CHAPTER I

INTRODUCTION

Wood is the most popular construction material known to man. It gives strength, toughness, duration, beauty, lightweight and flexibility to be made into any shape. Therefore, wood is not only used as construction material but it is also used as furniture. The furniture industries alone in Thailand worths more than ten thousand million Baht which more than half are exported. Since furniture industries scatter around Thailand in various sizes from large companies to home industries, therefore this business provides jobs and sources of income to thousands and thousands of people all over the country.[1]

The forest department of Thailand estimates that Thailand has less than 25% of its forest left now. Illegal deforestation resulted in logging ban in Thailand since 1988. This policy strongly affected the construction and wood-furniture industries. Since most of the construction materials and wooden furniture and products base on hard wood, therefore, long term shortage of wood supply will cause serious problems in construction and wooden furniture industries. Subsequently, Thailand will loose a hard to gain foreign currency in order to import wood products from abroad.

Importing timbers and wood products from neighboring countries will temporary delay wood shortage problems. With the demand of wood products exceeding the supply, eventually, Thailand will suffer wood shortage. At that time illegal deforestation may be very difficult to control and forest reservation may no longer be exist.

Therefore, it should be the time to look seriously into alternative and renewable resources on wood products. Thailand has a lot of planted rubber trees (*Hevea braziliensis*), a softwood species, that produce latex for tires, adhesives, and other products. Rubber plants have been a major economic plant in the southern and the eastern part, including some part of the northeastern

part. At present, Thailand has about 11.6 million rais of rubber plantation area. The rubber plantations in Thailand tend to continue increasingly every year, particularly in the north-eastern part.[2]

As a result of forestry concession banning, the furniture manufacturers have lacked of materials from hard wood. Therefore, the manufacturers turned to develop the utilization of softwood, which is rapid growth tree and non-reserved wood species, particularly rubber wood as a substituted material in large quantities. The manufacturers found that it can substitute the hard wood from natural forest in certain applications. Moreover, the export market prefers furniture made from rubber wood. Today, rubber wood products have been increasing in values and bring not lower than 10,000 million Baht a year income to the country.

After the economic life of a rubber tree which was estimated to be 25 years, it produces too small amount of latex, and the tree must be replaced with a new one. The rubber trees can be used to substitute import sawlogs and sawntimber from the neighboring countries. Around the country, there are uneconomic rubber trees, which are cut down at about 200,00 rais for annum, equivalent to the volume of wood at about 9.8 million cubicmeter. If all of the wood could be used, it would be very useful and make strong impact to the economy of the country.[3]

1.1 Objectives of the research work

1. To study the methods of making rubber wood-polymer composites comprising of impregnating rubber wood with acrylate monomers then curing at elevated temperature and pressure.

2. To study the physical and mechanical properties of rubber wood-polymer composites obtained under various conditions.

1.2 Scopes of the research work

In this research work, the wood-polymer composites were prepared from 2-hydroxy-propylacrylate (2-HPA), butylacrylate (BA), 2-ethyl-hexylacrylate (2-EHA) and rubber wood. Types of monomer and various impregnation conditions such as initiator content, evacuating time, soaking time were investigated. The physical and mechanical properties of specimens such as polymer loading, density, water absorption, antiswell efficiency, modulus of elasticity, flexure stress, compression Parallel to grain, resistance to termite and SEM of the microstructure of WPC would be studied.