Online Predictive Asset Monitoring Via Cloud Specialist System

Glayson Soares Habr[1], Silvio Balieiro[2], Marco Machado[3], Gilmar Rios[4], Marcos Branco[5] Marcel Duarte[6], Debora Rocha[7] and Leo Borba[8]
1. Automation Engineer
2. Specialized Technician
3. Mechanical Engineer
4. Specialist Engineer
5. Automation Engineer
6. Maintenance Supervisor
Hydro Paragominas, Paragominas, Brazil
7. Customer Success Engineer
8. Head of Sales
Tractian Technology Ltda, Brasil
Corresponding author: Glayson.Habr@hydro.com

Abstract

In an industry, physical assets are related to machines and equipment that require Preventive and Corrective maintenance when necessary, aiming at the continuity of the production process for which the asset was specified. Predictive Maintenance has methods, techniques and tools that during a defined periodicity assists maintenance teams in diagnosing failures so that the equipment does not stop operating. However, these techniques depend on the technician moving to the equipment for vibration and temperature collection of critical assets in a pre-established routine, which in the vast majority is not enough for a failure to be diagnosed in advance, before equipment collapses due to occurrences between data collection times. This results in equipment failures and loss of production because we do not have anticipated information of a potential failure, because all physical assets before stopping have warning signs that if monitored and interpreted correctly avoid the collapse of equipment, consequent loss of production and financial loss to the company. Therefore, the present study aims to present the Online Predictive Monitoring of Critical Assets via Cloud Specialist System, which uses vibration sensors and wireless temperature with transmission via SimCard Mult Operator 3G/4G to specialist cloud system with artificial intelligence, installed in critical assets in Hydro Mining Paragominas. With this solution you can receive real-time insights from major equipment failure modes, identifying faults in advance and correcting before the equipment collapses, resulting in avoided losses, maximization of asset operation, increase in life, cost reduction, increased predictability and production control as well as assists decision-making in the data.

Keywords: Assets, Monitoring, Predictive, Cloud, Artificial Intelligence

1. Introduction

The aim of this article is to highlight how online monitoring technology can optimize the industry by enabling real-time monitoring of asset conditions through vibration and temperature analysis. This approach helps in the early detection of anomalies and in the adoption of predictive measures. Furthermore, the differences between online and offline monitoring and the specific advantages of online monitoring will be explored.

Predictive maintenance is associated with preventive and anticipated practices to preserve the proper functioning of the equipment used in industrial operations. This approach usually involves periodic monitoring using vibration analysis, ultrasound and visual inspection. Regular collection

of temperature and vibration data is carried out manually, following a schedule (day, weekly or monthly) to identify irregularities in the equipment before they become more serious problems. However, this technique depends on the physical presence of the technician with the equipment for the data collection of critical assets, following a pre-established routine. Unfortunately, this approach is often not enough to diagnose failures early, before the equipment collapses, due to sudden events that occur between data collection periods.

Figure 1. Example of portable vibration collector.

2. The Internet of Things

The Internet of Things (IoT) is rapidly transforming the industrial sector, revolutionizing the way we interact with objects and technology. With the advancement of connectivity and the growing adoption of smart devices, IoT is becoming a tangible reality, bringing with it an unprecedented potential for the reformulation of various industrial segments.

At its core, IoT refers to the interconnection of physical devices over the Internet, enabling real-time data collection, sharing and analysis. In the industry, IoT is revolutionizing manufacturing, logistics and maintenance processes. Smart sensors enable real-time monitoring of machines and equipment, preventing failures and optimizing maintenance. Through data analysis and smart automation, efficiency and productivity are maximized, reducing costs and downtime.

2.1 IoT in Maintenance

The use of the Internet of Things (IoT) in maintenance is radically transforming the way maintenance tasks are performed in various industrial sectors. By interconnecting smart devices and sensors, IoT enables real-time data collection and analysis, enabling early detection of failures, optimizing maintenance processes and reducing operating costs.

With the implementation of IoT in maintenance, equipment and machines can be monitored continuously, providing detailed information about their performance, operating conditions and maintenance needs. Sensors installed on the equipment collect relevant data, such as temperature, vibration and power consumption, which are transmitted to a centralized platform.

8. Conclusion

Online vibration monitoring allows the predictive team to analyze the data collected by the sensors quickly via the web or the mobility app, handling the alerts generated and keeping the maintenance team continuously informed about the assets and their behavior.

In this way, it is possible to maximize the operation of assets and extend their life by understanding that the equipment is working at the optimal point of operation and making data-based decisions. In the event of any potential failure, it is possible to act and avoid unnecessary wear, thereby reducing costs and increasing the predictability and control of production.

With the results presented in section 7, the decisions to not stop the equipment were based on data and continuous monitoring of the equipment avoiding a corrective stop, bringing the equipment to a preventive stop foreseen in the annual calendar of the plant and in a planned way. If we did not have online monitoring all equipment would have stopped and we would then have corrective and losses for the company.

9. References

1. IoT system for maintenance management. Tractian in 2022. Available at: https://tractian.com/blog/systema-iot-to-gestao-of-maintenance. Access to: 13 Jun. by 2023.
2. IoT in Industry 4.0, what are the first steps? Tractian in 2022. Available at: https://tractian.com/blog/iot-na-industria-4-0-which-the-first-steps. Access to: 13 Jun. by 2023
3. The use of artificial intelligence (AI) in maintenance. Tractian in 2022. Available at: https://tractian.com/blog/a-intelligence-artificial-on-maintenance-the-future-of-plants-industrial. Access to: 13 Jun. by 2023.
4. Complete guide on online asset monitoring. and Tractian. Available at: https://tractian.com/blog/guide-complete-over-monitoring-online-of-assets?utm_term=&utm_campaign=maior-desempenho-sasozal-ordens-de-servico&utm_source=adwords&utm_medium=ppc&hsa_acc=1812744788&hsa_cam=18128956684&hsa_grp=&hsa_ad=&hsa_src=x&hsa_tgt=&hsa_kw=&hsa_mt=&hsa_net=adwords&hsa_ver=3&gad=1&gclid=CjwKCAjwyqWkBhBMEiwAp2yUFu4qoqG7X_56TijRhgPglBumHpEDJLjbHxJF7GGw5vAWqiKLSmk6sxoCzmcQAvD_BwE. Accessed on: 14 May. by 2023
5. Vibration and Thermography Analysis in the Maintenance and Reliability of Equipment of a Seed Benefit Plant. The Ufu Repository, 2023 Available in: https://repositorio.ufu.br/bitstream/123456789/25383/1/AnaliseVibracaoTermografia.pdf