DETERMINE THE LOWER AND UPPER BOUNDS OF PREVENTION BARRIERS FAILURE PROBABILITIES TO PREDICT THE ACCIDENT CAUSATION PROBABILITIES

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ABSTRACT

Any institutions or industries may have their own internal guidelines in order to reduce the risk of accidents and controlling the hazards surround the area. But, the current available guidelines might not able to give the probability of failure for the equipment. This study is focusing on equipment in Pilot Plant building located at Universiti Teknologi MARA (UiTM) Shah Alam which is Continuous Stirred Tank Reactor (BP 100). The objectives of this research are to determine the boundaries of prevention barriers failure probabilities and directly predict the accident causation probability and also to provide a software those can easy the risk assessment. Fault Tree Analysis Diagram has been used as the risk assessment method. The Fault Tree Analysis has been done to the Continuous Stirred Tank Reactor (BP 100) in order to predict the condition that may happen if it is undergo overheating (more than 50℃). Fault Tree Analysis Software of Continuous Stirred Tank Reactor (BP 100) has been constructed using Microsoft Visual Basic 6.0. Resulting from the constructed software, it is shows that overheating of Continuous Stirred Tank Reactor does not lead to the failure of overall equipment because the reliability value is 0.9991 compared to probability value which is 8.0108×10^{-4}.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

In recent years, safety becomes a demanding issue and important to all institutions and industries. Many of academic institutions started to the research about safety. Safety in Malaysia becomes better day by day since there is developing of technology. Safety is required in order to protect from loss of life and properties. In Malaysia, the occupational safety and health had started since 1896 (DOSH, 2016).

In Malaysia, Department of Occupational Safety and Health Malaysia (DOSH) is responsible over the safety and health of the workers at the workplace by evaluating the risk in industrial area including machineries and reports. The sectors that include in DOSH responsibility or the place that should performing safety are manufacturing, mining and quarrying, construction, hotels and restaurant, agriculture, forestry and fishing, transport, storage and communication, public services and statutory authorities, any industries that using all types of utilities (such as gas, electricity, water, and sanitary services), finance, insurance, real estate and business services, wholesale and retail trades (DOSH, 2016).

The performance of safety can be measured by identification of hazard, risk assessment, and risk analysis (Covello and Merkhofer, 1993). Identification of hazard can be done by observing the area of workplace for the machinery or working area and referring to safety data sheet for the chemical. Risk assessment is a tool that helps to identify the specific counter measure for the specific hazardous material or situation (Covello and