



At Volkswagen in Wolfsburg, vibration sensors in press line 400 monitor the status of the main motor's bearings

Volkswagen AG

Volkswagen AG, Germany

Efficiency in the press shop

In its press shop in Wolfsburg, Germany, Volkswagen AG has established its own condition monitoring team, which is systematically implementing an integrated solution for condition-dependent maintenance. The goals are trouble-free production and maximum availability of the press lines. Initial experience shows that it is possible to save not only time and money this way, but also energy.



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The Siplus CMS X-Tools software analyzes, visualizes, and archives the measurement data and provides corresponding indications on the condition of machines and plants

About 67,000 employees manufacture around 3,800 vehicles every day in the Volkswagen factory in Wolfsburg. In this press shop alone – the largest of the entire group – approximately 2,000 employees help produce 400,000 auto-body components from 2,500 t of steel on the 38 plants every day. After initial studies showed that both efficiency and production could be optimized through condition monitoring, Volkswagen and Siemens together developed a comprehensive solution for the electrotechnical equipment of the press shop. “With the condition monitoring system, we were able to plan the replacement of a bearing in good time,” says Dipl.-Ing. Florian Becker, head of the condition monitoring team in the Volkswagen press shop in Wolfsburg. The bearing in question was that of a flywheel with a weight of about 10 to 15 t in press line 400. Seven of the large press lines had already been equipped with the Siplus CMS4000 condition monitoring system (CMS) by the end of 2013.

Precise diagnostics with powerful software

A maximum of six vibration sensors can be connected to the hardware of the CMS4000, that is, to the interface nodes. Due to the high sampling frequency of up to 192 kHz, it is possible to record vibrations that can be compared to the manufacturers' transmission and motor specifications in order to detect gradual or sudden changes in the frequency response. In addition, many other plant and operating data flow into the CMS as well, such as the purity levels of the hydraulic oil, oil temperatures, water content of hydraulic fluids, currents, vibrations, and pressures. For example, more than 300 measuring points are merged in the central control system of press line 400, an industrial PC from Siemens. The art in this process is the intelligent evaluation of the data, not their generation.

Volkswagen uses the Siplus CMS X-Tools software for the evaluation. With it, data are analyzed, visualized, and archived. Users can enter the desired coverage as well as the permissible range of values in the software and thus automatically document any deviations. A traffic-light function with different colors ensures fast visual detection. This way, the employees in the Volkswagen press shop can measure, for example, the vibrations on bearings, transmissions, and so on at 15-minute intervals. Each measurement takes about 30 seconds. The measurement cycles are set up in X-Tools individually, depending on the components. The same, of course, also applies to the remaining measured values such as pressures, currents, and so on. From this information, the operators can read trends and also immediately detect sudden changes in condition.

Improving energy efficiency

Condition monitoring can also contribute to increasing energy efficiency. Nonconformance and optimi-

Advantages of Siplus CMS4000

- Open software design for industry-specific extensions
- Creation and protection of customized analysis models based on off-the-shelf function blocks
- Optimized for reaction-free integration into existing and new automation plants
- Quality assurance for production processes through black box functions
- Detailed analysis, diagnostics, visualization, and archiving
- Continuous monitoring of rolling bearings, transmissions, fans, pumps, and machines – all the way to low-frequency tower vibrations

zation potential can be determined through the evaluation of consumption data, especially during downtimes, and energy can also be saved through the timely implementation of maintenance measures. For example, a leak in the compressed air network would be detected through the data evaluation in condition monitoring. Moreover, despite the fact that production sequences have already been energy optimized, there are still devices that require energy even when they are not used in the production process. These include claws in the suction presses, electrical drives, and hydraulic pumps. For this reason, the CMS and the exact consumption flows should be openly accessible from the shopfloor, the plants, and the control station. It is, of course, possible to code the system in a role-based manner, so that data can only be seen and adjusted by those employees who are authorized to handle them in accordance with their positions.

Systematic increase in cost-effectiveness

Experience so far clearly shows the benefits of carefully planned condition monitoring. Thanks to the option to incorporate numerous values from the automation level, such as current, voltage, and so on, the project team was able to save a great deal of money. With the Siplus CMS4000 interface nodes as hardware and the Siplus CMS X-Tools software, the team was able to set up a comprehensive system for the technical monitoring of press lines in the press shop at Volkswagen AG with only relatively little additional installation effort. ■

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