

Press Information  
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## **Predictive maintenance: When a machine knows in advance that repairs are needed.**

+++ Predictive maintenance enhances efficiency and sustainability at the BMW Group +++ Smart digital monitoring and maintenance prevent unplanned production downtimes +++ Cloud-based platform integrated into global BMW Group production network +++

**Munich.** When it comes to maintaining production systems, the solution of choice at the BMW Group is to use sensors, data analytics and artificial intelligence (AI). So rather than the previous approach of rule-based maintenance at regular intervals, predictive maintenance is carried out, based on the current condition of the system. This not only prevents unscheduled downtimes in production but also makes an important contribution to sustainability and the efficient use of resources by ensuring optimum system availability. Innovative, cloud-based predictive maintenance solutions are currently being rolled out across the global production network.

### **Predictive maintenance as an early warning system in production.**

The increasing digitalisation of maintenance has made a predictive approach more and more important. By monitoring equipment and status data, predictive maintenance can forecast system failures before they actually happen. To optimise the upkeep of systems, data is used to decide when to replace components as a precaution so as to prevent unnecessary downtimes. Predictive maintenance also enhances efficiency and sustainability by ensuring intact components are not exchanged too early.

### **Forecasting states via a cloud-based platform.**

Predictive maintenance uses a cutting-edge cloud platform to obtain early warnings about potential production downtimes. The data comes directly from the manufacturing systems themselves, which are connected to the cloud only once, via a gateway, for monitoring, and then constantly transmit data – usually once a second. Individual software modules within the platform can be switched on and off flexibly, as needed, to accommodate changing requirements immediately. And with a high degree of standardisation between its individual components, the system is globally accessible, highly scalable and allows new application scenarios to be implemented easily and existing solutions to be rolled out fast.

Predictive maintenance allows maintenance and repair processes to be carried out as required by the actual condition of the system and planned into already-scheduled production downtimes. Repairs can be more accurately targeted and carried out more cost- and resource-efficiently. In addition, extending running times prolongs the service life of tools and systems significantly. The guiding principle behind the provision of this solutions is: Developed once, rolled out often – across the BMW Group production network.

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**Diverse range of applications.**

The flexible, highly automated systems in mechanical drivetrain production manufacture a conventional engine or casing for an electric motor every minute. To keep these machines in good condition, predictive maintenance uses simple statistical models – or predictive AI algorithms, in more complex cases – to detect any anomalies. It then issues visual warnings and alerts to inform employees that maintenance is due.

Over in the bodyshop, the welding guns perform about 15,000 spotwelds each per day. To prevent potential downtimes, data from welding guns around the world is collected by specially developed software. It is then sent to the cloud to be collated and analysed with the help of algorithms. All the data is displayed on a dashboard for worldwide use to support the maintenance processes.

In vehicle assembly, predictive maintenance helps prevent downtimes in conveyors. At BMW Group Plant Regensburg, for example, the control units of the conveyor systems work 24/7 to send data on points such as electrical currents, temperatures and locations to the cloud, where it is constantly evaluated. The data specialists can then identify the position, condition and activities of every conveyor element at any given time. Predictive AI models use the data to detect any anomalies and locate technical problems.

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**The BMW Group production network**

Uniquely flexible and highly efficient, the BMW Group production network is able to respond quickly to changing markets and regional sales fluctuations. Expertise in manufacturing is a key contributor to the BMW Group's profitability.

The BMW Group production network uses a range of innovative digital and Industry 4.0 (IoT) technologies, including virtual reality, artificial intelligence and 3D printing applications. Standardised processes and structures across the production system ensure consistent premium quality and allow a high degree of customisation.

**The BMW Group**

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 31 production and assembly facilities in 15 countries; the company has a global sales network in more than 140 countries. In 2020, the BMW Group sold over 2.3 million passenger vehicles and more than 169,000 motorcycles worldwide. The profit before tax in the financial year 2020 was € 5.222 billion on revenues amounting to € 98.990 billion. As of 31 December 2020, the BMW Group had a workforce of 120,726 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company set its course for the future early on and is making sustainability and resource efficiency the focus of the company's strategic direction – from the supply chain, through production, to the end of the use phase, for all its products.

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