Making the digital breakthrough

Many machine manufacturers are asking themselves what they need to do to stay ahead of the competition in the age of digitalisation and Industry 4.0. What does the future look like? What do/will customers really want? How can you make your business fit for the future? What do you have to do to keep up?

This article is intended to give machine manufacturers some concrete recommendations for action based on what customers typically want now. A specific application is then presented to explain how such customer requirements can be met.

Predictive maintenance

The condition monitoring of machines and systems has been around a long time. Predictive maintenance, however, gives customers a significant new benefit. Condition monitoring uses conventional methods to monitor the status of machines. When pre-defined limit values are exceeded, alarms are generated, and on-site operating personnel are informed of the problem. The system then requires shutting down to trouble shoot and to perform any repair work needed. Condition monitoring therefore results in downtimes which are difficult to plan and budget for. Such problems can be avoided with modern "predictive maintenance" approaches. These use clever algorithms, based on the combined analysis of many different operating parameters, to predict the expected failure times of individual system components. System operators can then plan downtimes to have minimum impact on operations. The algorithms used in predictive maintenance are usually "adaptive", i.e. prediction quality improves with the number of monitored systems. The ideal place for such adaptive systems is a worldwide accessible cloud, especially when systems at different locations are to be centrally monitored.

Connectivity

For the efficient use of modern condition monitoring or predictive maintenance systems, the different data sources require connecting with each other and to the cloud. Efficient analysis can be carried out only when all operating parameters are brought together and evaluated centrally. To achieve this for systems of machinery that have been built up over the years may require major effort. For new facilities, connections to different types of cloud services are required by operators who may also want to connect multiple systems located around the world and monitor them from a central control centre.

Complete solutions

Customers/system operators typically no longer want to design such a monitoring application themselves nor assemble together the individual components such as sensors, data acquisition devices, measurement data management and software for visualisation and analysis. Instead they want finished solutions with all the components, including installation and commissioning, coming from a single source. They can then expect optimum compatibility across the entire system and need only one point of contact for maintenance and servicing.

Delphin Technology AG
Lustheide 81 | 51427 Bergisch Gladbach · Germany | Phone +49 (0)2204 97685-0 | Fax +49 (0)2204 97685-85
info@delphin.de | www.delphin.com

"Everything-as-a-Service" becoming increasingly important

Machine operators benefit even more when they no longer need to worry about commissioning, planning and the carrying out of maintenance or repair tasks because these can be left to the machine manufacturers. This extends to another level the business models of machine manufacturers. Profits are then generated not only from the sale of machines and systems, but also through recurring income from a monthly service provision of guaranteed machine availability. Customers gain many advantages from the model. By paying a fixed monthly fee, they get guaranteed machine availability for the month. Costs can be accurately budgeted and unplanned expenses are virtually eliminated.

Meeting the needs of customers

How can a machine manufacturer best meet such needs? The simplest way is to work together with a measurement technology provider who has a product portfolio that enables the setting up of a globally connected monitoring system: from hardware for data acquisition and central measurement data management through to the worldwide, location-independent visualisation and analysis of measurement data. Each machine system sold can then be equipped with the necessary hardware and software and connected to the central measurement data management system and the cloud. Machine manufacturers can then offer customers an individualised complete solution, including the required services.

What does such a solution look like?

A solution currently being used: Condition monitoring on conveyor belts for bulk material

An internationally operating manufacturer of conveyor belts for bulk material not only wants to sell its systems, but also to offer service and maintenance agreements. To be able to do this cost-effectively, the system manufacturer needs to monitor and analyse systems located around the world from its central control centre.

How has the task been achieved?

The system manufacturer uses Loggito devices from Delphin to record the relevant operating parameters for condition monitoring. All the sensors being used such as 4-20 mA, thermocouples and Pt100s can be connected to the Loggito. Measurement data undergoes pre-processing in the Loggito devices and is then transferred into the network via LAN, WLAN or LTE depending on the location, before being transmitted to the Delphin Data Center, a central measurement data management system installed on a central server of the conveyor belt manufacturer. The data is then consolidated and further processed there. Measurement data analysis, which forms the actual core of the condition monitoring system, is also carried out there. The manufacturer's many years of experience means it has expertise in knowing how parameters relate to the condition of the machines. AI algorithms are planned for the future to further improve the predictive quality. When analysis indicates damage is imminent, the manufacturer receives an alert at the central control centre and is then able to take appropriate measures. Depending on the type of service agreement concluded, the appropriate measure might be either notifying the customer of a required service or actually carrying out the service.

Predictive maintenance enables machine downtimes to be minimised for customers. Machine operators also require, separate to a centralised system for condition monitoring, a simple on-site option for visualising the current operating parameters. ProfiSignal Web from Delphin can be used for this purpose. This software enables any local machine operator to connect wirelessly to the Loggito devices via a smartphone or tablet and view the current status of the machines using personalised dashboards in any browser.

Summary

Both machine manufacturers and operators are benefiting from the new trends from digitalisation. New business models are emerging for mechanical engineering companies, especially in the service sector. These new models can use predictive maintenance to enable machine operators to better plan their downtimes and fully outsource machine maintenance when required.

To be able to implement these new trends requires reliable, globally distributed data acquisition, central consolidation and further processing of any type of measurement data as well as its location-independent visualisation.

Such requirements can be met by using the Delphin Data Center – a central measurement data management system – in combination with measurement data acquisition hardware and the software ProfiSignal from Delphin.

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