



Whitepaper

How to achieve a clean Conveyor Path: Innovative Belt Cleaning Technology eliminates Carryback at Cement Plant

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After installing an innovative primary cleaner designed for punishing applications a Detroit cement producer could stop excessive carryback and equipment fouling. With a significant reduction in carryback, spillage, and labor for cleanup, the plant was able to improve workplace safety, lower the cost of operation and see a quick return on investment.

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The St Marys Detroit plant is prominent on the skyline as commuters drive across the Rouge River. (Pictures: © Martin Engineering)

The St Marys Cement plant – located along the Rouge River in Detroit (MI) – produces 200 to 250 tons per hour (180 to 225 metric t/h) of Portland cement. For that reason, roughly 30 000 tons (27 200 metric tons) of raw material and clinker arrives weekly by truck and ship. The aggregate is offloaded to an outdoor storage area, where the material tends to get saturated when the Michigan weather turns wet and cold. This causes large amounts of mud and sludge.



Limestone and other raw material taken from trucks and barges is stored in outdoor piles.

Front-end loaders transfer the fine grained, dust containing 1.5 to 2 inch (38 to 50 mm) minus limestone and gypsum aggregate onto the 30 inch (750 mm) wide No. 14 belt. Inclined approximately 20 degrees at the point of loading, the belt conveys cargo for 20 feet (6 m) up to ground level, moves horizontally for 200 feet (60 m), then begins another long 30-degree incline into the top of a 50-foot-

tall transfer tower. In the conveyor discharge zone, with only enough room to fit one primary cleaning blade, material is offloaded into a chute. Operators found that polyurethane cleaner blades were unable to completely clean the belt. "The fines and mud take on the tacky consistency of toothpaste, causing it to cling to the belt along with smaller pieces of aggregate and shale," said David Accomando, Plant Maintenance Supervisor for St Marys Detroit. "This led to a lot of carryback spilled along the return path, where it fouled idlers and built up so high under the loading zone that it would encapsulate the tail pulley."



The previous blade heaped up and encrusted material, degrading cleaning performance.

Maintenance technicians periodically had to stop other essential duties and shut down the system to replace frozen return idlers and prevent further damage. After digging out the tail pulley, workers needed to clean the face, which often had abrasive buildup that could reduce the belt life. The cleaner required regular

tensioning and periodically needed to be removed, re-cut and shaped. In addition, 2 to 3 workers spent up to 8 hours twice per month to clean the loading zone and the belt path using shovels and a vacuum truck.

Cleanscrape Installation

After a site inspection [Martin Engineering](#) technicians concluded that the #14 conveyor was an excellent candidate for their Cleanscrape primary cleaner. This cleaner system requires considerably less space than other primary cleaners, can be effective enough to eliminate the need for a secondary blade, and is proven to deliver as much as four times the lifespan of competing urethane blades.



Mounted diagonally, commonly at a 17° angle, the Cleanscrape spans the entire belt profile.

The flexible cleaner is installed diagonally across the discharge pulley, forming a three-dimensional curve beneath the discharge area that conforms to the pulley's

shape. The unique design incorporates a matrix of tungsten carbide teeth and is tensioned lightly against the belt to prevent damage to the belt or splices. Despite extremely low contact pressure, it has been shown to remove as much as 95% of potential carryback material. Designed for belt speeds up to 780 fpm (4 m/s) for mechanically spliced belts, pulley diameters up to 50 inches (1270 mm), and belt widths up to 96 inches (2438 mm), the Cleanscape is engineered to perform under the punishing conditions of cement applications and other bulk handling industries. Its patented design requires very little maintenance. The tensioners are tightened during initial installation, and typically no further adjustment is required over the life of the blade.

Results

As cargo with a moisture level between 10 and 15 percent was loaded onto the belt, dust and fines built up into a thick paste as usual, but ended up being fully removed from the belt. “For this application, we were very surprised by how well it worked,” Accomando said. “The return side of the belt might have a little bit of wet material still on it, but nothing even remotely close to what it used to be.” After a full year of punishing 24/7 operation with little downtime through conditions that included cold slush and mud, as well as hot and dry dusty material, the original CleanScape cleaner continues to perform consistently well, without a single adjustment. The cleaning schedule has been altered from a 2 to 3 person crew over a full shift twice per month, to just a single worker hosing down critical areas for an hour or so, once per month. “We haven’t touched the blade or tensioner once since they were installed a year ago,” Accomando pointed out. Then he adds: “In addition to their equipment being top notch, Martin’s service is what stands out most to me. They follow up regularly to make sure that we’re happy with the product – and we are, absolutely!”

About the Authors

Jeremy Cairns Technical Writer for Martin Engineering