New Installation

Tubular drag cable conveyors are top dog for conveying dry pet foods

A pet food manufacturer installs tubular drag cable conveyors in a new processing line to increase production and reduce operating costs.

C&D Foods, Driffield, East Yorkshire, UK, produces standard and specialty dry foods for cats and dogs as well as other animals. At the beginning of 2010, the company designed a new processing line to increase the dog and cat food production. However, since the company wanted to keep operating and maintenance costs low, it didn't want to install screw conveyors or bucket elevators like those being used in its other processing lines to transfer products between process steps. To find a cost-effective, clean, and gentle conveying solution for the new line, the company worked with a local manufacturers' representative for a US-based equipment supplier.

The stainless steel tubular drag cable conveyor provides dust-free conveying from the mixer up to the cooler inlet.

Considering different conveying options

The company's new processing line dries, mixes, and cools the pet foods at up to 6 tonnes per hour, more than 2.5 tonnes per hour than the other lines. When the company was searching for equipment for the line, it easily found a dryer, mixer, and cooler, but had difficulty finding a way to transfer the product between equipment at the required rate without using screw conveyors or bucket elevators.

"Traditionally, we would have used screw conveyors and bucket elevators to move the products," says Jim Greenley, C&D Foods engineering and environmental manager. "However, to handle the increased production capacity, this equipment would have been fairly large and the motors would have consumed a lot of power and kept operation costs high. Large bucket elevators have a lot of moving parts and swinging buckets that wear, which can cause spillage that can't be recycled back into the system. Plus, screw conveyors and bucket elevators have a lot of maintenance requirements."

Finding a better way to convey

During the project's planning stage,

Since the cable conveyors are enclosed systems with no wearing parts, the company has minimized fugitive dust and virtually eliminated spillage and product loss.

The tubular drag cable conveyor gently moves the pet food from the cooler to the bulk bin at up to 6 tonnes per hour, transferring product without degradation or cross-contamination.

Greenley was contacted by manufacturers' representative Steve Lovell, a sales manager for Flo-Mech Ltd., Orton Goldhay, Cambridgeshire, UK. Lovell proposed that the company use enclosed tubular drag cable conveyors manufactured by Cablevey Conveyors, Oskaloosa, IA USA, to move the products through the new line. The supplier manufactures custom-designed conveying systems for the food processing, agriculture, wood, and other bulk solids industries.

"At first, we said no, because we thought that it was an aeromechanical conveyor, which was something we didn't want to use," says Greenley. "Steve told us that it wasn't. He said that it's a slow-running, dust-free conveyor that can gently convey friable products. He showed us a video of the conveyor operating. We liked what we saw, so we sent the supplier some product and arranged to meet them at their booth at a food expo in Germany for a demonstration."

At the expo, the supplier put about 30 kilograms of dry dog food in a 2-inch-diameter (5-centimeter-diameter) tubular drag cable conveyor and started it up. "For the next day and a half, I watched the conveyor move the dog kibble around, hour after hour," says Greenley. "When the trial run concluded, I saw very little breakage with just a little dust inside the tubes, and the dog kibble was still a good, salable product. This confirmed my interest in the conveyor, and I got quotes for three of them. For our capacity requirement, they specified conveyors with six-inch-diameter (fifteen-centimeter-diameter) tubes because we'd get extra life out of them since they run slower than a smaller-diameter conveyor."

The tubular drag cable conveyor

In spring 2010, Greenley purchased three custom-designed Super 6 HVH-style tubular drag cable conveyors, each with one inlet and one outlet. A local engineering contractor installed the processing line's equipment, and a Flo-Mech engineer oversaw the final installation of the conveyors. In July 2010, the company commissioned and started up the new line. It processed product at the required rate that very same day.

Each conveyor consists of two enclosed tube sections (an infeed and a return tube) with a turnaround section at one end and a 5.4-horsepower (4-kilowatt) drive-and-sprocket assembly at the other. The turnaround section connects the infeed and return tubes at the infeed end and is an automatic tensioning device. The drive-and-sprocket assembly connects the tubes at the discharge end, forming a continuous circuit. The conveyor is constructed of stainless steel, making it suitable for food-grade applications.

A continuous flexible stainless steel cable is installed inside the enclosed tubes, and solid, food-grade, white plastic circular discs are mounted on the cable at regular intervals. The discs are shaped to ease material movement and reduce degradation. Since the discs are nearly the same diameter as the tubes, their narrow clearance with the tube walls ensures that the material stays between them during conveying and minimizes residue on the tube walls. To minimize downtime between product runs, a food-grade wiper disc installed on the cable keeps the tubes clean, and a continuously operating air-knife at the outlet blows air across the discs when they pass to dislodge any material from them.

Each processing line's equipment and tubular drag cable conveyors are connected to the company's central controller, allowing an operator to operate the entire line from one location. In

operation, product is conveyed from an extrusion line to the dryer. The product bottom-discharges from the dryer into the first conveyor and is conveyed to the mixer inlet. After the product bottom-discharges from the mixer to the second conveyor, it's moved to the cooler inlet. The product then bottom-discharges from the cooler to the third conveyor and is transferred to the packaging station and filled into a bulk bin. The conveyors operate at one fixed speed, and each conveyor first moves the product horizontally a short distance, then vertically to the appropriate height, then horizontally another short distance before discharging.

Improving the pet food production process

"The cable conveyors have worked well from day one," says Greenley. "We've seen very little product damage because they gently convey it between the equipment. And because they use smaller drives than screw conveyors and bucket elevators do, they produce much less noise and use a lot less power, which helps keep operating costs low."

Since the cable conveyors are enclosed systems with no wearing parts, the company has minimized fugitive dust and eliminated spillage and product loss. "We've also eliminated cross-contamination because there are no hang-ups inside the tubes," says Greenley. "And the conveyors are virtually self-cleaning. Because we run similar products each time and use the wiper disc and air knife, we only have to run them empty for about twenty minutes to clean them between product runs."

When compared with screw conveyors and bucket elevators, the cable conveyors require very little maintenance. "Maintenance involves periodically checking the discs and cable couplings and inspecting the other components," says Greenley. "Since each conveyor has a self-tensioning device, we don't have to make constant cable tension adjustments. And if a disc gets damaged, we can easily replace just that disc without having to replace the whole cable system."

Greenley concludes, "It was a really good installation, and the supplier and their rep have been good partners to work with. And we're so impressed with the cable conveyors that we're looking at three more of them for a future project."

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