IMPROVEMENT OF MOTORCYCLE SUSPENSION TEST SET-UP

MOHD ZAKI BIN BAHROM

(2000338798)

A thesis submitted in partial fulfilment of the requirements for the award of Bachelor Engineering (Hons) (Mechanical)

Faculty of Mechanical Engineering

Universiti Teknologi MARA (UiTM)

DECEMBER 2003

ACKNOWLEDGEMENT

Praise and grace to ALLAH S.W.T Creator of the universe for under His command, I manage to complete my final project. This final project (EM 220) is prerequisite in attaining a B. Eng. (Hons) in Mechanical Engineering from the Mechanical Engineering Faculty, Universiti Teknologi Mara.

I would like to express my gratitude to my Project Advisor, Prof. Madya Dr. Solomon Darius Gnanaraj and Mr. N. Valliyappan David for their help, advice and guidance in completing this final project and the preparation of this report.

Special thanks also to all technicians in Workshop of Mechanical Engineering especially Mr. Abdul Halim (Chief Assistant Technicians), Mr. Adam Mahlis, Mr. Ahmad Khuzairi Omar Bakhi, Mr. Darnalis A. Rahman for their help to constructive suggestion and for their physical help in the design work. Without their co-operation, help and encouragement, I would not have been able to complete this project work.

I also thank The Institute of Research Development and Commercialization (IRDC), UiTM for providing financial assistant for carrying out this project.

Finally, it is pleasure to thank all who have involved directly or indirectly in this project. Thank you.

ABSTRACT

This project is about the improvement of the Motorcycle Suspension Test Set-up and the vibration test on the motorcycle suspension performance using the new test rig. The testing was conducted on the motorcycle which has complete parts to find the effect of adding Palm Oil to the Fork Oil in different proportions. The viscosity tests are also conducted to find the viscosity of fork oils having different percentages of palm oil (0%, 10%, 30%, 50%, 70%, 90% and 100%).

Linear bearing are used to guide the motorcycle in the vertical direction during testing. A platform is provided in the testing, so that the motorcycle can be easily fixed for testing.

The advantages of the improved test set-up over the earlier test set-up are highlighted. The performance of Fork Oil containing 10% Palm Oil is found to perform better compared to other combination tested.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

1.1 Suspension in Motorcycle

A motorcycle suspension system consists of front fork, shock absorber springs, and a swing arm. These components support the motorcycle on its axles and wheels and affect the handling of the motorcycle. The development of lighter, faster motorcycle has led to significant change in frame geometry, shock absorber and swing arm arrangement. Frame and suspension technology advances each year, especially for off road and road-racing motorcycles, which in turn affects the technological development of all other types of motorcycles. There are many factors and components at work to provide suspension and the handling characteristics of a motorcycle. Much of the engineering of a suspension system is based on the motorcycle's sprung and unsprung weight. These two affect the choice of springs that are required for efficient suspension system operation. The spring and the factors involved in their operation determine the amount of damping the shock absorber must provide. (Prentice Hall Career and Technology, 1994). The details of the Motorcycle Suspension are given in Appendix-I.