Resources for a Connected World

SME
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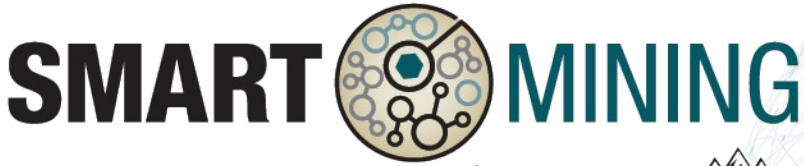
CMA
COLORADO MINING ASSOCIATION
CMA 121st NATIONAL WESTERN MINING CONFERENCE

Actual Challenges and Benefits of Monitored Rollers



Josu Perlacia

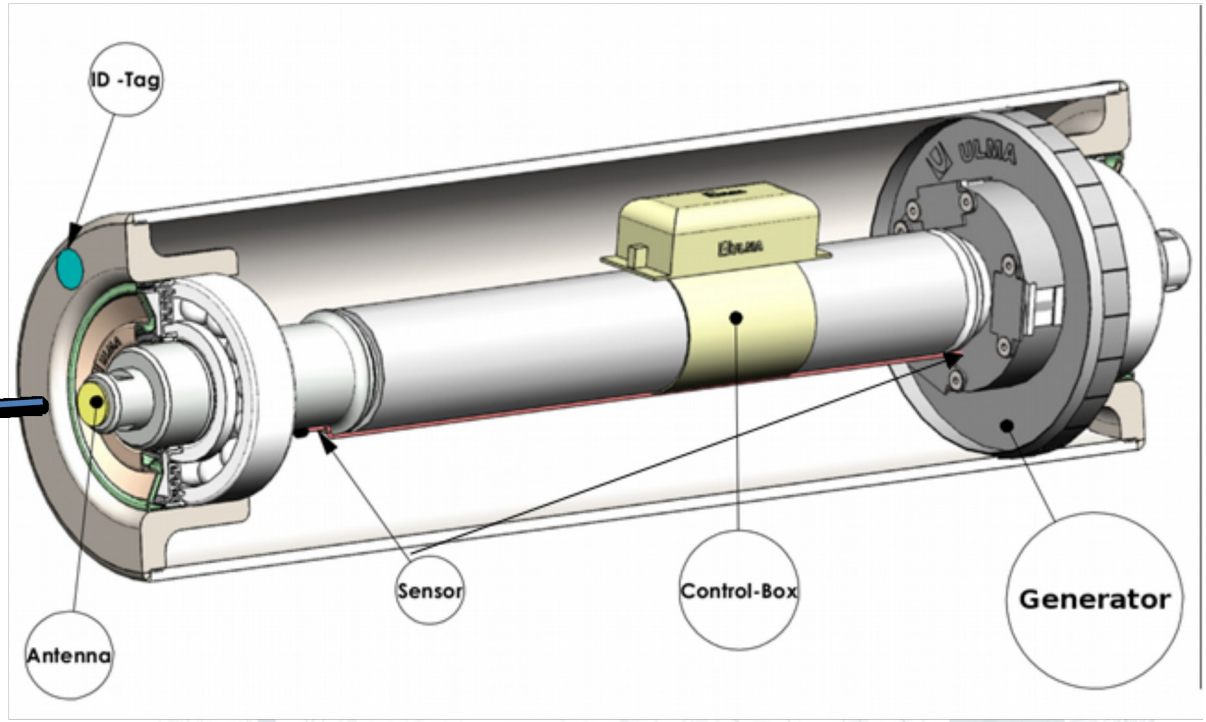
ULMA Conveyor Components

General Overview

- Unexpected break of rollers can be a **source of very expensive failures and inopportune stock-outs.**
- Rollers must withstand the most demanding working conditions.
- Inspection and maintenance operations are **expensive and hard going**. On-site checks are necessary.
- Current failure identification methods (listening or thermographic) are intensive in workmanship and not very accurate.
- Non scheduled stops reduce production's efficiency and **worsen the operational safety level**.

Components of the system

- Autonomous energy generation system.
- Sensors.
- Communications.
- Reception and monitoring



Current state and installations

- Rollers installed in several working environments.
- Varied sizes: CEMA C to CEMA F rollers.
- Enduring extreme weather environments, from cold Norway to suffocating Australia.
- Different electromagnetic and mechanical challenges: iron ore, cooper ore, reclaimers, overlands, quarries, etc.

