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BETTER BEET PILERS BOOST PRODUCTION, CUT COSTS

Drive standardization helps American Crystal Sugar Company

FARGO, N.D.—Standardizing three models of gear reducer drives for its fleet of sugar-beet pilers helped American Crystal Sugar Company improve reliability, reduce downtime and lower maintenance and repair costs. Using some of the same drives in its processing plants has extended these benefits.

In the process of harvesting, sugarbeets are placed for temporary storage in large piles by machines known as “beet pilers.” These machines consist of a receiving hopper, a belt conveyor, a screen to remove soil and other

debris and a large boom that deposits the beets in the piles.

American Crystal is a world-class agricultural cooperative specializing in the production of sugar and related agriproducts. American Crystal is owned by nearly 2,800 shareholders, a cooperative that raises about a third of the nation’s sugarbeet acreage in the Red River Valley of Minnesota and North Dakota.

As the largest beet sugar producer in the United States, the company utilizes innovative farming practices, low-cost production meth-

(top) The Quadrive shaft-mount drive on the end of this stacker conveyor is belt driven.

(above) Close-up shows drive arrangement with motor coupled to the Planetgear reducer.



ods, and sales and marketing leadership to produce and sell about 15 percent of America’s finest quality sugar. The company’s technical services center and corporate headquarters are located in Moorhead, Minn.

American Crystal’s fleet of 106 pilers is

spread for nearly 200 miles along the Red River Valley between Fargo and Grand Forks, N.D., and in Minnesota. They load truckloads of sugarbeets brought to the sites by farmers onto piles of beets that reach up to 32 feet high, holding an average of 70,000 tons each.

Previously, the company purchased the pilers from two different suppliers. Over the years, the manufacturers made frequent changes in the drives used to power piler functions, such as conveyors and track drives.

"You didn't know from year to year what gearboxes you were going to get, and that made it really tough to stock parts for maintenance," said Dave Leach, a buyer for American Crystal Sugar.

In addition, some of the gear drives had become obsolete, making parts difficult or impossible to obtain. To address the issue, the company contracted with a supplier that would build the machines to its specifications.

Benefits of Standardizing

A major focus for the new supplier was the standardization of the drive components to reduce repair parts inventory and simplify maintenance procedures. Improved reliability also was a key factor.

"As a co-op, we have to look at the downtime costs and what it's costing the farmers if they aren't able to deliver because of piler issues," Leach said.

The main conveyors that elevate the beets and distribute them to the piles are equipped with Rexnord Planetgear drives. These drives are designed around self-aligning planet carriers that float radially and axially to provide perfect alignment of the drive train. Rex tapered roller bearings on both input and output shafts provide high overhung and thrust-load capacity. Hardened, wear-resistant gearing handles heavy-duty applications and shock loads. A self-aligning gear train ensures equal load distribution, and components are spline-connected to isolate the gear train from external forces. Taconite duty-rated seals are standard. Two seals on each shaft provide a grease-purgeable cavity to keep dirt and moisture out. The drive incorporates an internal backstop, which is ideal for incline conveyor applications.

The planetary drives are easy to maintain and repair when necessary. Planetgear drives use standard sub-assemblies that allow fast gear ratio changes in the field, and no bearing adjustments are required. No special tools are required for changing wear items, and no shimming is required to set bearing clearances. Leach recalls attending a seminar where customers could participate in disassembling a typical unit.

"We found out how easy it was," he said.



"With even a small amount of mechanical ability you can service them easily." In addition, alignment is not a critical factor with the planetary design as with many other types of drives.

The two conveyors onto which the arriving trucks dump the beets are powered by Rexnord Quadrive shaft-mount reducers. Their helical gearing design features high hardness, surface-finished teeth with a wider face for maximum load carrying capacity. Rex tapered roller bearings on both input and output shafts provide large overhung and thrust load capacities.

In addition, severe-duty, grease-purged Viton seals handle high temperatures, and prevent leakage, ultimately preventing gearbox failure. Their patented torque-assist taper bushing eliminates binding found with twin-taper and single-flanged bushings and comes with a lifetime removal guarantee. The inboard bushing location minimizes sheave overhang, saving high-speed bearings.

Ultramite drives are used to drive the tracks that move the pilers. Based on its performance Ultramite drives are also used to drive the stacker boom swing and stacker boom hoist. They feature an integral high-speed pinion that is fully supported by bearings within the gearbox, not by motor bearings. Dual lip seals prevent contamination. Because they are designed to accept standard NEMA C-face motors, they are easy to remove and replace.

Leach said they were chosen for their high

The Venus series Planetgear drive is shown on the center feeder.

ratio, which provides the low output speed needed without added reduction. Previous drives used in this application proved unreliable. One failed in the middle of a busy season, and parts and service were difficult to obtain.

American Crystal buys the drives through Malloy Electric, a leading supplier of parts and services to the electrical and power transmission industries. Leach, who previously managed production for one of the companies that manufactured the piling equipment, said the personal knowledge and service provided by Doug Weispfenning, of Malloy's Fargo facility, has played a major role in the success of the standardization effort. It was his recommendation that led to the adoption of the three-drive platforms, Leach said.

In its five North Dakota and Minnesota processing plants, American Crystal uses many of the same Rexnord and Falk drives, particularly the Planetgear units, which are installed on a wide variety of belt conveyors, mixers, fans and pumps.

Leach said improved reliability probably is the biggest benefit of the drive changeover. With a single responsibility for the drives, service and response have been excellent, an important factor in a highly concentrated seasonal business. ■