

## CONTENTS

PART I : INTRODUCTION

1	<u>CHARACTERISTICS OF RUBBER LATEX</u>	1
1.1	THE COMPOSITION OF HEVEA LATEX	2
1.2	RUBBER MOLECULES	4
1.3	THE NONRUBBER CONSTITUENTS	6
2	<u>EFFECTS OF NONRUBBER CONSTITUENTS</u>	8
2.1	THE PROTEIN EFFECTS	8
2.2	THE EFFECTS OF ACETONE SOLUBLE LIPIDS	9
2.3	EFFECTS OF INORGANIC ELEMENTS	10
2.4	STORAGE HARDENING OF NATURAL RUBBER	12
3	<u>INVESTIGATION OF RAW RUBBER</u>	14
3.1	CHEMICAL ANALYSIS	14
	-ACETONE EXTRACT	
	-ASH CONTENT	
	-NITROGEN CONTENTS	
	-ALDEHYDE CONTENT	
3.2	PHYSICAL TESTING	18
	-MOONEY VISCOSITY AND WALLACE PLASTICITY	
	-PLASTICITY RETENTION INDEX	

3.3 VULCANIZATION	20
-SULPHUR VULCANIZATION	
-PARAMETERS OF THE VULCANIZATION PROCESS	
4 <u>INSTRUMENTS FOR RUBBER TESTING</u>	24
4.1 PLASTICITY	24
-ROTATION PLASTIMETER	
-COMPRESSION PLASTIMETER	
4.2 CURE CHARACTERISTICS	26
-THE AGFA VULCAMETER	
5 <u>AIMS OF THE PROJECTS</u>	28
PART II: <u>EXPERIMENTAL</u>	
1 <u>PREPARATION OF SAMPLES USED IN THE PRESENT STUDIES</u>	30
-SAMPLES FOR CHEMICAL ANALYSIS	
-SAMPLES FOR PHYSICAL TESTING	
2 <u>CHEMICAL ANALYSIS</u>	31
-ACETONE EXTRACT DETERMINATION	
-ASH CONTENT DETERMINATION	
-NITROGEN CONTENT DETERMINATION	
-ALDEHYDE CONTENT DETERMINATION	
3 <u>PHYSICAL TESTING</u>	39
-DETERMINATION OF MOONEY VISCOSITY	
-DETERMINATION OF PLASTICITY	
DETENTION INDEX	

4	<u>DETERMINATION OF VULCANIZATION CHARACTERISTICS</u>	41
PART III:	<u>RESULTS</u>	44
1	NITROGEN CONTENT	
2	ACETONE EXTRACT & ASH CONTENT	
3	ALDEHYDE CONTENT	
4	PLASTICITY	
5	MOONEY VISCOSITY	
6	PLASTICITY RETENTION INDEX	
7	CURE CHARACTERISTICS	
	<u>DISCUSSION AND CONCLUSION</u>	
1	<u>COMPARATIVE PROPERTIES OF CLONAL RUBBERS AND THE SELECTION</u>	
	<u>OF GOOD QUALITY CLONES</u>	48
1.1	COMPARATIVE PROPERTIES OF CLONAL RUBBERS	
1.2	METHOD OF ASSESSMENT OF THE QUALITY OF CLONAL RUBBERS	
2	<u>CORRELATIONS BETWEEN PROPERTIES AND NON RUBBER SUBSTANCES</u>	60
2.1	PLASTICITY AND MOONEY VISCOSITY	
2.2	PLASTICITY RETENTION INDEX	
2.3	CURE CHARACTERISTICS	
	<u>CONCLUSION</u>	68
APPENDIX:		69
TABLES		71
FIGURES		82
REFERENCES		90

A STUDY OF SOME CHEMICAL AND PHYSICAL PROPERTIES

OF CLONAL NATURAL RUBBER GROWN IN THAILAND

BY

VANNEE SUNTORNJANAKIJ

ABSTRACT

Eleven of the Thai clonal rubbers, viz KRS 21,25,48,57,128,133,141,156,161,163,were studied. Chemical analysis of nonrubber constituents were made. Thus the protein contents, ash contents, acetone extracts and aldehyde contents were measured. Some physical characteristics including the Mooney Viscosity,,Plasticity Retention Index and cure characteristics were also determined. The results obtained served as criterior for the selection of 'good' rubber clones. Ranking of the clonal rubbers was tentatively made, which read KRS 161,21,156,48,57,163,25,138,141,128,133, in order of decreasing quality. Further determination of vulcanizate properties of these rubbers was believed necessary before a more reliable assessment of the rubber quality could be made. The Mooney Viscosities of the rubber studied showed definite linear correlation with the plasticity numbers. However, the crrelations between the Mooney Viscosity Plasticity number,Plasticity Retention Index. and Cure Characteristics and the nonrubber components Ie. the protein contents, ash content, and acetone extracts, were poor.