Actual Challenges

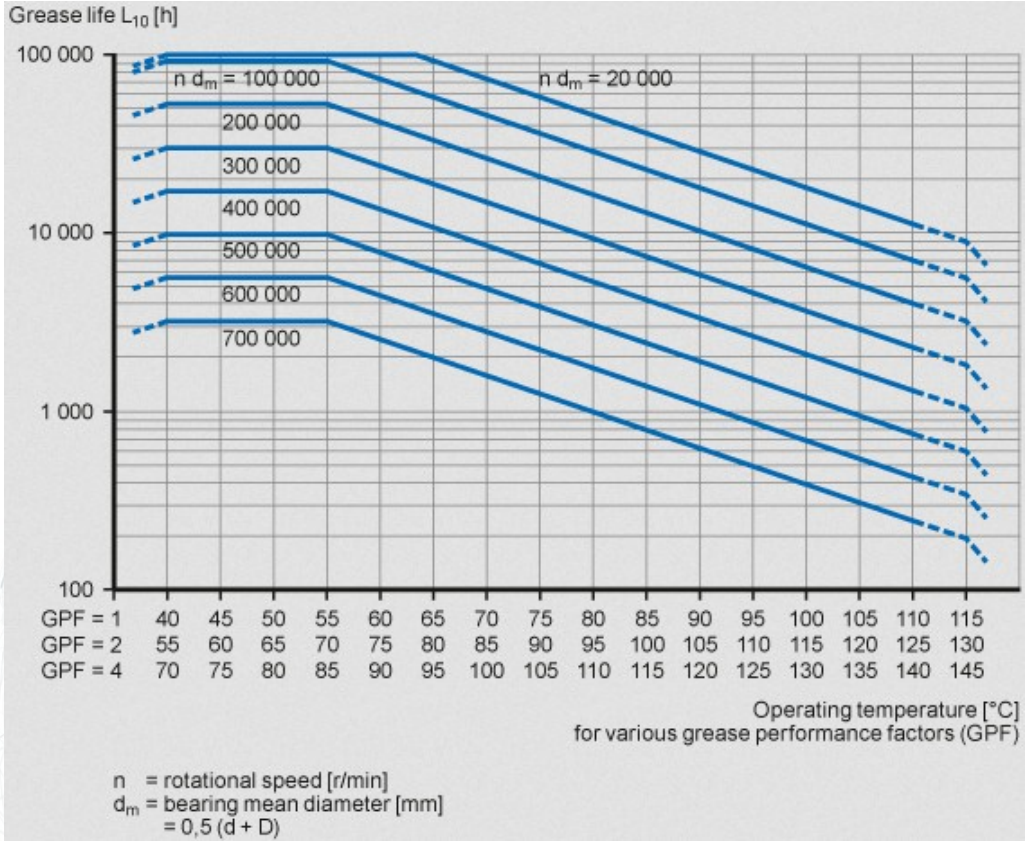
- Aggressive contaminant atmosphere.
- Exposition of components: balance between protection and communication.
- **Electromagnetic environment.**

Electromagnetic Environment

- Metallic structures (rollers, frames, etc.) and their effects: reflections, black spots, range reduction, etc.
- Creation of a proper Ad-hoc Wireless Sensor Network: communication protocol, shape of the antenna, etc.
- **Balance of the different features.**

