CEMA
CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

Field Inspection of Conveyor Backstops

By: Rich Collins, **Ringspann Corporation**

This white paper is intended to serve as a guideline for field inspection of conveyor backstops. Backstops are safety devices incorporated into conveyor drives to prevent reverse runaway of a conveyor belt when the drive is stopped. There are many different styles and brands of backstops, and one should always follow manufacturer-specific guidelines for best instruction on backstop inspection.

Please note that any amount of conveyor rollback is an indication of a backstop malfunction and must be taken seriously. If possible, the conveyor should be run until the belt is empty before the drive is shut down and taken offline until the problem has been inspected and addressed by a qualified technician.

The following checklist will cover routine backstop inspection points for the most common backstop manufacturers.

First, determine the location and style of the backstop. If the backstop is internal or integrated into the motor or gearbox, then backstop inspection is limited to the observation of elevations from baseline noise, vibration, or localized heating. If the backstop is integrated (bolted onto) the gearbox, then a yearly inspection of bolt torque may be performed. Periodic oil analysis may also be used to identify elevated wear material. Further inspection of internal/integrated backstops cannot be performed in the field.

If the backstop is external, then it is often located on the head pulley shaft of the conveyor or on a double-extended output shaft of the gearbox. Depending on the application, there may be more than one backstop per conveyor.

External Backstop Checklist:

- Temperature – Backstop operating temperature can vary significantly and is influenced by numerous factors. The best method of using operating temperature to monitor backstop health is to establish a baseline (range) of normal operating temperatures and to look for deviations beyond the normal range.

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

- Oil leak - Is there any evidence of oil leaking from the backstop? If so, where is it coming from? Note: Most backstop designs feature purgeable grease chambers that help keep contamination away from oil seals. Seeing grease purge from both faces of the backstop may be normal and suggests that grease maintenance is being performed.

- Oil volume - Verify that the backstop contains the proper amount of oil. Most external backstops feature a visual oil gauge with indicators for static and running oil levels.

- Oil type - Many backstop manufacturers prohibit the use of oils containing extreme pressure (EP) additives. Verify that the proper oil type is being used to lubricate the backstop.

- Breather - Make sure that the breather for the backstop is not buried in dust and that the breather element is clean and dry. If an element is saturated with oil, then: Verify that the breather is located at the uppermost position of the backstop, Check that the backstop is not overfilled with oil, Check that a suitable bend is incorporated into the piping to minimize internal oil splash.

- Axial retention - Most external backstops are designed to have a clearance fit with the shaft for ease of installation. However, it is very important to make sure that a proper method of axial retention is used to prevent the backstop from “walking” on the shaft during operation. Shaft collars, keeper plates, retaining rings, retention keys, and built-in setscrews are common methods of axial retention.

- Key retention - Similar to axial retention, key retention is equally important to make sure that the key does not come out of engagement over time. Shaft collars, retention plates, setscrews, etc. may also be used to secure the key.

- Torque arm - It is important to verify that adequate clearance is maintained between the torque arm and support bracket. Any amount of shaft run-out will translate into larger movements at the end of the torque arm. This movement is not harmful to the backstop, but if this movement is restricted by inadequate clearance or debris caught between the torque arm and support bracket, then this will result in premature backstop bearing wear.

- Torqued Bolts - After the first few weeks of operation and once per year thereafter, bolts connecting backstop cover plates to the outer ring should be re-torqued. The backstop outer ring will expand under load, and repeated radial movements between the outer ring and cover plates may affect the tightness of the bolts over time.

- Oil analysis - Most backstop manufacturers recommend changing the oil after the first few weeks of operation to wash out burnishing materials. After the first oil change, it is recommended that periodic oil analysis is performed on the backstop to establish a baseline and monitor trends of wear particles that exceed the norm.

- Vibration analysis - Condition monitoring technology is improving, but at the writing of this paper, vibration sensors are not well suited for accurate analysis of low-speed backstop applications. If vibration analysis is being used, then the best recommendation would be to establish a baseline for normal operations and look for trends that exceed normal values.

- Repair plan - Backstops are wear items. With proper care and maintenance, backstops can last a long time, but they will eventually wear out. In order to minimize downtime, it is advisable to make sure a plan is in place to address minor and major backstop issues. If there is a minor issue that can wait until the next planned outage, then coordinate with the manufacturer or an authorized service center to schedule time to have the backstop repaired and returned to service during the outage period. If the backstop is part of a critical application that cannot tolerate extended downtimes, then it is recommended that a spare backstop be maintained on-site and in a state of usable storage so that it may be swapped out in a short time. Depending on the condition of the old backstop, it should be immediately repaired or replaced and serve as the spare to the new backstop.

Since nothing happens when backstops work properly, they are easy to overlook. To help avoid unexpected conveyor downtime, regular inspection and maintenance of backstops are strongly recommended. If the end-user does not have the capacity to perform their own regular inspections, then they may wish to coordinate with the conveyor OEM or the backstop manufacturer to have a local field technician work with them to inspect the equipment at regular intervals.

If troubleshooting is required to address existing backstop issues, then it would be best to communicate directly with the backstop manufacturer.