The everyday increasing competition in industry and the compulsion of faster investment paybacks for complex and expensive machinery, in addition to operational safety, health and environmental requirements, take for granted high availability of the production machinery and high and stable quality of products. These targets are reached only if the machinery is kept in proper working condition by utilizing an appropriate maintenance tactic. In this frame of thought, monitoring of machinery systems has become progressively more important in meeting the rapidly changing maintenance requirements of today's manufacturing systems.

Besides, as the pressure to reduce manning in plants increases, so does the need for additional automation and reduced organizational level maintenance. Augmented automation in manufacturing plants has led to rapid growth in the number of machinery sensors installed. Along with reduced manning, increased operating tempos are requiring maintenance providers to make repairs faster and ensure that equipment operates reliably for longer periods. To deal with these challenges, condition based maintenance (CBM) has been widely employed within industry.

CBM, as a preventive and predictive action, strives to identify incipient faults before they become critical through structural condition assessment derived from different condition monitoring techniques (CMT) and nondestructive tests (NDT). An effective CBM program requires early recognition of failures and accurate identification of the associated attributes in a feasible manner. The achievement of this proficiency in industry is still intricate and relatively expensive due to deficient information about the potential failures as well as inadequate knowledge or improper application of different CMTs and NDTs.

Accordingly, a new toolbox has been developed to facilitate and sustain effective CBM programs in the industry. The CBM toolbox is consisted of three major tools. The first tool is a series of statistical failure analyses which uses the failure history data available in a plant's information system to generate valuable information in tabulated and graphical postures. The second tool is a repository filled with expert knowledge about different CMTs and NDTs formatted in a way that in addition to the concept of each technique, its applicability, detectability, and its pros and cons are expressed. The third tool is an object based problem and cause analysis whose outcome is tabulated problem-cause relationships associated with particular machinery objects. These major tools are also accompanied by two supplementary tools, a financial analysis tool and a selection matrix, to ensure feasibility of all undertaken decisions while using the toolbox.

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