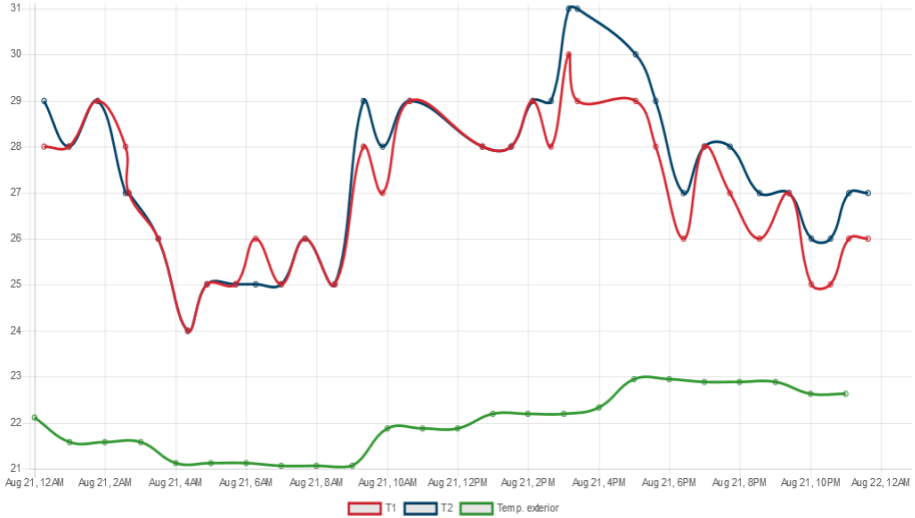
Results of Real Conveyors

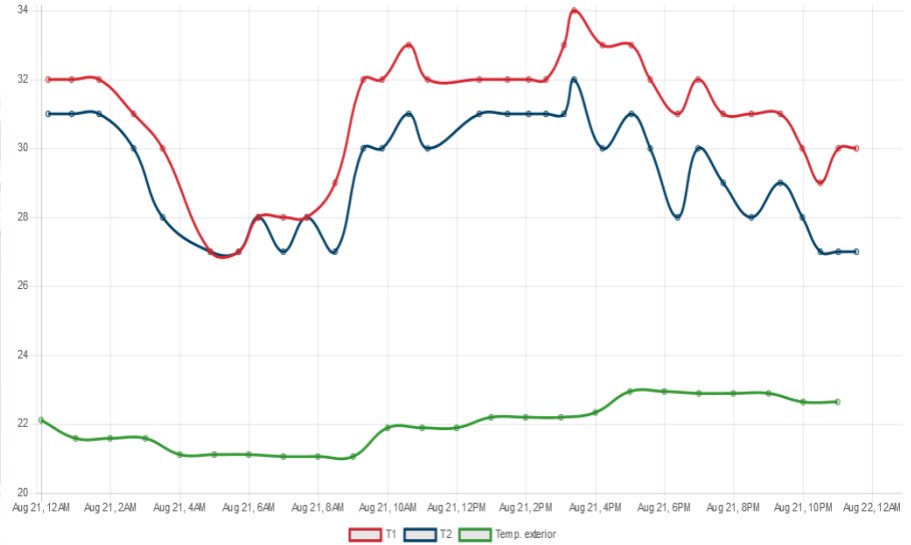
- Establish the background scenario to understand how the rollers really work.
- The load on the belt, rotation speed, idler type, conveyor's slope etc. will change the lifespan of the roller's bearings.
- **This will allow to actually predict the lifespan of the rollers in an accurate way.**
- Laboratory tests won't be able to simulate all the small differences from one conveyor to another.



CEMA F (Reclaimer)

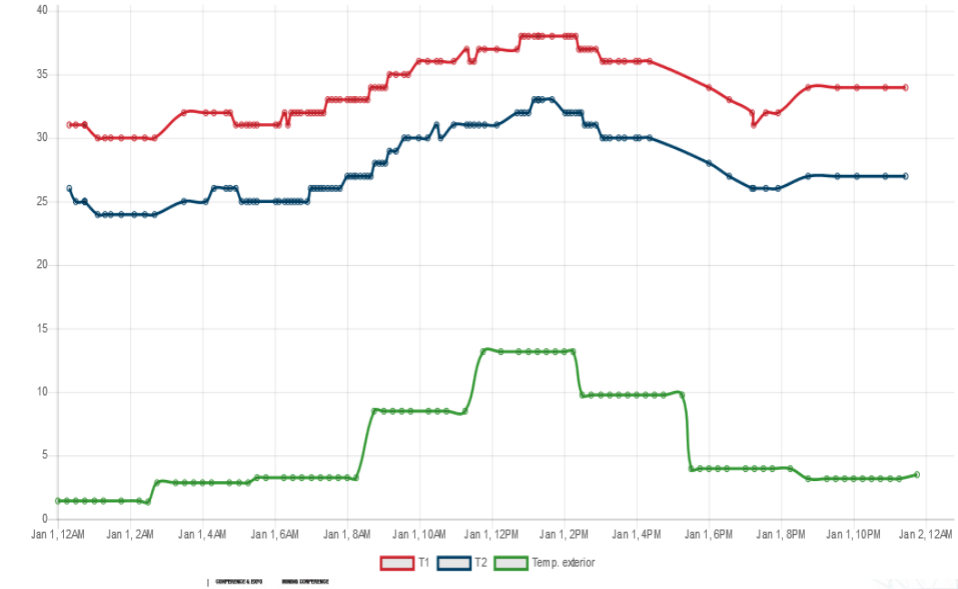
- **It is continuously going up and down instead of smoothly changing if the load changes.**
- The temperature of a heavy duty roller's bearing is related to the ambient temperature to a certain point.
- Rollers in the same conveyor show very similar results if they are placed in the same area.

