Integrating Maintenance Management Into MES

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The need to reduce all forms of inefficiency and reduce capital investment by maximizing the use of existing assets rather than acquiring new ones is leading many companies to pay greater attention to maintenance management and consider the possibility of managing it as a business or production process. This, however, opens an organizational debate: Is maintenance a business process or an operations process? Does maintenance need to be part of enterprise resource planning (ERP) or the manufacturing execution system (MES)?

My opinion, as I wrote a couple of years ago, is that maintenance management is much more effective if brought to the operations level, where it can be integrated with other production processes and managed much

closer to where things actually happen. This seems to be a slow but strengthening trend, and many companies are implementing maintenance management as a part of an MES/MOM project.

A great contribution to this comes from technology.

> The possibility to connect assets and acquire information from them automatically—moving from preventive to predictive maintenance—requires managing all the data collected.

This is a task that comes easier to a system designed to manage operational rather than business processes.

We recently developed a project that integrates maintenance management into the MES, creating a single integrated tool to manage all the processes happening at the operational level. It's interesting to examine some of the reasons why the client decided this approach and some results they were able to achieve.

The manufacturer was actually in a pretty common situation. It had an ERP system in place, managing accounting, finance, stocks, master items and manufacturing resource planning (MRP). All the maintenance activities were managed externally to the system using paper-based forms and Excel spreadsheets. No data was acquired directly from the field, and the information was not even manually integrated with the production data.

In terms of maintenance, it was kind of a greenfield situation, enabling the constraint-free choice of integrating maintenance management into ERP or MES. The manufacturer, fortunately, chose MES, and we began integrating all maintenance-related activities into execution management.

The maintenance plan was integrated with production scheduling in order to minimize the impact of any activity on production time or product quality. Information about stoppages are collected automatically and delivered to maintenance personnel in real time, and are also used to automatically trigger work orders in the case of situations impacting production. All activities are tracked and execution time measured in order to calculate KPIs both on production and on maintenance, analyzing how the two processes interact and correlate. All information is available both in real time to enable production and maintenance operators to make informed decisions, and on a historic basis to analyze the behavior trends and optimize the organization.

Everything was designed to be paperless. Any information, instruction, mechanical or electrical draw is accessible from mobile devices close to the asset under maintenance. Spare parts are identified as well as their location, and stocks are managed accordingly in real time. Production operators can access maintenance screens from the local PCs while maintenance personnel can access specific SCADA screens from mobile devices. This enables both of them to have a clear view of what's happening without moving from their natural working positions to interact with the system. All collected data can be used immediately and seamlessly in both systems without the need for specific interfaces.

The result, as you can see, is a single totally integrated system that manages not only the maintenance "numbers," but rather the maintenance activities optimizing the integration with production.

After just a few months of usage, there's not yet enough history to have complex statistics and data on the turnover, but there are already some clear benefits:

- The impact of maintenance activity on production is reduced through the integration of two processes, and the planned availability of production assets is increased.
- Production asset downtime is reduced because of the prompt response of maintenance operators as soon as any abnormal situation triggers an activity.
- Data is available in real time; and because it's managed directly in place, it is more accurate than the data previously collected ex post. This gives a better view of how the processes interacts and enables better organizational choices.
- Maintenance activities take less time with all the documentation available on mobile devices. This not only reduces the time needed to collect the necessary documentation, but also reduces the number of errors.

- Collaboration has increased because of the more transparent information availability.

  I believe we collected the low-hanging fruit at this point, and there will be many more benefits moving forward.

  But even the first results are extremely positive and, in my opinion, difficult to reach with a different approach.