Smart Material Processing Equipment

Integrated monitoring products to achieve maximum availability and operational life of critical assets in mining and minerals processing

Component-specific, end-to-end monitoring products

Mining sites and mineral treatment plants often share similar process steps, but all are unique in the end. Most are built up of a subset of standard types of installations found all over the globe in similar mills.

Zensor has developed and offers a set of intelligent end-to-end monitoring solutions, tailored for the continuous and real-time follow-up of key installations and components used in material treatment and internal transport. The goal of these products: allow the equipment to run with a maximal availability and keep product quality stable and on a maximal level. The current brochure provides an introduction to the products available for these installations, used in different stages of the process.

"Predictive maintenance isn't truly valuable when just detecting damage in an early stage, it's all about flagging conditions that will ultimately lead to damage!"

Underlying: The Virtual Engineer

Specific installations require specific solutions. Even for similar machines, their behavior and the issues encountered are often unique, depending on their brand, specific process parameters, material properties, and maintenance strategies. Therefore Zensor has developed the concept of the Virtual Engineer.

Each Virtual Engineer fulfills a role similar to its human counterpart as it can collect, combine and interpret various data streams related to an individual asset and its associated operating environment. The result: a set of relevant insights and warnings. The interpretation relies on multiple layers:

- Classification Layer: what is the installation doing? Separate the data streams based on operational conditions.
- Process & Physics Layer: what is expected or normal behavior under these conditions?
- Component Layer: Component-specific tuning and machine learning-based approaches make the follow-up specific for your installation.

Our Approach

It is important to note that Zensor's product portfolio hasn't been developed for the follow-up of isolated, primary components such as motors, pumps, gearboxes, but, on the contrary, focuses on the entire machine or installation.

It also goes far beyond mere "anomaly detection" or "threshold watching" on temporal data. It relies on translating raw data from combinations of continuous measurements related to various aspects into descriptive parameters and indicators. The monitoring includes short-term, mid-term as well as long-term elements. This gives back control to those responsible for making informed financial and operational decisions, considering all relevant factors.

Not only the analytics needs to be strong. The preceding data preparation and validation stages are equally essential for a reliable follow-up. No matter how advanced the analysis algorithms: when fed with faulty data, their output is also non-relevant. Therefore, the incoming data streams are continuously checked within the platform . When data is absent, zero, out-of-bounds, too noisy, non-coherent or simply unrealistic for the specific sensor type on the location it's installed in, the appropriate action is triggered. The responsible entities are informed, and processes are set up to ensure the correct data streams being re-established as soon as possible.

configuration for your specific asset and situation is rapidly established and put into action. As the underlying models are developed and pre-trained for each specific asset, there's a short time-to-value. This means that, once activated, the platform starts identifying issues and predicting damage from the very beginning. From that moment on the follow-up only becomes more intelligent by continuously optimizing the configuration and self-learning modules. The prediction horizon as well as ability to provide context only becomes more specific for your exact situation.

"The follow-up doesn't rely on standalone, pure threshold watching, but is based on a multi-aspect, continuously improving and context-aware follow-up."

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Monitoring products for

Ball mills, Hammer Mills, Vertical Roller Mills, Belt Conveyors, Classifiers, Screw conveyors, Chain conveyors, Sieves, Screens, Jaw Crushers ...
Consult our individual, asset-specific leaflets for more details.

Building blocks

A solution for a specific machine type always consists of the same building blocks:

- The engineering block: selecting what data and hardware is needed in this specific situation.
- Data collection:
  - A combination of multiple additional sensors of different types, distributed over the asset, all connected to the associated acquisition system and/or
  - Ingesting data from existing on-site data lakes, such as PLCs, SCADA, Historian servers, Pi...
- Data management: combining all the data collected in a single, dedicated, warehouse and ensure all data received is present and reliable
- Continuous and automated analysis and interpretation of the data collected
- On-line visualization: insights derived can be consulted in a set of graphs and visual indicators, with access to the associated raw data streams for those interested
- Alarming: Sending warnings and alarms in relevant conditions

"Our 'Engineers in a Box' continuously watch over your installations, send out alarms when things tend to go wrong and provide periodic reports indicating the present state and what preventive repair is required: the ultimate tool for risk reduction and maintenance optimization!"