

January/February 2020

# BIOMASS

M A G A Z I N E

## MOVING MOUNTAINS

First U.S. Commercial-Scale  
Torrefaction Plant  
Under Construction

PAGE 16

**PLUS:**

New Pellet  
Capacity Trends  
in Canada

PAGE 32

**AND:**

Developer Drives  
California Biogas  
Gold Rush

PAGE 24



#### ON THE COVER:

Construction of Restoration Fuels, a commercial-scale torrefaction facility in John Day, Oregon, is well-underway. The plant is colocated at Malheur Lumber Co.

PHOTO: RESTORATION FUELS

## 07 EDITOR'S NOTE

### The Wide Umbrella of Bioenergy

By Anna Simet

## 62 MARKETPLACE

## COLUMNS

### 08 The RFS: Where Things Stand

By Bob Cleaves

### 09 Carbon Capture Technologies: Biomass Industry's Unique Opportunity

By Jessie Stolark

### 10 The Science is Clear on Renewable Wood Energy

By Brian Rogers

## 12 BUSINESS BRIEFS

## FEATURES

### 16 PROJECT DEVELOPMENT

#### Shouldering Risk for Forest Restoration

After nearly a decade of R&D, testing, collaboration and strategy, Restoration Fuels is under construction.

By Anna Simet

### 24 PROFILE

#### Gold Rush

Offering comprehensive service packages and choices for farmers, Maas Energy Works is a leader in California dairy digester development.

By Ron Kotrba

### 32 MARKETS

#### Northern Ambition

With intentions to increase its market share in Europe and Asia's growing demand for wood pellets, the Canadian industry continues to expand.

By Matt Merritt

## CONTRIBUTIONS

### 40 DESIGN & ENGINEERING

#### The Dos and Don'ts of Boiler Design

There are many factors to consider and key steps to take when designing a commercial or institutional biomass heating project.

By Bede Welford

### 44 FEEDSTOCK

#### Siting a New Bioenergy Facility: Pitfalls and Preconditions

Siting a new project in an optimal wood basin is critical to ensuring that a sustainable, affordable wood supply is available throughout the plant's operating life.

By Stan Parton

### 48 SUPPLY CHAIN

#### The Growing Importance of PKS in the Japanese Biomass Market

The supply and availability of palm kernel shells, a major feedstock in Japan's growing biomass energy market, are determined by a range of issues.

By Rachael Levinson

### 50 MAINTENANCE & REPAIR

#### Biomass Refractories: One Size Does Not Fit All

Performing a process audit and understanding key wear mechanisms can drastically maximize refractory lining performance.

By Jim Caprio and Brent Buchuski

### 52 TECHNOLOGY

#### The Evolution of High-Velocity Thermal Spray

Initially used in specialized shop applications, high-velocity thermal spray is commonly used in the energy sector for critical equipment protection.

By Marina Silva

### 54 DESIGN & ENGINEERING

#### Reducing Conveyor Maintenance Time Through Better Access

Improved conveyor access can significantly reduce maintenance time and prevent injuries.

By Rick Felde

### 56 SPONSORED

#### January/February Sponsor Spotlight

Featured in *Biomass Magazine's* Sponsor Spotlight are Continental Blower, TerraSource Global and E=MC<sup>3</sup>.

By Anna Simet

*Biomass Magazine*: (USPS No. 5336) January/February 2020, Vol. 14, Issue 1.  
*Biomass Magazine* is published bi-monthly by BBI International. Principal Office: 308 Second Ave. N., Suite 304, Grand Forks, ND 58203. Periodicals Postage Paid at Grand Forks, North Dakota and additional mailing offices. POSTMASTER: Send address changes to *Biomass Magazine*/Subscriptions, 308 Second Ave. N., Suite 304, Grand Forks, North Dakota 58203.



Inspection doors and track-mounted components facilitate maintenance for extended equipment life.  
PHOTO: MARTIN ENGINEERING

# REDUCE CONVEYOR MAINTENANCE TIME THROUGH BETTER ACCESS

Improved conveyor access can significantly reduce maintenance time and prevent injuries.

BY JERAD HEITZLER

Virtually every vehicle on the road today is designed with a hood that can be easily opened for access to the engine so mechanics can perform routine service, or diagnose and address problems that arise during its lifespan. Conveyor systems should be designed in the same way, with convenient points along the length of the belt to allow technicians to inspect its condition, perform service as needed and help prevent

catastrophic failure. Unfortunately, this type of access is often overlooked when conveyor systems are being engineered—that is, until a pressing need arises, which increases the difficulty of ongoing inspections that could have allowed technicians to observe and service critical components before a crisis develops. As a result, costs go up and productivity goes down.

Conveyor manufacturers have responded to the need for increased accessibility by de-

veloping components and accessories specially designed to reduce labor time, while improving safety during service. Innovative equipment designs such as slide-out cradle frames, belt cleaner assemblies, idler assemblies, and sealed heavy-duty inspection doors offer better access for safer and more efficient maintenance, resulting in fewer injuries, reduced labor time and a lower total cost of operation.

---

**CONTRIBUTION:** The claims and statements made in this article belong exclusively to the author(s) and do not necessarily reflect the views of *Biomass Magazine* or its advertisers. All questions pertaining to this article should be directed to the author(s).

