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## View Machinery As 'Functional'

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### **Is your maintenance capability able to support the growing business velocity that manufacturing technology enables?**

*By John Teresko*

Most production machinery is not equipped to predict maintenance needs or anticipate how wear points will eventually degrade," says Jay Lee, director, Center for Intelligent Maintenance Systems (IMS) at the University of Wisconsin, Milwaukee. The result is a strategic disconnect with the business model.

Lee, with support of the National Science Foundation and industry partners, wants to change that. He is leading a comprehensive approach to maintenance issues and technologies with his IMS research partner Jun Ni at the University of Michigan, Ann Arbor.

"The idea is to refine best practices, develop standards and initiate test beds for the strategic use of maintenance systems and technology," says industry partner Joe Kann, vice president global business development, Rockwell Automation, Milwaukee. (IMS industry partners total more than 30 across manufacturing.)

One IMS focus is studying how to bring a greater infotronics capability to traditional production equipment. "The objective is to have the manufacturing investment provide better support of business objectives." Lee's point: Conventional machine controllers and communications linkages aren't enough. "We need to understand that a production machine needs to be considered as a functional asset, not a physical asset," he asserts.

"Infotronics will eventually allow a machine to have a direct connection from a user to suppliers to machine makers." To reach that objective, Lee is first addressing research on predictive maintenance. The emphasis is on performance monitoring, not failure monitoring.

Lee predicts machine tools three to five years hence "will routinely order the cutting tools and cutting fluids. They will be proactive, not reactive production partners." The enabling software is IMS' D2B (Device-to-Business) platform. "The idea is to transform machine data and information into a valuable business asset."

The plants of some IMS partners serve as ongoing test beds. For example a GM plant is now validating IMS computational algorithms for predicting the degradation or performance loss of production equipment, says Pulak Bandyopadhyay, laboratory group manager at the GM R&D Center's Manufacturing Systems Research Laboratory, Warren, Mich.

The tests involve multiple sensor signals from various wear points on manufacturing equipment. Bandyopadhyay is careful to say that the solution may not be one of adding more sensors to machines. "One of the problems we had in the past was that our plant floor network infrastructure did not allow us to access that information."

He says GM's move to Ethernet will permit the use of real-time information. "With Ethernet enabling the plant floor network, we will have a lot of signals in real time. Only then will we evaluate whether additional machine sensors are necessary." Bandyopadhyay says the IMS efforts could have significant impact across all manufacturing.