

Predictive Maintenance

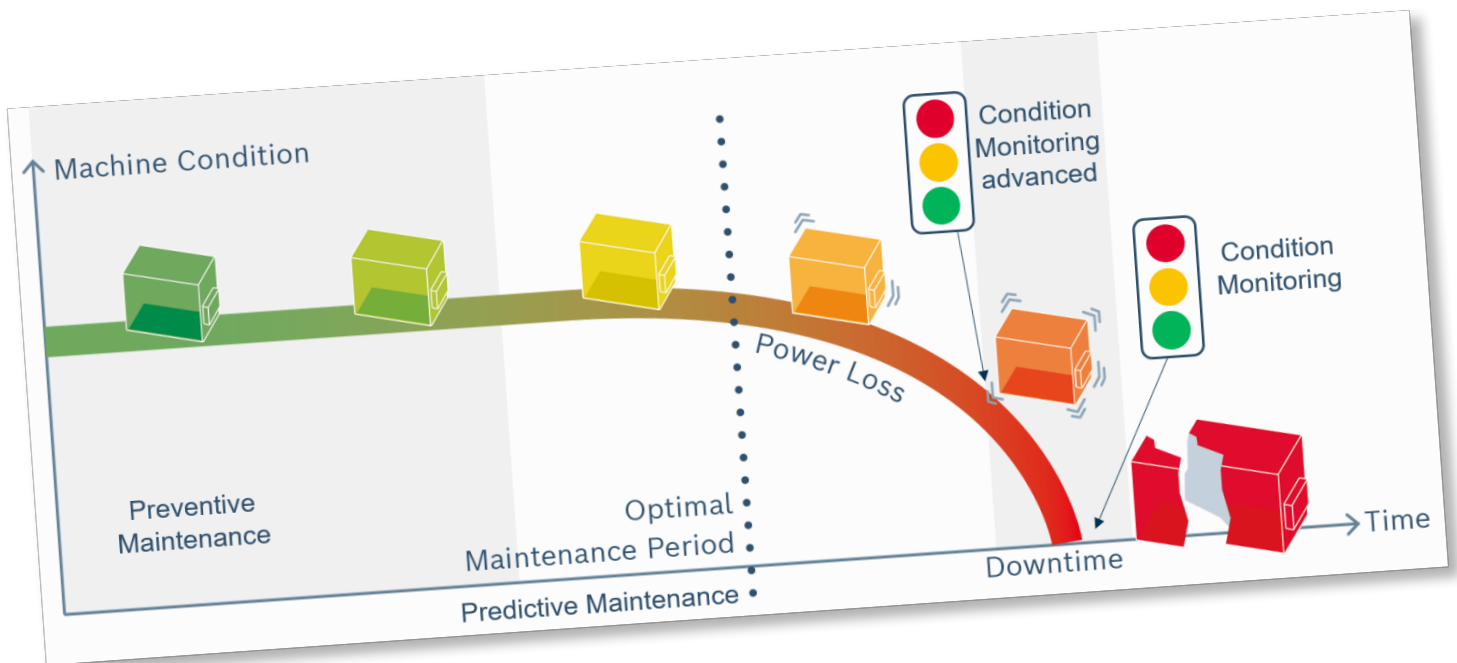
What is it, what can it do and how

can you implement it as easily as possible

With predictive maintenance, maintenance personnel see today what needs to be done tomorrow. In the white paper, you will find out how this “crystal ball” approach works, what its effects are and how it can be integrated into existing facilities.

Machine downtimes cost money, and lots of it. On the one hand, this is because of the direct loss of production and, on the other, because of the secondary effects on subsequent processes. Under certain circumstances, the entire line may be forced to shut down until the cause can be ascertained and remedied. Delivery capabilities suffer, and the non-fulfillment of just-in-time obligations can result in severe contractual penalties. Plant managers put various strategies into place to mitigate these financial risks. They have critical components replaced at fixed intervals, even if they are still working fine and do not actually need changing. They stockpile important spare parts, which requires additional storage and maintenance costs. Or they accept high express surcharges for express deliveries or repairs. The goal of predictive maintenance is to avoid these multiple consequential costs by recognizing unplanned disruptions in a timely manner and by allowing the components to reach their maximum life cycle without them posing a risk to the productivity of the plant.





▲ 01 Predictive maintenance uses locally collected data and cloud analyses to calculate the optimal service intervals.

WHAT DOES PREDICTIVE MAINTENANCE ACTUALLY ENTAIL?

To avoid unplanned disruptions, relevant data is first collected from the system with sensor technology, it is then securely transferred to the cloud and stored there. The disruption time is not predicted automatically. Algorithms search the data for abnormalities, which are then evaluated by an expert, who then decides about additional measures if necessary. The customer is informed in advance as to how they can prepare for maintenance and carry it out more efficiently. For example, they could plan to change a hydraulic pump during production-free periods over a weekend, when they will still have sufficient time to procure the replacement part.

