CHAPTER I
INTRODUCTION

1.1 Synthetic Running Track

Nowadays, polymers have been used widely and the examples of polymers are polyethylene, polypropylene, polystyrene etc.. Polyurethane is one of polymers that have been used widely in polymer industry. Because polyurethane can be manufactured in an extremely wide range of grades, in densities from 6 kg/m^3 to 1220 kg/m^3 and polymer stiffnesses from very flexible elastomers to rigid, hard plastics. Polyurethane can be used in many types such as adhesives, foams, crash, padding for vehicles and reinforced structures in boat and aircraft. In this work study, polyurethane as paving sportsground (synthetic running track) instead natural running field was developed.

The benefits of polyurethane running track are relieving muscular fatigue and offerring the oppertunity to reduce injury of athletes when compare with natural running field.

Another advantageous characteristic of this synthetic running track using polyurethane are long life expectancy under various conditions, resistance to light and oxidation, low maintainance and good weather resistance that they are not subjected to environmental effects.

Polyurethane is formed by the reaction between alcohol with two or more reactive hydroxyl groups per molecule (diol or polyols) and isocyanate with two or more reactive isocyanate groups per molecule (diisocyanate or polyisocyanates). All polyurethane is based on exothermic reaction of diisocyanate or polyisocyanates with polyols molecules and this type of polymerization is called addition polymerization.

The production of polyurethane for paving sportsground can be seperated two types. One is called batch and the other is called continuous.

The effect on product properties by the following variables, i.e., the NCO/OH ratio, the molar ratio of polyester polyols : MDI : DEG and the quantity of brick that used as filler, was studied in batch experiment.

The suitable compoisition for paving surface in batch laboratory was tested with main equipment of continuous and discussion result of continuous polyurethane production compared with result of batch polyurethane production.

1.2 Statement of the problem

At present, the continuous polyurethane production for paving sportsground have involved the use of the equipment, raw materials and technology from oversea. Consequently, investment of building synthetic running track is very expensive. Thus to reduce high investment cost, we should study the production of polyurethane for paving sportsground and the use of raw materials that can be manufactured locally or easily obtainable in local market.

1.3 Objective of this work

The principle aim of this study was to study polyurethane production for paving sportsground. In detail, this study would include the followings:

1. Study effect of chain-extender on properties of polyurethane
2. Determine a suitable composition for polyurethane
3. Study, design process and test main equipment of continuous polyurethane production

1.4 The scope of this work

This work study consists of two parts. Part I or batch experiment was experimented to determine suitable composition and condition of polyurethane production.

Part II or continuous experiment: suitable composition and condition of batch experiment was used to produce polyurethane. Polyester polyol, isocyanate, chain-

extender and/or filler are mixed in static mixer. The finished products were tested for mechanical properties.