ANALYSIS AND SIMULATION OF A POLY BAG MANUFACTURING SYSTEM

A dissertation submitted to the Department of Mechanical Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Degree of Master of Engineering in Manufacturing Systems Engineering

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by

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DECLARATION

This Dissertation paper contains no material which has been accepted for the award of any other degree or diploma in any University or equivalent institution in Sri Lanka or abroad, and that to the best of my knowledge and belief, contains no material previously published or written by any other person, except where due reference is made in the text of this Dissertation.

I carried out the work described in this Dissertation under the supervision of Dr. T. S. S. Jayawardene

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DEDICATION

To my loving, Parents, Wife
and
To all my Brothers

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ABSTRACT

The film blowing plays a major role in manufacturing poly bag products that are indispensable in day-to-day life. Film blowing is largely deployed to manufacture poly bags in a continuous flow. As material prices skyrocket to new heights and forecasters see no end to this trend, any positive contribution in the poly bag manufacturing value chain has a great impact on reducing the manufacturing costs.

High density polyethylene (HDPE), low density polyethylene (LDPE), linear low density polyethylene (LLDPE), and polypropylene (PP) are basically used as raw materials for the poly bag manufacturing and subsequently undergo some other processes such as cutting, sealing, printing, quality checking, and packing. Due to the variations of parameters in poly bag manufacturing process with different products, a considerable setting time as conceded and substantial amount of raw material is wasted. Material wastage is high as 10% to 12% in figures. Rather high lead-time, improper line balancing, and improper inventory control mimic serious bottlenecks in the system from performance point of view.

With the purpose of identifying the productivity and the efficiency problems of the poly bag manufacturing system, as a preliminary study to simulation, risk analysis, bottle neck analysis, and SWOT analysis were carried out in poly bag manufacturing system. Then the possible risk of the selected system was prioritized. In addition, a computer based simulation has been carried out to simulate the system and thereby find the draw backs. The poly bag manufacturing system has been modelled to obtain the optimum production times and throughput time of a given type of bag. Production schedule has been developed for maximum productivity by using the simulated production and throughput times, and customer orders. The effect of changing the parameters of the control process was investigated through simulation trials. A Graphical User Interface (GUI) was developed to present the result of simulation easily and user friendly.

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