

APPLICATION REVIEW

Biomass Power Generation

Power Plant Improves Reliability and Uptime with Improved Feedstock Conveying

The Challenge – Inefficient Feedstock Handling

A small power producer had a contract to supply a nearby malting facility with its electricity and heating needs. The plant produced approximately 20 Megawatts of power. Any excess was sold to the area utility grid. The power producer struggled to fulfill its obligations at times due to unexpected downtime of conveyors and poor material distribution.

The material flow issues began at the truck receiving system to the storage facility. The power producer received a mixture of woodchips, hulls, and hog fuel by truck which was unloaded into a pit hopper either by truck dumper or live bottom trailer. The conveyor under the hopper was expected to meter the material, elevate material out of the pit, and transfer it to a bucket elevator; however due to shortcomings with the original layout and plant design the result was a pit, hopper and conveyor which was less than desirable. The inaccurate layout created an instantaneous load on the conveyor which caused excessive stress on the drive, chain and housing of the conveyor. In addition, the short horizontal section and a steep +60° incline made the loads on the chain flights excessive. This created premature wear, damage and unexpected downtime.

Project Summary

PROBLEM

- Original material handling system design was inefficient created unexpected downtime, and added negatively to production costs

CHALLENGE

- Redesign a material handling system for boiler biomass that enhanced feedstock flow and had a long service life

BUSINESS RESULTS

- Simplified material handling system and optimized material flow
 - Reduced maintenance & unplanned downtime
 - Maintained capital project budget & timeline



The redesigned L Path En-Masse Conveyor System effectively handled feedstock from truck unload to the storage silos.



L Path Conveyor design minimized chain pull and maximized conveyor life.

The inefficient, unloading process added labor costs, maintenance cost, and production costs while creating unexpected downtime and reduced output.

The Right Conveyor Layout – The Critical Factor in Effective Material Handling

The power producer needed a better way to move feedstock from unload and storage to the boiler. The goals of a redesigned material handling system were a reduction of equipment, streamlined material flow, built in redundancy, and improved safety and reliability. CDM, a leader in the design and manufacturer of drag chain conveyors, was contracted to supply two En-Masse Drag Chain conveyors with a capacity of 60,000 lbs/hr per conveyor. The two conveyors allowed the facility to have built in redundancy and insure a continuous supply of fuel to the boilers.

The new conveyors would be designed in an L-Path configuration. This design allowed for a short horizontal section, +/- 20 ft., and relatively long incline section, +/- 120 ft., @ roughly a 40° incline to provide 80' of lift. This enhanced layout and design along with proper selection

of a chain and flight assembly would allow the power producer to effectively unload and evenly distribute the feedstock. The exclusive dropped forged-case hardened chain resists wear and provides a long service life, even in harsh service environments.

The power producer had a tight capital budget, and short window to get the conveyors installed; the malting company was running six days/week and could not afford a loss of power or a blackout. CDM worked with the power producer to reuse some of the existing conveyor components that still met safety and performance specifications. CDM also instructed the power producer's maintenance crew on how to properly install and maintain the conveyors. These ancillary project management offerings by CDM, not only saved the power producer on up-front capital costs but also saved long-term maintenance and provided optimum conveyor performance.

The CDM En-Masse Drag Chain Conveyors have been operating for years without downtime. The fuel handling system redesign enabled the power producer to reduce unloading time of the trucks and minimize maintenance and downtime. This facility has improved safety, reliability, and feedstock flow, while removing countless pieces of equipment from operation.



The En-Masse Drag Chain Conveyor receives biomass material directly from the in-feed hopper. The sealed drag chain carries material up to the storage silo.

ABOUT CDM SYSTEMS

For more than 40 years, CDM Systems has provided the best in En-Masse conveyors and conveying systems that set the industry benchmark for quality, dependability, and operational efficiency. We use our material handling experience and industry knowledge to solve the most difficult bulk transportation challenges. Our conveying systems are specifically designed for reliable 24/7 operation in aggressive and high-temperature applications. Whether unloading trucks, railcars, or vessels, or moving commodities within a process facility, we provide the technical support and the right equipment designed specifically for your needs.



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