The Integrated Methodological Development of Reliability, Risk and Condition-Based Maintenance in the Improvement of the Thermal Power Plant Availability

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Abstract : Availability of a complex system of thermal power plant is strongly influenced by the reliability of spare parts and maintenance management policies. A reliability-centered maintenance (RCM) technique is an established method of analysis and is the main reference for maintenance planning. This method considers the consequences of failure in its implementation, but does not deal with further risk of down time that associated with failures, loss of production or high maintenance costs. Risk-based maintenance (RBM) technique provides support strategies to minimize the risks posed by the failure to obtain maintenance task considering cost effectiveness. Meanwhile, condition-based maintenance (CBM) focuses on monitoring the application of the conditions that allow the planning and scheduling of maintenance or other action should be taken to avoid the risk of failure prior to the time-based maintenance. Implementation of RCM, RBM, CBM alone or combined RCM and RBM or RCM and CBM is a maintenance technique used in thermal power plants. Implementation of these three techniques in an integrated maintenance will increase the availability of thermal power plants compared to the use of maintenance techniques individually or in combination of two techniques. This study uses the reliability, risks and conditions-based maintenance in an integrated manner to increase the availability of thermal power plants. The method generates MPI (Priority Maintenance Index) is RPN (Risk Priority Number) are multiplied by RI (Risk Index) and FDT (Failure Defense Task) which can generate the task of monitoring and assessment of conditions other than maintenance tasks. Both MPI and FDT obtained from development of functional tree, failure mode effects analysis, fault-tree analysis, and risk analysis (risk assessment and risk evaluation) were then used to develop and implement a plan and schedule maintenance, monitoring and assessment of the condition and ultimately perform availability analysis. The results of this study indicate that the reliability, risks and conditions-based maintenance methods, in an integrated manner can increase the availability of thermal power plants. Keywords : integrated maintenance techniques, availability, thermal power plant, MPI, FDT

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