CERTIFICATION OF APPROVAL

PERFORMANCE MEASURE FOR STEAM ABSORPTION CHILLER OF A DISTRICT COOLING PLANT

By

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Approved by,

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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

SITI SUHAILAH BINTI KHAIRULLAH

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ABSTRACT

The project focuses on development of reliability and availability model for steam absorption chiller at Universiti Teknologi PETRONAS Gas District Cooling (GDC) plant. Since failure data is not easily available, performance data is used to develop the model. The Markov model has been adopted. Historical performance data 2009 and 2010 for the steam absorption chiller has been used for analysis. Pareto Principle has been used to group the data in order to determine the number of states. Initial analysis indicates that the data could be divided into three groups; first group is between 850~1250 RTh, second group is between 450~850 RTh and the third group is between 0~450 RTh. Hence, the Markov model will have three states namely; state 2 with 850~1250 RTh, state 1 with 450~850 RTh and state 0 with 0~450 RTh. Using Markov model to develop multi-state system, the failure rate has been determined based on mathematical equation of Markov Chain and state space diagram. The availability and reliability graph were obtained using Matlab software based on differential equation method. The comparison for both results was also done using the traditional binary system which is BlockSim software. The availability results obtained between Matlab software and Block Sim software have small percentage different of 1.31% whereas the reliability result between Matlab software and Block Sim software have the high percentage different of 31.03%.

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