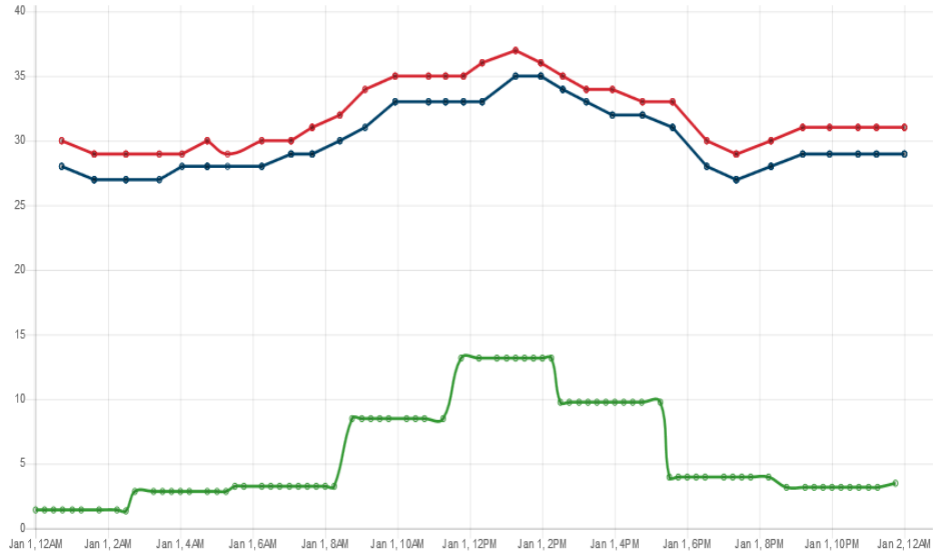




CEMA F (Overland)

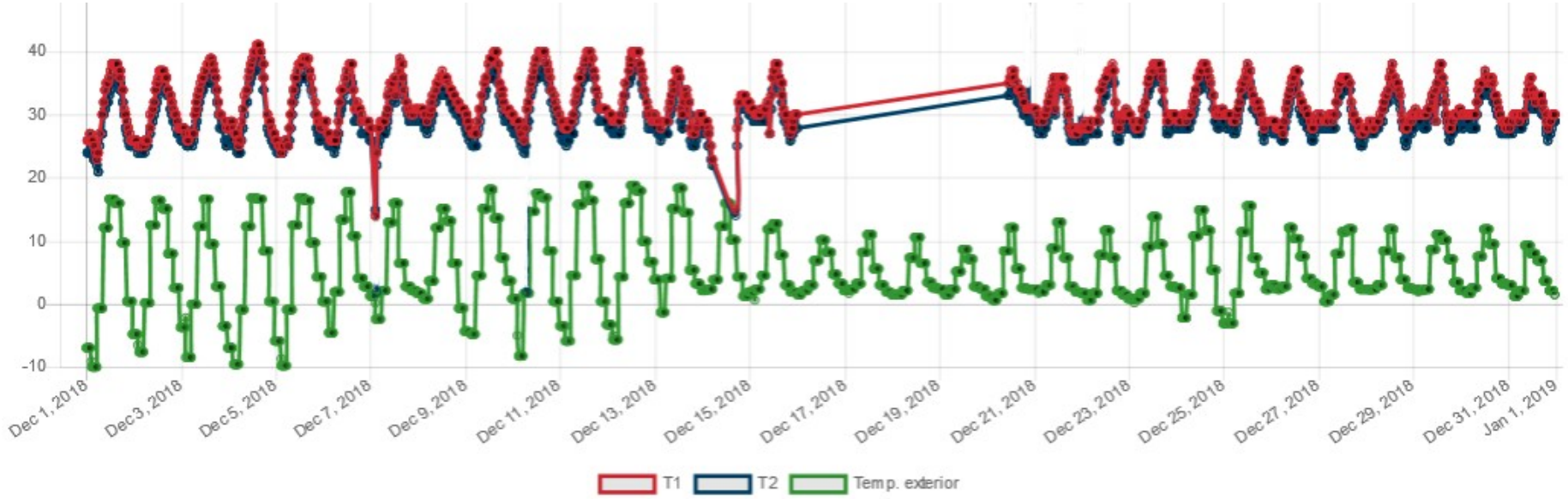
- **Smoother shape, less changes in the rollers' load.**
- A more direct connection with the ambient temperature.
- Rollers in the same conveyor show very similar results if they are placed in the same area.





