Project File (20-12-2024)

I- About Artisanal mine

An **artisanal mine** refers to small-scale mining operations, often carried out by individuals or small groups, using manual tools or minimal machinery. It is common in developing regions like Burkina Faso, where it plays a significant role in local economies. For more details, you can refer to this link: artisanal mine.

II- Recorded Data in the Ball Mill Ontology

Currently, I am recording the following types of data:

- **Flow:**

Purpose: Monitor the movement of materials (e.g., ore and powdered material) within the system.

- **Load:**

Purpose: Analyze the weight or load within the mill to maintain optimal grinding conditions.

Temperature:

Purpose: Detect overheating in the drum or motor, ensuring operational safety.

- **Rotational Speed:**

Purpose: Measure and control the rotational speed of the drum to maintain efficiency and prevent wear.

III- Ideas for Additional Data for Enhancements

To further optimize the performance, safety, and sustainability of ball mill operations, integrating additional data points can provide deeper insights and enhance decision-making. This data will complement existing operational parameters such as flow, load, temperature, and rotational speed, ensuring a more comprehensive understanding of the system's performance. Below are two ideas for additional data that can be recorded:

- **Vibration Data**:

- **Purpose**: Monitor mechanical stability by tracking vibrations in components like bearings, gears, and the drum. High vibration levels can indicate wear, misalignment, or potential failures, enabling timely maintenance to reduce downtime.
- **Suggested Sensor**: A **vibration sensor (e.g., XENSIV™ TLV493D)** for accurate monitoring of vibrations in key components.

➢ **Energy Consumption Data**:

- **Purpose**: Record the energy usage of the ball mill system to identify inefficiencies and optimize power consumption. This data supports cost reduction and aligns with sustainable energy goals.
- **Suggested Sensor**: An **energy monitoring module** compatible with industrial systems (e.g., Infineon's energy metering ICs).

IV- Sustainable Development Goals address

The ontology also integrates the sustainability aspect, addressing health, social, and economic dimensions. For instance, it highlights the health impacts like dust exposure and noise exposure, linking them to mitigation measures such as respiratory masks and noise-canceling headphones. This directly aligns with the UN Sustainable Development Goals (SDGs):

- **SDG 3**: *Good Health and Well-being* – By addressing health risks through improved working conditions and equipment.
- **SDG 8**: *Decent Work and Economic Growth* – By supporting artisanal miners with efficient and safer tools, contributing to local livelihoods.

Incorporating these goals strengthens the project's relevance to global sustainability frameworks while enhancing its impact.