



Shop Floor Integration for sensor manufacturer

Automation instead over-maintenance

Digitization has led to an optimization of processes in production companies. However, there are still areas that require a lot of manual recording. This includes, for example, the maintenance of machines, which is generally carried out at intervals recommended by the manufacturer. A sensor manufacturer from the Ruhr area is now relying on condition-based maintenance for the production of one of its most important components using Shop Floor Integration, which is based on real data and records the individual wear and tear of tools. Automation prevents over-maintenance and premature tool replacement, thereby reducing costs and extending machine run times.

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ifm electronic GmbH, based in Essen, develops and produces highly specialized sensors for industry at locations in Germany, the USA, Singapore, Poland, Romania and India. 7,300 employees worldwide work for the company, which supplies customers from the packaging, automotive and food industries as well as machine tool manufacturers. With the ever growing trend toward Industry 4.0, IO-Link sensors are becoming increasingly important. Easy to set up and improving the transparency of machine data, these sensors promise an increase in efficiency and cost savings.

ifm produces IO-Link sensors at its plant on Lake Constance. The sensors differ in that they can not only measure, but also aggregate and forward information. Therefore, they can be used in a variety of ways in production facilities. The most important element of the intelligent sensors is a circuit board that enables communication. The circuit board is manufactured using surface mounted device (SMD) assembly machines from FUJI. However, regular maintenance of the placement heads is vital to ensure consistently high quality.

Condition-based maintenance instead of maintenance recommendations from the machine manufacturer

Up to now, the maintenance recommendations of the machine manufacturer have always been followed in the plant. Over time, however, it became apparent that the placement heads were not achieving their maximum output (number of picks per placement head) using this maintenance method, resulting in unnecessarily high costs and maintenance effort. "We therefore decided to switch to condition-



based maintenance and servicing, but we had to accept that the net effect would be limited. This was because the only way to determine the capacity limit of the placement heads was by laboriously and continuously checking the counter reading on the machine,” explains Stefan Gessler, head of the maintenance department at ifm. The only way to avoid having to manually enter the data into the ERP system, which would require a lot of staff input and would also be prone to error, would be to implement an automated solution.

They eventually opted for Shop Floor Integration (SFI), a vertical digitization solution from Siegen software manufacturer GIB mbH. With this solution, a sensor system in the machine measures the number of times the placement head is raised and lowered and automatically forwards the data to the ERP system. If the maximum number of picks is reached, a maintenance order is automatically created and a spare parts reservation is triggered. “For us, the big advantage of SFI was that we could use existing hardware and software. We didn’t have to install additional sensors, make changes to the middleware or adjust the ERP system. Standard customizing functions are used to create a connection from the shop floor to the business process level,” explains Matthias Marx, IIoT consultant at GIB.

Access information in real time and trigger alerts

SFI is a software solution that takes sensor data from the middleware and forwards the information to the corresponding areas in the ERP system. The information is saved there for later evaluation and serves as the basis for recommendations for action. This includes, for example, alerts for automatic purchase requisitions. For production of the printed circuit boards, in particular, this means that every placement head is recorded by barcode in the SAP system. The exact pick number of each head can be called up in real time. Depending on the individual degree of wear, the ERP system automatically suggests replacing the placement heads, which the maintenance technician can then carry out immediately. This way ifm avoids over-maintenance and the premature replacement of components, which would otherwise generate unnecessary costs and consumption of resources. “Maintenance and repairs have become easier for us to plan. We have been able to minimize downtimes and set-up times while at the same time ensuring high-quality production,” summarizes Stefan Gessler. “At the same time, thanks to the conservation of resources we have achieved, we are taking a further step towards green production by operating more sustainably.”

SFI has led to numerous improvements and more efficient machine utilization. Instead of manually entering the current number of picks into SAP once a week,



the movements of the placement head are automatically recorded and transmitted twice a day. Thanks to tracking, those responsible for production also know exactly where every tool is being used. In terms of production, it was also particularly pleasing that the entire implementation, including process analysis and training, only took two weeks. The loss of production itself was minimal. Last but by no means least, the solution is not expensive, allowing the company to recoup its investment within just six months.

Conclusion

Companies often assume that large investments are necessary to implement automation and digitization systems for Industry 4.0. However, in some areas, even small solutions can have a big impact without affecting ongoing operations in the long term. The implementation of SFI at ifm shows that a significant optimization of work processes can be achieved with comparatively little effort and expense. With component solutions like SFI, it is also worth noting that very little training is needed for employees and the solution is generally widely accepted.