

# CHAPTER I

## INTRODUCTION

Thailand is the biggest producer in world production of natural rubber[1]. Thailand exported the different types of rubber such as ribbed smoke sheet rubber, block rubber, crepe rubber, concentrated latex, air dried sheet rubber and others rubber. The problem of exporting was the competition by other countries. In the rubber industry, the most common methods for incorporating the compounding ingredients into the raw rubber involve either the use of a mill or a Banbury (internal) mixer. Vulcanizing systems and fillers are the main compounding ingredients. The objectives of compounding are to facilitate processing and fabrication, to ensure a rapid throughput with reject rate, to achieve the required balance in vulcanizate properties, and to provide durability, all at the lowest possible cost. The problem of manufacturing was the fillers (eg. carbon black) and the additives which are filled in the air. Moreover, carbon black has poor dispersion. The detrimental aspects of poor dispersion are summarized below[2,3]:

1. Reduced product life or poor performance during service.
2. Poor product appearance.
3. Poor processing and manufacturing uniformity.
4. Waste of raw materials.
5. Excessive energy usage.

Therefore, the objective of this research is to produce premixed raw rubber which contains carbon black and vulcanizing agents ready to use in the rubber industry. This compounds can reduce the fume of carbon black and the additives in the factory and it may be improves the dispersion of carbon black. The method for preparing this compounds is used ball mill mixing. The starting rubber is concentrated natural rubber latex because it has more rubber particles than natural rubber latex. Carbon black and the additives are mixed with the concentrated natural rubber latex. The advantages of this method are the reduction of processing, time, and cost for the factory if this compound was used as raw material. These compounds are very convenient to use directly and the products have good properties.

This research is very attractive because the product can be exported and it will make different types of exported rubber for Thailand.

### **Objectives**

1. To prepare the premixed natural rubber product containing carbon black ready to use by direct mixing the concentrated natural rubber latex with the additives.
2. To study the mechanical properties of the prepared rubber compounds.

### **Scope of the Investigation**

For the preparation of the natural rubber product containing carbon black ready to use, the appropriate formulations were studied. These compounded sheets were prepared by direct mixing the concentrated natural rubber latex with the additives. The aqueous dispersions of the additives were prepared by ball mill at appropriate time. The formulations of compounded sheets were changed so as to attain the good properties. The effects of surfactant, carbon black, vulcanizing system and mixing type were studied. The carbon black dispersion was assessed and the mechanical properties were determined following the ISO and ASTM method.