

**PROPERTIES OF PAPER SLUDGE – POLYPROPYLENE COMPOSITE IN  
RELATION TO THE ADDITION OF MAPP**

by

**NOOR ASYIQEN BINTI ABDUL JALIL**

**Final Project Paper Submitted in Partial Fulfilment for the Diploma in Wood  
Industry, Faculty of Applied Science, Universiti Teknologi Mara**

**September 2001**

## **ACKNOWLEDGEMENTS**

Thanks to Allah SWT, the Most Gracious and the Most Merciful, for giving me the strength and patience to finish my final project entitled “ Properties of Paper sludge – Polypropylene Composite in Relation to the Addition of MAPP”. I would like to extend my gratitude to my advisor, Prof Madya Dr. Jamaludin Kasim for his guidance, assistance, advice, critics and suggestions in completing this final project. Deepest appreciation is also extended to all my lecturers especially to En. Amran Syafie for his commitment during my research in UiTM Shah Alam. Also to En. Ismail for giving full cooperation during my research in laboratory at the School Applied Science, UiTM Shah Alam.

I also would like to extend my sincere appreciation to all my beloved friends who supported me, by being together during information gathering. Last but not least, to my beloved family for their continuous support and prayers. I hope this final project can be use as a reference to other people who are interested in thermoplastic composite.

# TABLE OF CONTENTS

	<b>Page</b>
<b>APPROVAL SHEET</b> .....	<b>ii</b>
<b>DEDICATION</b> .....	<b>iii</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>iv</b>
<b>LIST OF TABLES</b> .....	<b>vii</b>
<b>LIST OF FIGURES</b> .....	<b>viii</b>
<b>LIST OF PLATES</b> .....	<b>ix</b>
<b>LIST OF ABBREVIATIONS</b> .....	<b>x</b>
<b>ABSTRACT</b> .....	<b>xi</b>
<b>ABSTRAK</b> .....	<b>xii</b>
 <b>CHAPTER</b>	
<b>I INTRODUCTION</b> .....	<b>1</b>
 <b>II LITERATURE REVIEW</b> .....	
2.1 Paper Mill Sludge.....	3
2.2 Paper Recycling System.....	4
2.3 Polypropylene.....	7
2.4 Maleated Anhydride Polypropylene (MAPP).....	9
2.5 Composite.....	10
2.5.1 Lignocellulosic Composite.....	11
2.5.2 Composite Thermoplastic.....	12
2.6 Potential of Lignocellulosic Thermoplastic Composite.....	14
 <b>III MATERIALS AND METHODS</b> .....	
3.1 Sample Preparation.....	16
3.2 Blending With Polypropylene and MAPP.....	16
3.3 Board Manufacture.....	18
3.4 Sample Testing.....	20
3.4.1 Tensile Strength.....	20
3.4.2 Bending (Modulus of Rupture).....	22
3.4.3 Water Absorption.....	23

<b>IV</b>	<b>RESULTS AND DISCUSSION</b> .....	24
	4.1 Strength and Physical properties.....	24
	4.2 Effect of Filler Loading.....	25
	4.3 Effect of MAPP.....	28
<b>V</b>	<b>CONCLUSION</b> .....	34
	<b>REFERENCES</b> .....	35
	<b>APPENDIXES</b> .....	37
	<b>VITA</b> .....	43

## **ABSTRACT**

### **PROPERTIES OF PAPER SLUDGE – POLYPROPYLENE COMPOSITE IN RELATION TO THE ADDITION OF MAPP**

by

**NOOR ASYIQEN ABDUL JALIL**

**September 2001**

In this study, paper mill sludge and polypropylene were blended in a dispersion mixer at 180°C for about 30 minutes. The admixture was then moulded into composite board and tested for their mechanical and physical properties. The results showed that by increasing the filler content from 10% to 50% all the tensile, bending strength and elongation at break decrease while the flexural modulus and tensile modulus increases. The water absorption and thickness swelling also increases. The addition of maleated anhydride polypropylene (MAPP) was shown to increase the tensile and bending strength. The thickness swelling and water absorption decreases with presence of MAPP.