Smart (Belt) Conveyors

Are used to:

- Transfer primary materials to the treatment installations
- Transport materials between milling units and sieves
- Move materials in between stages and towards bunkers

A virtual engineer, fully dedicated to the state-of-health of your installation: **InfraLytics®**

The Context

Conveyors are used in multiple stages in the material processing and mining business. It is used to provide a continuous supply of raw materials such as rock or granulates to the treatment installations, but also to have different material flows have their own route and to move material in between stages. In general conveyors are running 24/7 and if they become unavailable, part of the production stops. For those conveyors that are critical to the process, a continuous monitoring could may be relevant.

Shock detection and Tensioner health

Conveyors are meant to operate smoothly over a long period. In reality, however, shocks distort the movement. These are to be avoided, as they result in excessive loads on motors, gearboxes and bearings and can also create minor damage to belts or chains, a potential onset of rupture at a later moment. Continuous monitoring based on accelerations, tensioner levels or forces and/or electrical currents allows detecting these shocks in an early stage and linking them to the operational conditions they occur in.

The Solution

At Zensor we provide a dedicated, modular, product for the continuous follow-up of conveyors. The product comes in the form of a dedicated software and a hardware add-on if not enough data would be available. At first the client indicates which of the aspects (listed below) are relevant to their situation, and subsequently the Zensor specialist configures the product. When required additional hardware is installed. Once launched, the software continuously crunches the incoming data and translates it into alerts and warnings in case of upcoming damage or breakdowns or other unexpected deviations such as blockages.

Scraper health

To make sure that the material falls or drops off the belt where it should, often a so-called scraper is used. It is important that the scraper can move freely and doesn't degrade excessively. Using acceleration data in multiple directions the motion of the scraper can be tracked continuously and warnings can be sent in case of deviations that will in the end impact the quality of operations.

Friction detection

Friction between belts or chains and the main structure, in the end, will lead to excessive wear or even breakages. It results from alignment issues or mechanical deformations. Combining motor currents with acceleration and/or temperature allows smart algorithms to detect friction in an early stage. The resulting warnings lead to corrective interventions, such that failure can be prevented.

Roller health

Conveyor systems rely on extensive amounts of rollers to ensure smooth operation. Although benefiting from quite some redundancy, continuous monitoring of the operation of the conveyor can yield insights into roller degradation and as such trigger maintenance tasks at the right moment.

Conveyor types

Not all conveyors are belt conveyors, also screw conveyors, chain conveyors or reddlers and others are encountered. The monitoring solution is of course adapted to the specific type of conveyor targeted.

Motor health

Conveyors are supposed to run all the time. In general, a single conveyor is driven by a single motor. Motor failure thus equals the non-availability of the conveyor. Failure or malfunctioning is thus best predicted well in advance to limit the impact on operations. Combining a follow-up based on vibrations, temperatures and electrical currents the state-of-health of the motors can be tracked continuously, deviations detected in an early stage and unwanted standstills prevented.

Tear prevention

By continuously monitoring for the occurrence of shocks and/or friction many of the reasons for rupture of belts or chains can be detected and minimised. As such this type of follow-up also serves as a means of tear prevention.

Temperature limitation

Often a processing environment has an Atex (or other) classification indicating a highly explosive environment due to the buildup of dust. In a classical approach the installation is equipped with multiple temperature-based limiting switches: once the limit temperature is reached, the installation is stopped abruptly. By equipping bearings with temperature sensors and following the data measured with an intelligent algorithm one can detect relative temperature increases and trends. As such the maintenance crew can be warned, check and remediate the situation on beforehand and sudden stops during night or weekend shifts can be avoided.

Gearbox health

In an optimal case, gearbox degradation is detected in an early stage, such that repairs or replacements can be planned ahead of time and failure can be avoided. Ideally, gearbox degradation can be minimised by limiting the situations where excessive loads are experienced. Combining a follow-up based on accelerations as well as temperatures, both on the gearbox as well as the connected motors and axles, provides a tool for optimal health-monitoring of the gearboxes.

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