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TITLE:
DYNAMIC PROCESS SAFETY ASSESSMENT BY MAPPING ALOHA SIMULATION INTO BOW-TIE ANALYSIS : APPLICATION TO PACKED BED REACTOR IN PRODUCTION OF METHANOL ROUTE 2

SUPERVISOR:
ENCIK MUHAMMAD FIRDAUS BIN HUSIN

SCHOOL OF CHEMICAL ENGINEERING
COLLEGE OF ENGINEERING

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ABSTRACT

Numerous accidents have occurred since the start of industrial growth. When something like this happens, it not only results in losses for business owners but also damages the environments, peoples, and animals. Most of the time, these mishaps are the result of ignorance or equipment malfunction. Methodology that contains hazard identification, risk assessment, risk or hazard acceptance, risk control and propose unit operation are the method used in preventing any major accident from occur. In order to make this methodology work successfully, the combination of BOW-TIE analysis and ALOHA software are needed. BOW-TIE analysis is an easy method for determining areas where additional or improved controls may be beneficial. Meanwhile ALOHA software help in predicted the threat zone and difficulty in modelling the hazard. This can be seen in the case study given, the production of Methanol 2. There are a few threat zone that generated from the production of Methanol 2. For example, Methanol. From many chemical involve in the production of Methanol 2, Methanol was the worst one. This can be seen after the comparison of all results. From the results, Methanol from the tank sources has the largest threat zone compare to other chemical which mean that if accident happen, Methanol will have the worst consequences. As a conclusion, the combination of BOW-TIE analysis and ALOHA software has been successfully use to overcome the limitation that have been faced by numerous engineers before this in order to prevent any major accidents from occur in the future by giving accurate threat zone hazard and risk consequences. Not only that, the combination of BOW-TIE analysis and ALOHA software also help in determining the barriers that can be used in preventing the major industrial accident.

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CHAPTER ONE
BACKGROUND

1.1 Introduction

When it comes to hazardous chemical, safety is the most important things in order to prevent any unwanted accidents from occur. Accident when handling a hazardous chemical not only will cause danger to workers but also animals, environments and community if the accident happen can cause explosion, fire or toxic release. In order to prevent those unwanted accident from happen, an effective solution are needed. However, the solution must follow the safety standard that have been determine by the government to make sure that the solution created are safe to use because safety is not something that can be taken lightly. Every work situations that involved hazardous or dangerous things already have safety standard that need to be follow strictly. For instance, wearing a mask. When handling soluble gases such as chlorine or ammonia, wearing a mask is a must because those gases can cause severe burning in the eyes, nose, throat, windpipe, and large airways within the minutes of exposure to them. Another example is, safety helmet. When walk under a construction, the possibility objects to falling from above is higher. By wearing a safety helmet, it can protect worker from getting injure in the head as head is a crucial part of human body.

1.2 Literature Review

1.2.1 Hazard of chemical

Any source of possible danger, injury, or negative health impacts on something or someone is a hazard. A risk is essentially the potential for harm or a negative outcome. For example, to people as health effects, to organizations as property or equipment losses, or to the environment. Instead of the actual source of the hazard, the harm that results is sometimes referred to as the hazard. For instance, some people could refer to the illness tuberculosis (TB) as a "hazard," but generally, the "hazard" or "hazardous biological agent" would be the bacteria that causes TB (Mycobacterium tuberculosis) (Canadian Centre for Occupational Health & Safety, 2023).