

**LIGNOCELLULOSIC THERMOPLASTIC COMPOSITE  
FROM SHREDDED WASTE PAPER**

By

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Shredded waste paper is one of the abundant sources of used fiber. It has the potential to be use as reinforcing fillers in thermoplastic composite. In this experiment the waste paper thermoplastic composite was made through melt-blending process and its physical and mechanical properties were determined. The waste paper and polypropylene (PP) were blended in a dispersion mixer machine and then made into a composite using a mould, with waste paper percentage varying from 0 to 30%. The maleic anhydride grafted polypropylene (MAPP) was added to improve the bonding and interaction between the hydrophilic waste paper and hydrophobic polymer matrix. Composites produced were tested for tensile, flexural and water absorption properties. Results were compared to composite made from 100% neat PP. For thermoplastic composite without MAPP, loading of waste paper into the composite decrease the tensile strength and its ability to elongate. The higher amount of waste paper however increase the modulus of elasticity, water absorption and the flexural strength. The addition of MAPP in thermoplastic composite helps to improved the properties of composite. The flexural and tensile strength increases with the addition of MAPP. Overall, the waste paper was found to be a suitable material to be use in the manufacture of thermoplastic composite.

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## CHAPTER I

### INTRODUCTION

Paper is one of the main product produce from wood or other cellulose fiber material (Biermann, 1993). Most of the fiber sources were from tree. With the felling of so many trees in such a short time, by the year 2000, the timber resources will be running out. Action must be taken to ensure the wood fiber is still available when needed. But how can get more wood fiber without felling more trees?

The world most famous answer to that question is 'recycle' back the paper. Paper is one of the large solid waste producers in the wood-based industry (Franklin, 1974). For the year 1999 from January until May, Malaysia import about RM 179 million worth of writing paper (Anon., 1999). Most of the white paper is used in the office whether for photocopying, faxing, writing and printing documents. After used, often it is discard in shredding machine and thrown in the dump side.

It is such a waste to throw away the waste paper just like that despite the facts that it can be used again. For years, paper mills are trying to