

Prognostics and Health Management of Modern Systems and Components: Recent Developments and Perspectives

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ABSTRACT

The ever-rising competitiveness on global markets is constantly pushing up the requirements for higher quality of the products and services as well as improved reliability and efficiency. Prognostics and Health Management (PHM) is an enabling technology that helps meet these goals by converting knowledge on failure mechanisms into decisions on system lifecycle management. Key to the PHM is in the ability to anticipate the time when the component will fail and to take timely and optimal mitigation actions. First major successes of PHM have been witnessed in the aerospace industry and transport. Substantial impact on the return of investment has been demonstrated thanks to the improved reliability and availability of the equipment, higher product quality and breaking the maintenance costs by replacing periodic maintenance with condition-based maintenance.

In this talk, we will first review the most recent advances in PHM. Its rising deployment into new areas is conditioned with rapidly evolving enabling technologies such as the Internet of Things, cloud computing, edge computing and Big data. Some promising results from our own case studies will be shared, in particular in the domain of critical industrial drives and the new generation of solid oxide fuel cell systems. The aim of the talk is not only to show the potentials of PHM but also to point out how fertile ground it is for problems and challenge attractive for the research community.

The final part of the talk will address the perspectives of PHM within the evolving concept of Industry 4.0, and future generation of machines and devices.