Reduce Production Costs with Tubular Drag

Dhunseri Petrochem & Tea Ltd. (DPTL) is a leading global manufacturer of bottle-grade PET (polyethylene terephthalate) resin. The company's plant is located in the port city of Haldia in West Bengal, India. The facility is a continuous chemical process plant which operates non-stop round the year. It produces 600MT of PET resin per day and 200,000 MT per annum.

Bottle-grade PET is a engineering plastic produced out of purified terephthalic acid, more commonly known as PTA or TPA, and other chemical compounds. In addition to being easily extrusion blow molded to any number of shapes, PET is recyclable, clear, strong and lightweight.

About 60 percent of PET production is used to manufacture synthetic fibers yarn, with bottle-grade PET production accounting for around 30 percent of global demand. The PET produced by DPTL is commonly used for bottle applications that will contain drinking water, carbonated soft drinks and other beverages.

Standard Process Wastes Energy

PET manufacturers around the globe typically employ pneumatic conveyors to transport PTA from storage silos and hoppers to downstream processing vessels. The Haldia plant was no exception. The facility receives PTA in 15-ton bulk truck loads. From the massive hopper at ground level, 25 cubic meters (883 ft^3) of PTA powder is conveyed each hour to a staging silo 35 meters (115 ft) above.

“Our original process relied upon pneumatic conveyors to move PTA powder,” noted Subrata Mazumdar, Senior General Manager of Engineering for DPTL. “The pneumatic conveying system — mainly nitrogen compressors) consumed an enormous amount of energy and nitrogen.”

Alternative Conveying Method Sought

With the cost of energy and nitrogen contributing to higher cost of production, an alternative conveying method was sought.

“After much research we realized tubular drag conveying would be the most efficient and effective means for conveying PTA powder,” said Mazumdar. “We chose Hapman because they provided a better design and robust construction of drag conveyor.”

 The tubular drag conveyor consists of a stationary outer casing through which a chain is pulled by a sprocket drive. Flights are attached to the chain at regular intervals. As this endless chain and flight assembly moves through the casing, bulk material is pulled from the in feed point(s) to the discharge port(s).

“While similar in some ways to cable and aero-mechanical style conveyors, tubular drag technology is superior to these systems since it utilizes a heavy-duty chain to move material at a low velocity,” says Naresh Gandhi, Managing Director of Hapman, India. “The result is a conveying method that is rugged, yet gentle for the widest array of materials with virtually no maintenance, is quiet and consumes little power.”

Gandhi also noted the slow-moving, positive displacement action of the chain

assembly is ideal for handling friable and/or blended materials without separation or degradation. Because the fully-enclosed system does not introduce air, a constant supply of nitrogen is not required for explosion suppression. The system does employ a purging system, which requires little nitrogen.

In 2009, a Hapman tubular drag conveyor was installed at the Haldia facility. The conveyor's 200-mm (8 in) casing is constructed of stainless steel and employs three inlets and one outlet, as well as a discharge vibrator to ensure 100 percent discharge of the powder. A low-horsepower (25-HP) motor moves a stainless steel chain with polyethylene flights throughout the conveyor's 99-meter (325-ftoo) circuit to a final discharge height of 35 meters (115 ft) at a 79-degree incline.

"We've achieved our goal of reducing energy and nitrogen consumption when conveying PTA by replacing the 320kwh pneumatic conveyor with a 25-horsepower tubular drag conveyor," noted Mazumdar. "We are satisfied with this system."

For more information, please visit www.hapman.com *[1].*

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[1] http://www.hapman.com/