



**Faculty of Information and Communication  
Technology**

**MAINTENANCE MODELLING TOOLS WITH  
SPECIAL REFERENCE TO INCOMPLETE DATA**

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**MAINTENANCE MODELLING TOOLS WITH  
SPECIAL REFERENCE TO INCOMPLETE DATA**

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## DECLARATION

I declare that this thesis entitle “Maintenance Modelling Tools with Special Reference to Incomplete Data” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :  .....

Name : ABD. SAMAD BIN HASAN BASARI

Date : 28 AUGUST 2009 .....

## DEDICATION

*Dear Allah*

*I devoted my life and death to You, Allah. May my life is within Your guidance.*

*Dear My Parent*

*Thank you for your sacrifice and love. No such compensate except from Allah.*

*Dear My Beloved Wife*

*Your support, patience and encouragement give me strength to finish this study. May Allah bless us.*

*Dear Teachers*

*Thank you for all the knowledge. May your knowledge are beneficial and useful for all humanity.*

*Dear My Siblings*

*Thank you for your support and love. May Allah forgive us.*

*Dear My Children*

*May Allah guide and protect us to be good Muslims.*

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Abd. Samad Hasan Basari, Melaka, March 2009.

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## LIST OF ABBREVIATIONS AND GLOSSARY

AHP	<i>Analytic Hierarchy Process</i> , a method which can allow the decision makers to model a complex problem in a hierarchical structure showing the relationship of the goal, criteria, sub criteria and alternatives.
AI	<i>Artificial Intelligent</i>
CMMS	<i>Computerised Maintenance Management System</i>
CN	<i>Criticality Number</i> , a number used in FMECA to represent components/machines criticality with a specific formula based on probability theory.
CPO	<i>Crude Palm Oil</i> , a palm oil which is one of a final product at POM.
Decision Analysis	A decision support technique that utilise AHP, FLRB and DMG.
Defuzzification	A process to derive a crisp value from a fuzzy function. The crisp value then presented in a meaningful value that could be understand by the users.
Delay Time	The time lapse from when a defect can be first identified at an inspection to the time that the defect causes a failure (breakdown).

DMG	<i>Decision Making Grid</i> , a method to conduct prevention action analysis.
DSS	<i>Decision Support System</i>
ESS	<i>Enhance Subjective Survey</i> , a computer-based survey form aims to collect all information needed in developing maintenance model.
FFB	<i>Fresh Fruit Bunches</i> , a fresh ripe fruit plucked from palm tree to be processed at POM.
FLRB	<i>Fuzzy Logic Rule Base</i> , a rule base technique adopted from fuzzy logic theory.
FMECA	<i>Failure Mode, Effect and Criticality Analysis</i> , a bottoms-up method of analysing a system design or manufacturing process in order to properly evaluate the potential of failures.
FTA	<i>Fault Tree Analysis</i> , a top-down method of analysing a system in order to properly evaluate the potential of problems.
Fuzzification	A process to classify a membership function and universe of discourse in the fuzzy logic theory.
HLA	<i>How Long Ago</i>
HML	<i>How Much Longer</i>
IT	<i>Information Technology</i>
KKSBP	<i>Kilang Kelapa Sawit Bukit Pasir</i>
KKSS	<i>Kilang Kelapa Sawit Semenchu</i>
KSUB	<i>Kilang Sawit United Bell</i>