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DEPARTMENT OF POLYMER, TEXTILE AND INDUSTRIAL ENGINEERING

FINAL YEAR PROJECT PROPOSAL

INVESTIGATION OF PROCESSING FAULTS IN HIGH PRESSURE WATER PIPES AND PACKAGING BOTTLES

BY

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LIST OF ACRONYMS

PVC – Polyvinyl Chloride

PET – Polyethylene Terephthalate

HDPE – High Density Polyethylene

RCA – Root Cause Analysis

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1 CHAPTER ONE: INTRODUCTION

This chapter includes the background, problem statement, significance of the study, scope of the study and justification.

1.1 BACKGROUND

Dating back to the early 1900s when Bakelite was first launched, plastics have exploded into hundreds of thousands of different compounds(Donovan, 2019). Polymers have been used in the manufacture of specialized products for example the High-Pressure Water Pipes, Medical Packaging Bottles, and also in electrical appliances and construction(Poischbeg, 2020). The faults affiliated with polymer processing include bubble instability where the bubble could break, or/and flutter, variation in the gauges(Glassen, 2019), wrinkling of the product due to non-uniform metal cooling, film contamination caused by imperfections in the die lip area, rough films due to melt fracture(Quenos, 2018) and sharkskin defects(Pol et al., 2007). These faults could occur on all the types of molding which are Extrusion Molding, Injection Blow Molding and Injection Stretch Blow Molding(Belcher, 2017).

Normal water pipes have to have a high thickness in order to accommodate the high pressure of the fluid(Mart Piping, 2021). In order to accommodate this, engineers used specialized plastics that fulfil the role of delivering the fluid at a high pressure but also not using excessive material through the increase in thickness(Reliable Drain & Plumbing, 2020)(Belcher, 2017). These High-Pressure Pipes are made by the extrusion molding process and in the situation that the process undergoes faults, the pipe is bound to lead to loss of the fluid, lowering of the pressure of the fluid and also making the pipe incompatible with the recommended standards(Anderson, 2016).

Packaging Bottles are made using the blow molding process and with ever changing technologies, polymer materials like PET, High Density Polyethylene, and Polypropylene are currently used in the manufacture of these packaging bottles.

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