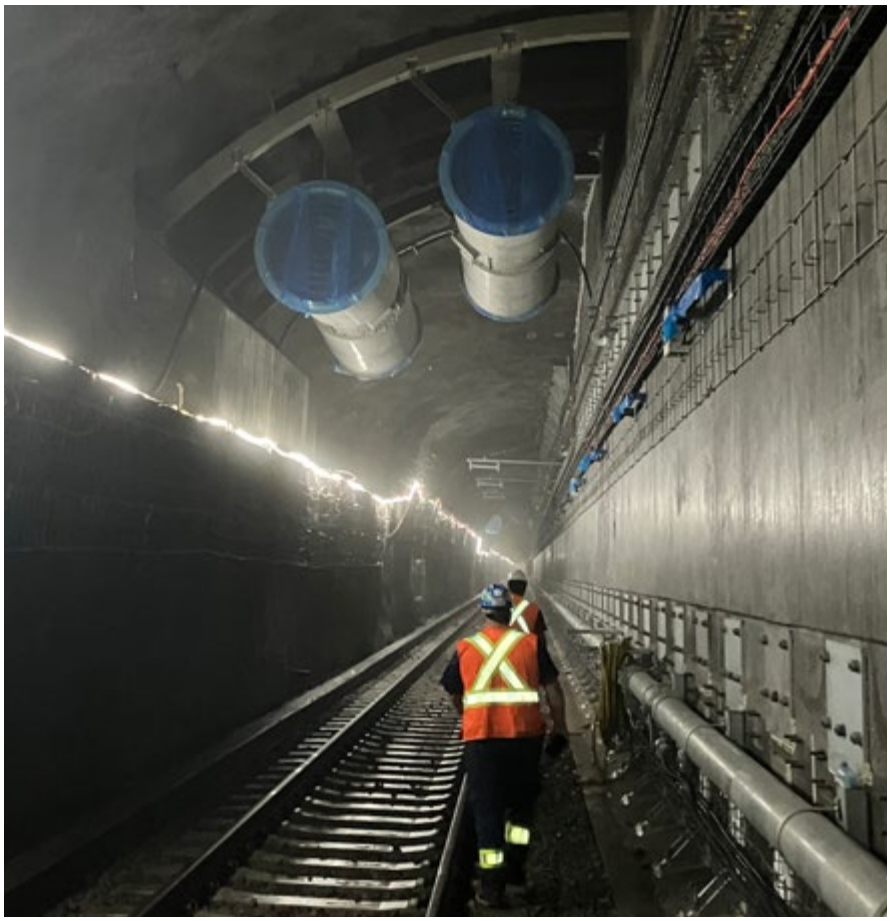
CASE STUDY

Enhancing safety and efficiency: smart sensors used by the REM on smoke evacuation fans for train tunnels and stations

The Réseau express métropolitain (REM) is the longest automated light rail line in the world featuring 26 universally accessible stations across Greater Montréal in the Canadian province of Québec. Ensuring passenger safety by adhering to the National Fire Protection Association NFPA 130 standard is paramount, particularly in enclosed spaces such as train tunnels and stations. In the event of a fire, effective smoke evacuation is critical to maintaining visibility and facilitating safe evacuation. Traditional maintenance practices often rely on scheduled inspections, which may not detect issues in real-time or provide early warnings of potential failures. However, the integration of smart sensors offers a promising solution to enhance safety and efficiency.



CHALLENGE

The implementation of a reliable monitoring system for smoke evacuation fans in train tunnels and stations.

SOLUTION

The installation of CAN-MD smart sensors provide a reliable solution for monitoring smoke evacuation fans by tracking vibration levels and triggering alerts.

RESULT

- Enhanced safety
- Improved reliability
- Cost savings

CHALLENGE

The challenge lies in implementing a reliable and proactive monitoring system for smoke evacuation fans in train tunnels and stations. The system must be capable of continuously monitoring fan vibration to detect anomalies indicative of impending failures or performance degradation. Additionally, it should provide real-time data and alerts to enable prompt intervention and minimise downtime.

SOLUTION

The implementation of CAN-MD® smart sensors from Dytran by HBK, equipped with vibration monitoring capabilities, offers a comprehensive solution to address the challenge. The CAN-MD-based solution is reliable due to its resistance to high temperatures and its communication protocol. These sensors are strategically installed on smoke evacuation fan motors to continuously monitor vibration levels and patterns. Any deviations from predetermined vibration baselines trigger automated alerts, prompting maintenance personnel to investigate further. The sensors also allow the stoppage of a fan during emergency operation to avoid its destruction. The programmable controller then allows the start of redundant fans or the activation of stepped-down operating modes.

Fans used to aerate train stations

Fans used to aerate train tunnels

RESULTS

The implementation of smart sensors for vibration monitoring on smoke evacuation fans in train tunnels and stations yielded significant benefits:

- Enhanced safety: Early detection of anomalies allowed for timely maintenance interventions, reducing the risk of fan failures during emergency situations, and ensuring uninterrupted smoke evacuation capabilities
- Improved reliability: Proactive maintenance based on real-time vibration data minimised unexpected down-time and prolonged the lifespan of smoke evacuation fans, enhancing overall system reliability
- Cost savings: By preventing catastrophic failures and optimising maintenance schedules, the smart sensor system resulted in cost savings associated with emergency repairs, downtime, and replacement parts

CONCLUSION

The successful deployment of CAN-MD® smart sensors for vibration monitoring on smoke evacuation fans in train tunnels and stations demonstrates their effectiveness in enhancing safety and efficiency. By leveraging real-time data and advanced analytics, authorities at the REM can proactively manage infrastructure, mitigate risks, and ensure passenger safety in emergency scenarios. As smart sensor technology continues to evolve, its application in critical transportation systems will play a pivotal role in shaping the future of urban mobility and infrastructure resilience.

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