

A STUDY OF TRIBOLOGICAL ASPECTS IN GEARBOX OF CNG ENGINE

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

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ABSTRACT

Public transportation helps to reduce road congestions, gasoline consumptions, saves money and also enhances personal opportunities. However, maintenance problem is a concern in public transportation that could cause disruption of service. In this study, this issue had been addressed in order to help prediction of wear so that the problem could be predicted before it happens. This project looks into the Nadi Putra bus on the inconsistency range of mileage in changing the automatic transmissions fluid (ATF). The objective of this project is to study gearbox conditions in a bus (Nadi Putra) in term of lubrication and wear. Experimental analyses were carried out in order to determine viscosity, types of wear particles and suitable range of mileage for the bus to change the ATF by analyzing the sample of transmissions fluid taken from bus gearbox. Oil analysis techniques such as ferrographic, spectrographic and viscometer have been used in this project. Using the oil analysis technique, wear and viscosity of the sample were determined. Three major findings were concluded from the experimental work. From the ferrographic test results, it was found that the types of wear for different mileage examined are rubbing or normal wear, break-in wear, cutting wear, rolling fatigue particle, scuffing gear particle, and severe wear. Based on the spectroscopic test results, the wear elements collected can be divided into oil contamination, oil condition, and transmission wears. For the viscosity test, the results show that viscosity decreases when the mileage increases. The viscosity of 50000 km of mileage has almost reached the recommended value. It is recommended for company to change the ATF before 50000 km of mileage. Outcomes of this project could help the Voith Turbo Sdn Bhd Company to understand the reasons for the inconsistency range of mileage in changing the ATF. This may help the company to standardize and plan for a more effective maintenance program in changing the ATF.

TABLE OF CONTENTS

	CONTENTS	PAGE
	PAGE TITLE	i
	ACKNOWLEDGEMENT	ii
	ABSTRACT	iii
	TABLE OF CONTENTS	iv
	LIST OF TABLES	viii
	LIST OF FIGURES	ix
CHAPTER 1	INTRODUCTION	
	1.1 Problem Statement	2
	1.2 Objectives of Project	2
	1.3 Scope of Project	3
	1.4 Significance of Project	3
CHAPTER 2	BACKGROUND TO AUTOMATIC TRANSMISSION SYSTEM	
	2.1 Manual Transmission	4
	2.2 Automatic Transmission	5