Boedeker Plastics, Inc. Case History

Boedeker Plastics, Inc. Helps Maintenance Staff at Bean Processing Facility Greatly Improve Wear Life of a Conveyor Bearing, Resulting in Less Downtime and Reduced Maintenance Costs

Intro

The United States is a major global producer of edible dry beans, with U.S. farmers planting close to 2 million acres of edible dry beans. These beans are processed and packaged by bean processing facilities used by food processors in the U.S. and worldwide to produce a wide range of food products like canned baked beans, soups, refried beans, and many others. The most common dry beans grown in the U.S. include pinto, navy, great northern, red kidney, and black beans.

Bean processing includes various production processes that clean, dry, and package all types of beans. These processes utilize various automated equipment incorporating ovens, conveyors, weighing systems, cleaning systems, and packaging systems. Each processing system relies on a wide range of metals, plastics, and composites for critical structural and bearing and wear components.

These components are subject to conditions that can cause them to fail over time due to corrosion, wear, or other conditions that contribute to failure and the resulting downtime. Plant Engineering, Maintenance and Supply Chain personnel are tasked with keeping each process in working order through preventative maintenance programs to minimize downtime and maximize production.

Challenge: Improve Part Life of Conveyor Shaft Flange Seal Bearing That Was Only Lasting 2 Months

A Bean Processing Facility in North Texas was experiencing failure with a conveyor shaft flange seal bearing in their bean drying process conveyors made from natural Delrin® (Acetal). The Delrin® conveyor flange seal bearings were lasting only two months before failing and creating unplanned maintenance and downtime.

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Solution: A Conveyor Shaft Flange Seal Bearing That Lasts 2 Years

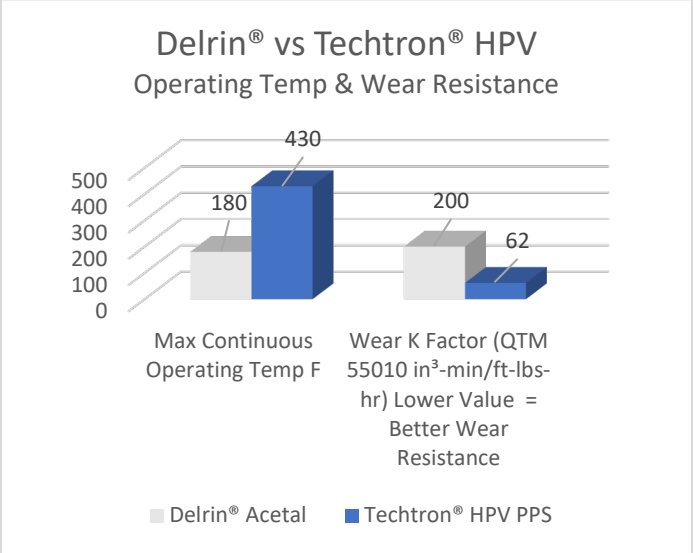
The Maintenance Manager of the Bean Processing Company contacted Boedeker Plastics, Inc. for help with selecting a material that would provide longer life than Delrin®. Bruce Rountree (Technical Services and Application Development) of Boedeker Plastics, Inc. worked with the Maintenance Manager to understand all the parameters involved with the failed part to understand the root cause of the failure.

After investigation, the two primary factors causing the failure were due to temperature and chemical resistance issues**.** The operating temperature of the application was 70F / 21C higher than the maximum recommended temperature for Delrin®. The sanitization process involved a caustic washdown with (sodium hydroxide / caustic soda) that is not recommended for use with Delrin® and was known to attack Delrin® and break down the material chemically. A third vital parameter to consider for the new material selection was the importance of excellent bearing wear properties since the component functions as bearing. After evaluating the three primary parameters, Techtron® HPV PPS was selected as the top candidate to replace Delrin®.

Continuous Maximum Operating Temp – Techtron® HPV offered a maximum operating temp of 430F / 221C vs. 180F / 82C of Delrin®.

Chemical Resistance – Delrin® is not recommended 80-100% at 70 F with sodium hydroxide / caustic soda, Techtron® HPV exhibits no chemical attack 100% at 70 F with sodium hydroxide / caustic soda. The sanitizing process occurred at room temperature; therefore, a higher temp resistance to caustic soda was not required.

Wear Factor – With this application functioning as a bearing, a low wear "k" factor was important. Techtron® HPV offered a "k" factor of 62 vs 200 of Delrin. A lower "K" factor indicates improved bearing wear resistance.



Boedeker Plastics, Inc. ISO Certified Plastics Only CNC Precision Machine shop manufactured machined replacement seal bearings out of Techtron® HPV after reverse-engineering the existing Delrin® parts. The new Techtron® HPV parts lasted 2 years compared to 2 months with the previous Delrin® bearing, a 12X increase in part life. *This significant increase in conveyor flange seal bearing part life contributed significantly to increased uptime, resulting in increased productivity, and reduced operating costs at the Bean Processing Facility.*

Boedeker Plastics, Inc. | 904 West 6th Street, Shiner TX 77984 | www.boedeker.com | 800-444-3485

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