“This is a cascading issue,” says Daniel Marshall, product engineer at Martin Engineering. “Insufficient access leads to poor maintenance practices, resulting in emergency outages and diminishing the operation’s productivity and safety. From an ownership and management perspective, downtime and injuries affect profitability through loss of production, capital expenditures for new equipment and ongoing insurance implications.”

In the past, managers often decided against the expense of adding safer and easier access points to a conveyor system beyond what is required by code. However, over the conveyor’s lifetime, safety professionals estimate that poor access adds as much as 65 percent to maintenance and cleaning costs.

When designing proper access into a bulk materials handling system, there are three easily achieved goals:

- **Easy to see.** If equipment cannot be seen, neither can the problems.
- **Easy to reach.** Equipment maintenance is likely to be postponed if it is awkward or dangerous to access.
- **Easy to replace.** Broken equipment is likely to remain that way if it is complicated and time-consuming to service.

## Loading Zone Innovations

“Many conveyor transfer points still have an antiquated roller system tasked with absorbing impact and centering the cargo,” Marshall continues. “These components often break and seize, causing friction and a potential fire hazard. To replace them, several workers must remove the skirtboard and break the plane of the conveyor to reach across the stringer with heavy tools to assess and repair equipment.”

To reduce maintenance time and labor, improve safety and extend equipment life, operators should consider track-mounted impact cradles and belt support cradles. Located under the skirtboard and mounted with rugged steel assemblies, the cradles feature large, impact-absorbing, ultra-high-molecular-weight polymer “box bars” engineered with smooth surfaces that the belt can slide across with little friction or belt wear. These assemblies can be pulled out by a single worker, safely from outside the conveyor. Using only a single tool, the box bars can be simply removed and flipped in a matter of minutes to double the service life. Along the cargo path in the settling zone and beyond, retractable idlers support the belt

and maintain the trough angle. Exposed to the punishing environment, gritty dust and extreme weather, rollers can seize over time. Often set closely together in the loading zone to avoid belt sag, slide-out/slide-in roller frames permit workers to perform idler service outside of the belt plane without the need to raise the belt or remove adjacent idlers.

## Discharge Zone Maintenance

“Wear parts such as belt cleaner blades need to be monitored, serviced or changed regularly to prevent carryback from causing dust and spillage along the belt path,” Marshall says. “However, blade adjustments and changes can require several hours of downtime.”

Primary cleaners, located on the underside of the head pulley, are mounted on rotating assemblies designed to retain the proper tension between the blade and the belt. Secondary cleaners are located behind the head pulley and raised slightly above the belt line for tension. Specially designed units can slide in and out by simply pulling a lever and releasing a pin. This allows blade maintenance to be performed outside of the system by a single worker in under an hour.

## Inspection Doors

A tight seal is the key to preventing fugitive dust from leaving any chute. Current setups often require workers to crouch or crawl under the system, or even enter a confined space to inspect it or perform maintenance, which can result in serious injuries. Inspection of the system needs to be fast, easy and safe. Small inspection doors, either solid or grated, can allow several observation points. Larger doors can offer access points with ample space for service of specific wear parts.

## Case Study

A coal plant in eastern China had belt damage, spillage and dust issues at two conveyor transfer points with outdated equipment in the loading zones. Raw coal ore was loaded onto the 40-inch-wide belts traveling 500 feet per minute. The first chute had a 16.5-foot-high drop chute that loaded into a 40-foot-long loading zone. The second chute had a similar drop, discharging into an 85-foot-long loading zone.

Suffering from an old design, the belts were supported by impact idlers and a troughed roller system, neither of which were equipped

to cope with new production demands. Equipment failures happened regularly, and without proper accessibility for routine maintenance, long periods of downtime were common. Belt sag created gaps between the belt and rollers, causing fugitive dust emissions throughout the facility. Inadequate impact control led to spillage becoming entrapped between the belt and tail pulley, damaging them both. Excessive downtime, costs for cleanup and equipment replacement seriously impacted profitability. Managers sought a solution that better protected the belt, sealed the chute from dust and spillage, and offered easier inspection and ongoing maintenance.

Technicians from Martin Engineering China were invited to perform an on-site assessment and suggest an affordable solution. After offering a detailed proposal, the team installed modern equipment that addressed the issues on both conveyors. The first chute was equipped with a track-mounted impact cradle to improve loading and protect the belt and tail pulley. In addition, slider cradles for smoother centering were installed, along with a full-length apron seal to prevent dust and spillage from escaping. A comparable solution was installed in the longer chute, with added cradle support down the entire length. Both chutes featured nonpowered dust bag systems to collect emissions.

Since installation, spillage around the loading zones is under control. Dust emissions have been drastically reduced. Operators report that a considerable drop in equipment failure rates has resulted in a substantial increase in productivity. Contributing to the success was workers’ ability to easily inspect and service components by sliding them out and servicing them outside of the conveyor.

“Access is a common element for both safety and productivity across all industries,” concludes Marshall. “By adding easy access and monitoring in the design phase, equipment can be better maintained using less labor, leading to reduced downtime. This is reflected in the cost of operation, offering a better overall return on investment.”

**Author:** Jerad Heitzler  
Foundations Training Manager, Martin Engineering  
www.martin-eng.com  
309-852-2384