Hot rolling mill

The hot rolling process starts with a large component of hot steel. While still hot the object passes through a series of rotating rollers to achieve the desired dimensions: thickness and/or shape in sheet metal production operations, the rolled steel is then wound into coiled rolls and left to cool.

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

Motor health

Motors (uni-directional or bidirectional) are essential for moving materials through the line. Failure or malfunctioning is best predicted well in advance. 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 or serious damage prevented. Both DC, as well as AC motors can be included in the process.

Gearbox health

In a rolling line gearboxes or multi-output reducers are heavily loaded: high torque, high RPM and often multiple axes. Being in the center of the drivetrain and hard to service, detecting issues in an early stage is essential. In an ideal case process deviations that would eventually lead to the gearbox, degradation is detected in an early stage. 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.

Coupling health

Couplings are used to transfer the torque from the gearbox to the rolls themselves. They are subjected to the continuous torque of the rolling process but also are impacted by intense peaks due when material enters and exits the stand or in case of process deviations. A continuous follow-up of vibrations at high frequency allows detecting and quantifying the deviations, in turn leading to early detection of upcoming potential problems.

Bearing health

As for the couplings, the bearings in a rolling stand are subjected to the continuous torque of the rolling process but also are impacted by intense peaks when material enters and exits the stand or in case of process deviations. A continuous follow-up of vibrations at high frequency allows detecting and quantifying the deviations, in turn leading to early detection of upcoming potential problems.

Process deviations

In an ideal world, each passage of material with equal dimensions and material properties results in the same signature in parameters such as vibrations, motor currents, torque... In reality, often deviations are observed. Automatic identification and quantification of these deviations, making use of the advanced and prior classification of the data, allows for tracking them in time. Using advanced correlation tools, the causes for deviations can be identified and, optimally, taken away.

Material quality issues

When all goes well, each passage of material with equal dimensions and material properties results in the same signature in parameters such as vibrations, motor currents, torque... When in seemingly identical runs the sensor values seem to deviate this can also be indicative for deviating material properties. Automatic identification and quantification of these deviations allow tracking them in time and provide relevant input for the process engineers. As such maximum product quality can be matched with optimal reliability of the installation.

Pinion health

Pinions are located in the chain transferring the torque from the motors to the rolls themselves. They are subjected to the continuous torque of the rolling process but also are impacted by intense peaks when material enters and exits the stand or in case of process deviations, including direction changes when applicable. A continuous follow-up of vibrations at high frequency allows detecting and quantifying the deviations, in turn leading to early detection of upcoming potential problems.

Thrust screw or hydraulics health

In many cases, the spacing between a pair of working rolls is modified during the process or in between runs. The actuator is screw or hydraulics-based. High accuracy is required, together with resistance against high impact and continuously fluctuating forces. Wear and degradation of the components in the setting system will impact the process quality. Continuous monitoring based on vibrations will allow detection of what conditions or operations lead to damage and how damage progresses with time.

Roll alignment

The rolls are embedded in a rigid frame. Sometimes, however, as a result of component degradation or under excessive forces, things may get deformed. Ultimately this will lead to quality issues, so deviations are best detected in an early stage such that the normal, desired situation, can be re-established as soon as possible. This is done using a model coupling vibrational data with motor currents and inclination data at high frequency.

Roll healthand surface integrity

Hot rolling results in enormous stresses being exerted on the rolls. Both thermal as well as mechanical, both at the entry and exit of the material as well as during the rolling phases. These loads can have an enormous impact, structurally as well as on the roll surface.
Tracking the process through vibrations in multiple axes, coupled with torque and/or motor current measurements as well as a close follow-up of the RPM allows algorithms to be trained that allow in-situ identification of structural or surface-issues w.r.t. the rolls.

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