



REVERSE ENGINEERING :
A CONCEPTUAL STUDY OF FATIGUE FAILURE
FOR GEAR APPLICATIONS



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BACHELOR ENGINEERING (HONS) (MECHANICAL)
UNIVERSITI TEKNOLOGI MARA (UTM)
NOVEMBER 2009

"I declared that this thesis is the result of my own work except the ideas and summaries which I have clarified their source. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

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ACKNOWLEDGEMENT

I would like to express my sincere gratitude and appreciation to my supervisor and co-supervisor for their continue support, generous guidance, help, patience and encouragement in the duration of the thesis preparation until its completion.

ABSTRACT

Fatigue failure contributes a large percentage of gear failure. Fatigue failure is known as a sudden and catastrophic separation of a machine part into two or more pieces as a result of the application of fluctuating loads or deformations over a period of time. In daily applications, a gear system will experienced this kind of failure mode since its applications involved loading and unloading loads for a period of time. Basically, in gear system, the point of concentration for fatigue is at its root. However, it is difficult but not impossible to investigate the fatigue behavior at the root. For this study, two materials that differ in their materials compositions were prepared for fatigue analysis, since analyzing a root of gear teeth has a difficulty. Also a construction of a gear model was performed by using CATIA and MITcalc software. As an experimental validation for fatigue analysis, a series of loads is applied to the specimens. This method represents a better way in analyzing crack propagation on the material's surface until it is fractured. At microscopic level, propagation of crack until fracture can easily be seen. For this study, this is a critical part, since the different in material compositions contributed to the different type of crack propagation. At this stage, any minor difference must be taken since it brings a lot of contributions to the analysis. Based on the result of this study, it is expected to achieve a deep understanding on how the crack propagates on two different kinds of materials.

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