



IoT-based Prescriptive Maintenance in Manufacturing Industry



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Introduction

“ Global competition requires automatic production systems that can operate seamlessly, efficiently and qualitatively ”

Global competition requires automatic production systems that can operate seamlessly, efficiently and qualitatively. In an automatic system with multi-stage and fast manufacturing processes, sudden failures in the production machine can be costly. The failure of the equipment to operate as needed is a standard cause of failure of the production machine. This immediately contributes to the production of time or resource wastes, such as waiting for unplanned downtime or rejecting the product. Extensive knowledge of reliability extent is therefore crucial in predicting unplanned downtime costs and spare parts, as well as in recommending optimum maintenance intervals. The implementation of an excellent reliability plan would ensure the collection of critical information on the reliability output of the system in the service period and guide the use of this information in analytical and management processes. Adequate data collection and analysis, along with the development of reliable models to support decision-making procedures, are necessary for valid successful reliability programs and maintenance development plans. Most industrial structures have a high degree of intricacy; however, they are repairable in many situations.¹

Asset management has traditionally been thought of as a preventive – and in many cases reactive, erratic, and out of necessity. Maintenance in this way of thinking is a cost center, not focused towards generating tangible profit. However, with an ever-increasing need for overall asset reliability and optimization, all businesses should be proactive in addressing asset maintenance.

The ability to digitize and proactively track assets through sensors has gradually evolved to the point where technology is now ready to revolutionize asset maintenance.²

Predictive and prescriptive maintenance has moved from early emphasis on proof-of- concept flights to wider rollouts.

Network World. (2019, January). [Image]



1. Tsarouhas P. (2020). Reliability, Availability, and Maintainability (RAM) Study of an Ice Cream Industry,

2. AspenTech (2019). Prescriptive Maintenance: Transforming Asset Performance Management

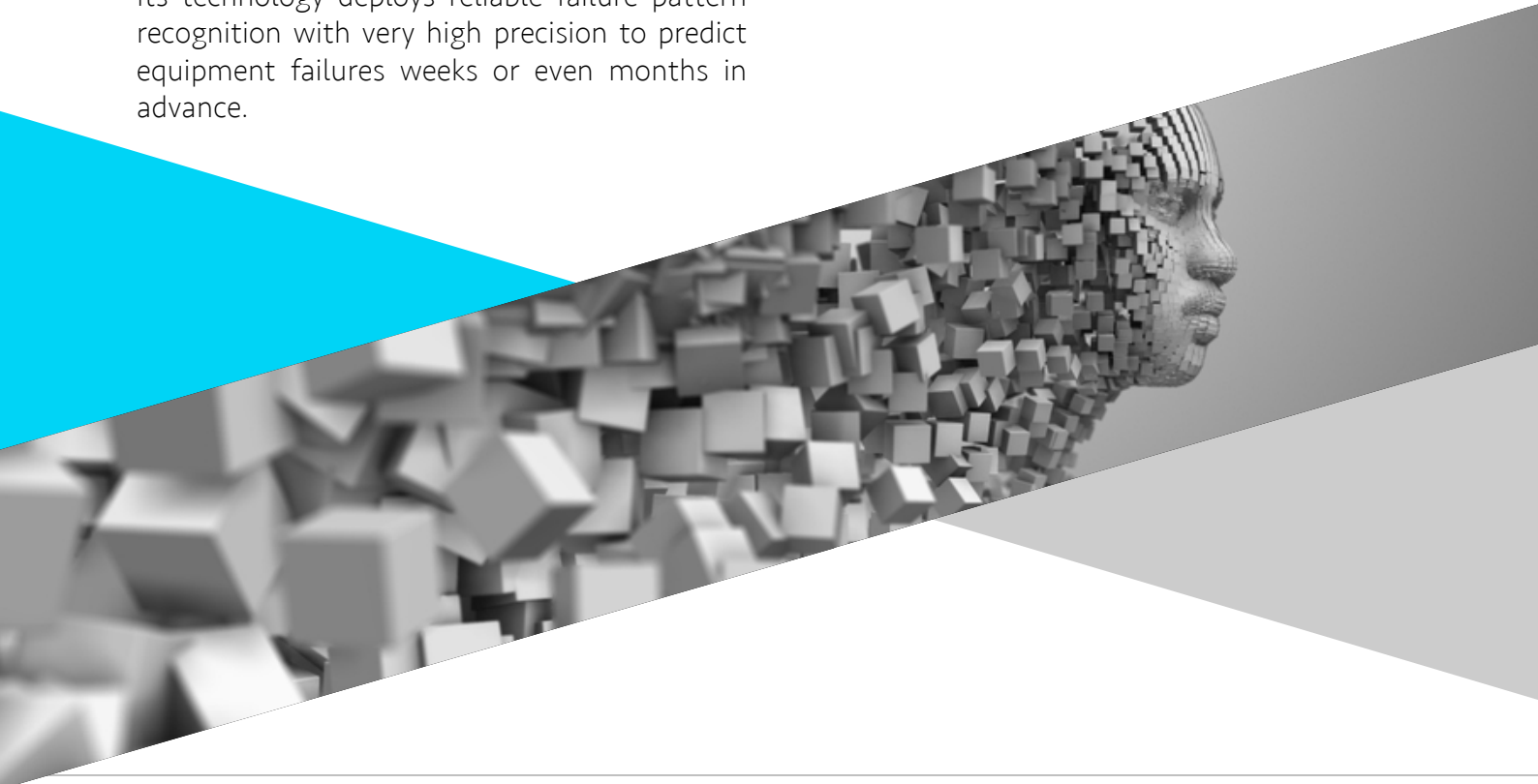
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Over the last few years, the market has learned that while everyone claims to be using machine learning and AI, quality is essentially characterized by the ability to execute efficiently on an enterprise scale. Standard preventive maintenance on its own cannot fix the problems of unforeseen breakdowns.

With asset performance management powered by low-touch machine learning, it is now possible to derive value from decades of design and operational data in order to perform prescriptive maintenance and improve asset performance.

Its technology deploys reliable failure pattern recognition with very high precision to predict equipment failures weeks or even months in advance.

Unexpected downtime and failure of the product are costly. Without information on the health of the equipment and the parts they produce, manufacturers cannot reliably predict failure, power, efficiency or production delays. It also has a cascading impact on the supply chain as inventories are unbalanced and orders are delayed, reducing customer service and brand loyalty. Around the globe, companies are actively pursuing new production approaches to resolve these issues.



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1

Predictive maintenance and quality are increasingly being used in Industry 4.0 solutions to predict equipment failures and product quality.

2

Using Industry 4.0 approaches, Intel's plants, one of the closest examples of Industry 4.0, reduce costs by 20% and decrease maintenance time by 50%.

Using gateway-connected sensors and data center / cloud with advanced analytics and machine learning algorithms, manufacturers can make a digital transformation to predict when equipment, inventory or finished products fail and improve supply chain management. Benefits include reliability, cost management, risk mitigation and cost-effective production.³

3

3. Intel (2019). Boost Uptime and Revenue with Well-Integrated Predictive Maintenance

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