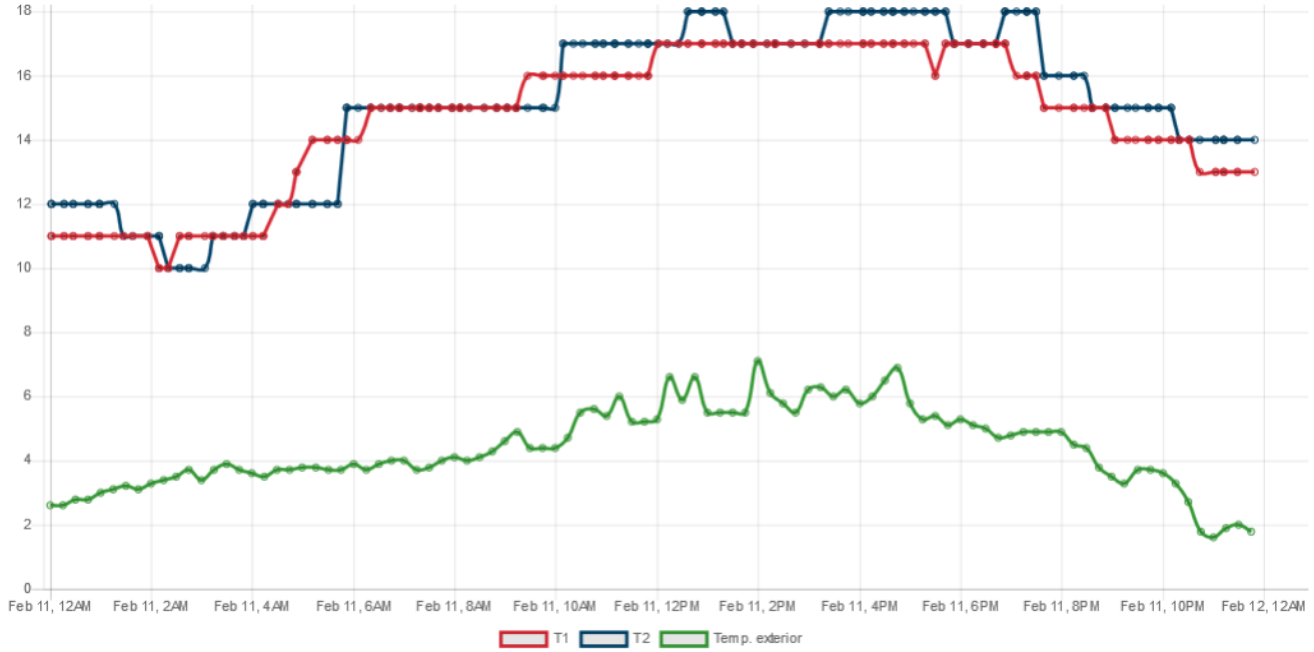
CEMA F (Overland)

- Temperature pattern during time.



CEMA C (Gravel Terminal)

- Less requirement than in Heavy Duty Rollers.
- Lower temperatures and less changes during time.
- Direct connection with the ambient temperature.



Conclusions

- We’re currently able to evaluate the working conditions of the rollers.
- it’s clear that lab tests predictions won’t be as accurate as real measurements done for every individual conveyor.
- The unplanned stops caused by roller’s issues will diminish due to the possibility of doing a preventive maintenance.
- The need to analyze the problem case by case will be in the center of the challenges for this technology nowadays
- A conveyor equipped with ULMA’s Monitored Rollers will obtain a lower operation and maintenance costs, specially **increasing the safety of the maintenance staff in a spectacular way. All the rollers will be controlled without the risk of visiting a working conveyor.**

Thank you very much!

ULMA Conveyor Components

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