

UNIVERSITI TEKNOLOGI MARA

**OPTIMAL LAYOUT OF A LPG STORAGE
FACILITY TO MINIMIZE RISK TO HUMAN**

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B. Eng. (Hons) Chemical

July 2017

ACKNOWLEDGEMENT

In preparing this project report, I was in contact with many people, researchers, academicians, and practitioners. They have contributed towards my understanding and thoughts. In particular, I wish to express my sincere appreciation to my main project supervisor, Dr Zulkifli Bin Abdul Rashid for encouragement, guidance, critics and friendship. Without his continued support and interest, this research project would not have been the same as presented here. I would to express my gratitude to my parents who never fail to give me moral support and motivations. I also would like to thanks my friends who have helped me to complete this project.

ABSTARCT

Application of LPG is extensive in domestic and industrial use. Because of the wide range application of LPG, the quantity of LPG increases every year. Due to the characteristics of LPG that are flammable and explosive, the LPG need to be handle with safe. Storage facility plays an important roles in the industry especially petrochemical product and gaseous product. Storage facility functions are to accumulate industrial product. In chemical industry, all product contain hazardous material that can cause vast impact and disaster to human and environment since they are the sources of catastrophic accident like fire and explosion and they also can cause harm to human health when toxic release occur. The chemical plants facility layout usually have been set up and installed without considering the optimal siting based on minimum risk consequences value. This research aim to identify optimum location for a LPG storage facility in order to minimize the risk to human. Here, in this work, probit equations were applied to estimate damage produced by thermal radiation on human (for second degree burns and lethality). An analysis is then performed to evaluate the percentage of affected people in the LPG damage, results shows the optimal layout consists of low percentage of affected people.

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

Safety is the first thing that need to be considered in the chemical industry world. During the last decades several accidents have occurred in industrial facilities, which have represented several fatalities and high economic losses (Martinez-Gomez et al., 2015). Facility layout factor has been identified as one of major contribution to the root causes that lead to the catastrophic chemical plants. Incident investigation is nowadays widely recognized as an important part of a comprehensive and efficient process safety management (Bubbico, Roberto and Marchini, 2008). The interest in take care of every human safety, property and also environment have become a global issue. Safety awareness towards chemical hazards is acknowledges internationally especially with resulting bad chemical accidents. This also made the public awareness to chemical industrial safety to rise.

Chemical industry involves activity like fabricating and deal with many hazardous material which contribute to higher risk to chemical accidents. Therefore the knowledge of safety is required to monitor and control the hazard in the chemical industry. Effective method of safety management should avoid accidents from happening and minimize adverse effects of accidents on human, properties and environment. Different techniques have been developed in recent years and they are widely available in the literature (Guidelines for Investigating Chemical Process Incidents, AIChE, 2009). Facility siting focuses on identifying hazard scenarios that could have significant impacts on process plant buildings and building occupants (Jung et al. (b), 2010). Chemical process layout optimization is a task to efficiently determine the relative position of the equipment or facility of the process (Han, Cho and Yoon, 2013).