MACHINE SIGNATURE CLASSIFICATION

This thesis is presented in partial fulfilments for the award of the Bachelor of Electrical Engineering (Honours) UNIVERSITI TEKNOLOGI MARA

NOOR FARHEEN BT MOHAMAD ZUBIR
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM
SELANGOR

ACKNOWLWDGMENT

Alhamdulillah, I praise God the Almighty for the blessings endowed upon me and give me the determination and patience to complete the project and the thesis.

I would like to express my gratitude to my advisor Puan Putri Aidawati Ahmad and Puan Zaiton Sharif for their help, support and patience during my completion of the project. Special thanks to Puan Putri Aidawati for giving me the permission to study and used her thesis as part of my project.

I also would like to thank En. Hasni Abd. Razak, En. Ridzuan Ali and Cik Maziaton Othman from Abacus Electronic Shop, Abacus Technical Department (ATD) for their time and guidance during my visits to Texas Instruments Malaysia Sdn. Bhd. Also not to forget my deepest appreciation to my family and friends for their understanding, full support and help all the way from the start of the project until the completion of this thesis.

ABSTRACT

Machine Signature Classification involves the classification of types of faults associated with the wire-bonding machine through monitoring the damping signature. The condition of one machine could be determined at any instant of time. In this study, the parameters of signature of the machine used in the manufacturing of Integrated Circuit (IC) are going to be classified.

Preliminary studies have shown that defect or fault associated with electro mechanical equipment is correlated to the electrical signature of the servo system. Using Exsys CORVID, the parameters of signature that best represent the characteristic of signature can be extracted. Damping signatures were collected using digital oscilloscope and spectrum analyser. From the parameters extracted, a set of data is obtained. Next, it is being tabulated or compared where afterward the machine condition can be determined. It can be good (can give a 100% accurate output) or defective and then list out what are the mechanical and electrical problems.

In this study, the damping signature is chosen because the shape of the damping signature reflects the condition of the machine. Any distortion or abnormalities in the shape of the signature indicates a problem and the system will flag the machine operator whenever the rule-base is met. The exact faulty component is shown and therefore it will assist personnel handling the machine. This type of maintenance is called predictive maintenance where the fault can be determined before breakdown occurs. The parameters of signature of the machine are classified using Exsys CORVID for predictive maintenance and monitoring system.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Background

Maintenance is an activity performed to avoid, detect, forestall, prevent, or counteract failure in order to maintain a plant's or machine system's physical facilities and equipment in optimum or acceptable working order [1].

In the early days of industrial development, maintenance has been synonymous with "repair" - an activity that involve varying amounts of craft, skill, brute-force, and common sense. Users tried to "maintain" machines only when something broke and they "needed it" - i.e., "*run-to-failure maintenance*". Normally, an examination of the failed parts provides evidence as to "what failed" and possibly the failure mode; but seldom does such an examination reveal the real culprit that caused the failure to occur in the first place. Thus, operators have practiced a corrective maintenance philosophy that is totally an unscheduled, emergency, crash crisis type of repair activity-often referred to as "breakdown maintenance". Such maintenance programs respond to "effects" of mechanical distress rather than actively pursuing and eliminating its causes.