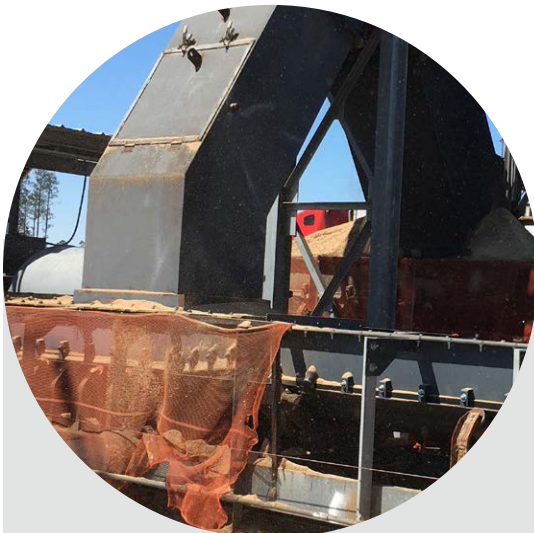
The Benetech Solution

Benetech provided turnkey service starting with the demolition of the existing conveyor systems. All installation was completed within the one week outage allotted for the project. New Primary Bark and Chip conveyor belts were engineered and installed with the MaxZone Modular Skirtboard and Belt Support System, which includes:

- MaxZone XN® Externally Adjusted / Internal Rubber Wearliner
- High performance dual seal B+ Apron Seals with polyurethane insert
- Quick Release Clamp Sealing System
- Peaked Hood Stilling Chambers to slow material and passively handle dust
- Simple Slide-Out Idlers for exceptional belt support and easy maintenance
- Dust-tight Inspection Doors for inspection of internal skirtboard

Successful Results

- Increased Safety of Workplace
- Reduction of Plant Mitigation Labor
- Reduction in Airborne Dust
- Reduction of Plant Maintenance Expenditures
- Increase in Belt Life



Before

Netting is used to try to contain dust and spillage.



After

MaxZone Modular Skirtboard and Belt Support System installed. Dust and spillage contained.

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