WHY IS A PREDICTIVE ANALYSIS PERFORMED ON THE CLOUD?

In order to be able to show a critical machine status as precisely as possible at any given time, and to be able to warn the user of unplanned disruption as early as possible, the predictive analysis must be made on a cloud. One reason for this is that a cloud has unlimited computing capacities and it can also provide enough “food” for data-hungry machine learning algorithms. In an anonymized form, they add to the locally collected data, to a limited extent. This involves the processing of immense quantities of data, which would be impossible to do in a private computer center of an individual company. This means that the customer does not need an additional IT infrastructure.

HOW IS PREDICTIVE MAINTENANCE DIFFERENT TO CONDITION MONITORING?

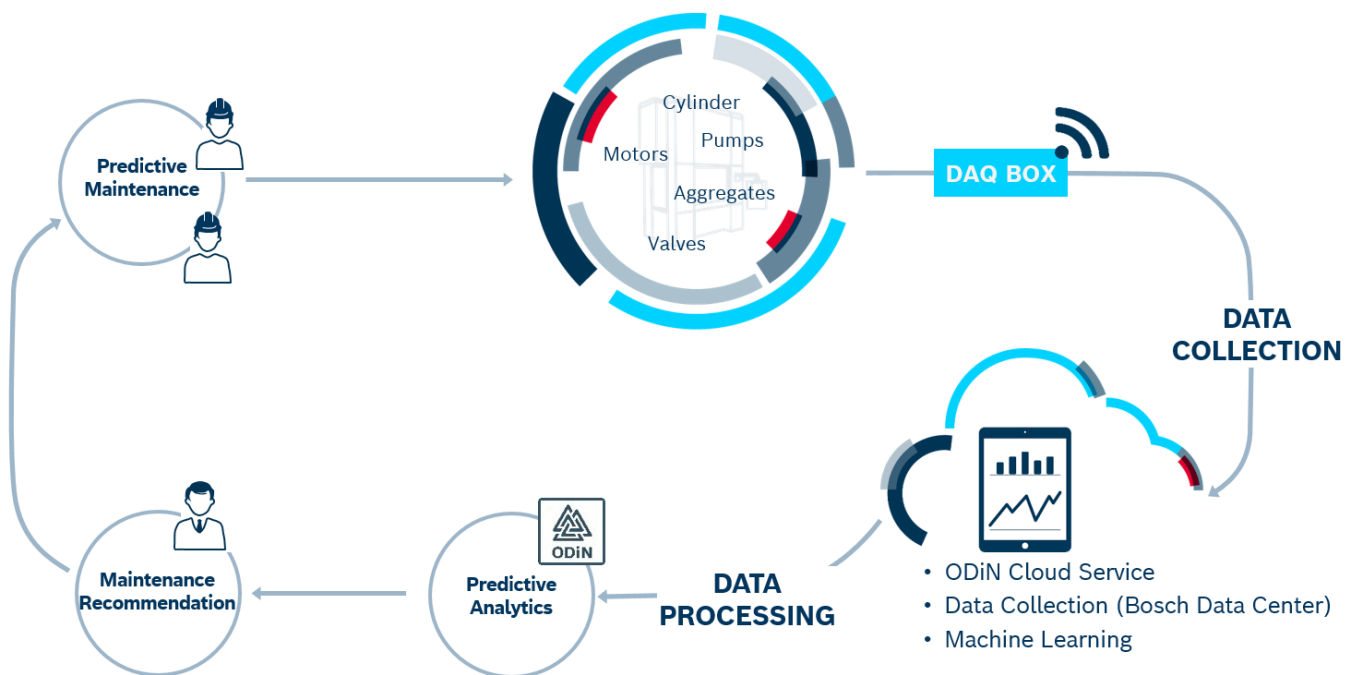
The advantage of the predictive analysis is that particularly complex error patterns can be detected earlier in comparison to a condition monitoring approach with limit value monitoring. Example: Condition monitoring easily detects temperature problems, but they usually occur at a late stage, meaning that there is not enough time left to avoid a breakdown. Predictive analysis involves a monitoring and early detection of potential error patterns.

CAN THE PREDICTIVE MAINTENANCE SYSTEM BE INTEGRATED INTO EXISTING PLANTS?

If the already installed sensor technology is not sufficient for the data collection, this can be upgraded easily and cost-effectively. Something that is crucial for the economic efficiency of the upgrades, is ensuring that the modernization does not interfere with or modify the existing structures. A gateway serves as a data collector to ensure the required connectivity to the sensor and cloud level. It is possible to configure the gateway without any real knowledge of programming.

INCREASED PRODUCTIVITY THROUGH ANTICIPATORY ACTION?

As unexpected machine downtime often results in immense costs, a predictive maintenance system already pays for itself after preventing one or two breakdowns. It also helps to increase productivity thanks to the plannable maintenance, prompt provision of spare parts and optimized storage costs that it provides.



▲ 02 From the local data collection to the cloud-based analysis: the individual components of predictive maintenance as a service.