

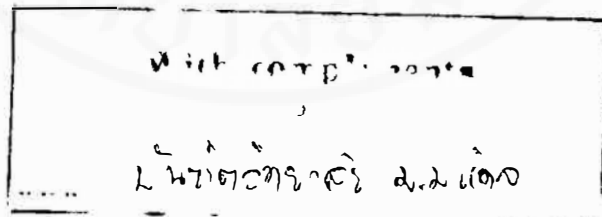


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AN APPLICATION OF FUZZY LOGIC  
TO MACHINE PERFORMANCE EVALUATION

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#### ABSTRACT

In machine performance evaluation, the risk assessment is found to be an effective way to evaluate the system criticality for Failure modes, Effects and Criticality Analysis (FMECA). Two parameters are concerned in the risk assessment. One is the severity of failure and another one is its probability of occurrence.

Due to the representation of the severity of failure and its probability of occurrence are often too vague, ambiguous, imprecise and too complex for formal mathematical modeling. The traditional method of risk assessment is found to be not suitable to handle such problems effectively.

This thesis proposed an idea to enhance the risk assessment of a Failure modes, Effects and Criticality Analysis (FMECA) based on the severity of failure and its probability of occurrence by using fuzzy logic theory. By this approach, fuzzy logic provides a tool for directly manipulating the linguistic terms that an analyst employs in making a criticality assessment for a FMECA. This allows for an analyst to evaluate the risk associated with the failure modes in a natural way. Then appropriate actions to correct or mitigate the effects of the failure can be prioritized even though the information available is vague, ambiguous, qualitative or imprecise. This will cause an improvement of the overall performance of the system/machine effectively.

The prototype of the proposed risk assessment model is developed and implemented to the real world system in a semiconductor manufacturing plant as the case study. From the experimental results, the approach proposed by the author is met the objectives of this thesis. There is some improvement of overall performance of the machine and can identify and prioritize the appropriate corrective action to the machine effectively.