ANALYZE ON HEAT RADIATON EFFECT FROM FEYZIN DOMINO ACCIDENT SCENARIO

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ABSTRACT

This research was carried out with three objectives which were to analyze the impact of the heat radiation happened during the incident at Feyzin, to assess accuracy of the mathematical models on explosion and fire occur at Feyzin disaster area and to recommend on uncertainty of the heat radiation models that has been used. This research had been carried out by using the data obtained from the explosion and fire occurred at Feyzin in from previous research by ARIA (2008) entitled BLEVE in PLG storage Facility at refinery Feyzin and also data recorded by T. Zoltán (2010) entitled Quantitive and Qualitative Risk Analyses in the Chemical. The data were analyzed and extracted to obtained probability of domino accident, time for the propane tank to fail and the fragments distribution ranges. Results obtained from the research proved that, the models used to determine the probability of domino accident shows that the tank will damage and explode leading to continuous accident. Based on the results, the predicted time to failure using models give a good agreement between real Feyzin accident scenario and correlated data for the T 61443 tank and the results on fragments distribution shows that the model used need further advances development.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Feyzin accident scenario brought about a catastrophic disaster resulting from an accidently small human error. It is the first accident which the phenomenon of boiling liquid expanding vapor explosion BLEVE was made clear (Kobayashi & Tamura, 1966). On 4th January 1966, a large scale explosion and fire accident of PLG (Pressurized Liquefied Gas) occurred in the Feyzin refinery of the France national petroleum company caused by leakage from a propane storage sphere. The accident cause 18 deaths and 84 injured with 49 of them were hospitalised. Also, the property damage was identified to occur both inside and outside the site.

Boiling Liquid Expanding Vapor Explosion (BLEVE) is an explosive caused by a very rapid evaporation on release of pressure liquefied gas (PLG) (Pinhasi, Dahan, Dayan, & Ullmann, 2010). It is one of the most severe accidents that can possibly occur in the process industry involving chemicals. Most cases, a severe fireball occur after the explosion which is BLEVE (Birk, Dusserre, & Heymes, 2013). A BLEVE can occur for many reasons, including overpressure in the vessel, damage to a pressurized vessel from mechanical impact or corrosion, and exposure of a pressurized vessel to external fire (CCPS, 2006).

Major chemical accidents such as explosion are important based on their risk and impact on human and the environment. Seveso III Directive is the main regulation used in the EU for the prevention of technological accidents as BLEVE (Török, Ajtai, Turcu, & Ozunu, 2011). These accidents show the need of more