

How Does Corrosion Affect Rollers?

Why corrosion matters

The rollers on your conveyor system are often an afterthought ... viewed as simply a disposable commodity that is easily replaceable. In fact, rollers are integral system components that can positively or negatively impact your productivity. And that means they should be carefully selected and matched to your application for maximum longevity and performance. If you think about it from a numbers perspective, there are more rollers than any other type of component on a conveyor system. Other than the belt, they usually represent the highest maintenance cost item in the system.

So it's no surprise that a failed or seized roller is no small matter. It can cause serious problems for your operation, from costly belt damage to extended system downtime, along with posing serious safety hazards for your crew. One of the main causes of premature roller failure is corrosion.

Causes of corrosion

To better understand the causes of roller corrosion, one must understand the different types of corrosion. External corrosion affecting the outside of the roll can be caused by anything from environment to temperature to application. For example, regions near a saltwater coast or applications that feature salt or chemicals can have an effect on the rollers. Corrosion accelerates the process of abrasion, changing the properties of the surface and stripping away layers of roller material.



Corrosion had a "polishing effect" on this steel roller, weakening the surface so drastically that material wore away at a rapid rate, leaving a shiny surface.

Internal corrosion is usually caused by moisture and fines making their way inside the roller and either damaging the bearing or causing build-up that seizes the internal components and stops the roller from turning.

Design and materials contribute to roller success

Since environment, temperature, and the type of material being conveyed can't be changed, many people just write off corrosion as an inevitable occurrence. However that doesn't have to be the case. Both the material the roller is constructed from, as well as the seal design that protects the bearing, can make a huge impact on the life of the roller.

Metal can rust, corrode, and scale. Plastic is more resistant to corrosion than metal. Rollers that match the ratings of steel are now available in polymers such as engineered Nylon and HDPE. These materials are resistant to corrosion from chemicals, salt, and moisture. Steel rollers can fall victim to several environmental factors including acid rain, saltwater, and salt-loaded spray from the snow-melting process. When exposed to moisture, nylon actually gains toughness while virtually eliminating the risk of premature failure due to surface corrosion.

Seal design is also paramount to the success of the roller. Many rollers don't reach their design life because of moisture and contamination reaching the bearing. In fact, statistics show that 43 percent of bearings fail prematurely for this reason. The best way to ensure the bearing in a conveyor roller reaches its full life is to prevent moisture and fines from reaching it. One way to accomplish this is by opting for a roller with a quality "centrifugal flinger seal." This feature offers up to nine times more centrifugal force, to help "spin out" fines, water, and other contaminants. The design of a flinger seal, combined with a rock shield, discourages the entry of contaminants and protects the bearing.

What can happen if your roller fails prematurely?

Regardless of the type of roller you install, preventative maintenance is one of the most important parts of roller success. Inspecting the rollers on your line, much like you inspect the other components of your belt conveyor system, is an important task. When a roller prematurely fails, the end result may not simply be a quick shut-down, replacement, and start up. Depending on the mode of failure, a premature roller breakdown can actually cause a catastrophic belt failure. Belts can be ripped by a loose end-assembly, causing safety hazards and the potential for a lengthy belt shut-down, not to mention the costs of replacement belting. When rollers are failing, especially if they are putting other costly components at risk, it is a good opportunity to look for a better option.

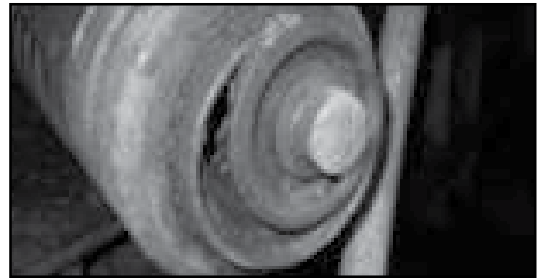
Choosing the correct rollers for your application

The first rule of thumb when choosing rollers that will last is to consider your environment, the application in which they will be used, the belt speed, and the size of your material load. These factors, as well as the size of your rollers and the number of rollers you need, should be a good starting point when choosing your rollers.

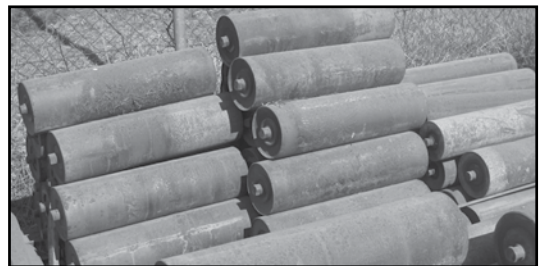
CoreTech™ Rollers from Flexco virtually eliminate corrosion

CoreTech™ rollers are made with engineered Nylon or HDPE material that is highly corrosion-resistant and sheds material quickly. Combined with a seal that protects against bearing damage, these rollers offer extended wear life and greatly reduce the frequency of roll replacement due to bearing failure and shell wear.

When moisture, acid, salt, or other corrosive materials are present, the CoreTech offering provides an excellent alternative to steel rollers. Since CoreTech rollers provide the same ratings as steel rollers, there is no loss of functional performance, and much longer life can be achieved through the benefits of the latest composite technology. CoreTech HDPE rollers are resistant to all acidic environments. CoreTech Nylon rollers are resistant to acidic environments, but should not be used in applications with sulfuric acid.



This bearing seized because of an ingress of moisture due to a poor quality seal. The CoreTech seal is designed to “spin out” fines, water, and other contaminants. The design also allows water to drain from the seal when the roller is at rest.



How an operation stores rollers has a big impact on corrosion. Any roller will “breathe” and wide variations in hot and cold temperatures can affect roller performance. Steel rollers, like the ones pictured above, can corrode when stored outside.



CoreTech™ Verified Solution



The CoreTech Roller on the left shows no signs of internal corrosion, while the two steel rollers on the right showed clear signs of corrosion on the shaft, as well as around the bearing.

A major mine conducted a test comparing rolls from 10 different manufacturers. Each manufacturer supplied nine rolls for the test, which were placed on the same conveyor. For 11 months, the mine evaluated the 178 mm, 6,309 bearing rolls, deeming a manufacturer roller a complete test failure if even one roll failed. Only three manufacturers survived the first round with all nine rollers surviving the 11-month test. Three roll samples were collected from each of the three survivors, including CoreTech and two steel roller manufacturers. When disassembled, both sets of steel rollers showed noticeable corrosion on the shaft and bearing as well as the outer shell, while the CoreTech rollers showed no signs of dust or moisture ingress. The effectiveness of the CoreTech field-proven seal design was evident by the lack of corrosion and moisture in the inner core.

To obtain further information, request a consultation with a Territory Sales Representative by visiting www.flexco.com/contactus.

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