

重油油槽火災之安全間距模擬研究

A Numerical Study of Fire Safety Spacing for Heavy Fuel Storage Tanks

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摘 要

石油是我們目前最常消耗的能源之一，大部分石油產品如汽油、柴油、煤油、航空燃油、燃料油，都是重要的燃料，儲油槽便是用來儲存這些各式各樣的油品。儲存這些危險的易燃物品時，除了需要有層層的安全防護措施外，油槽與油槽之間也必須有一定的安全間距，才能確保油品的安全。儲油槽可能因地震、雷擊或操作、施工不當而引起火災。而油槽火災具有燃燒速度快、火燄溫度高、易發生爆炸等特點，若彼此間距不足，會產生連鎖反應，火勢極易蔓延，造成搶救困難而一發不可收拾。由於臺灣的油槽區，大部分均設置於沿海地區及山坡丘陵地上，加上海島型氣候，鹽害相當嚴重，夏日炎熱多雨冬天又有東北季風吹襲，油槽的壽命可能較短，相關法規（石油管理法）等之規定，是否適用於特殊地形及氣候，亦有待研究探討，所以研究油槽火災，並提出量化數據有其重要性。

本文以數值模擬方法，使用場模式 FDS (Fire Dynamics Simulator) 軟體模擬重油油槽區火災，以不同的油槽安全間距，在不同風速下進行電腦模擬分析，探討火災發生時油槽間距是否恰當。並提出模擬量化數據及公式，建立油槽火災研究的基礎，供相關單位在設計及規範上作參考。

關鍵詞：儲油槽、重油、火災、電腦模擬。

Abstract

The petroleum including its products such as gasoline, kerosene and diesel oil is one of the main energy resources as well as the important fuel today. The petroleum tank is used for storing these dangerous flammable substances which needs stratified security protection, there must be a safety space between the petroleum storage tanks.

However, fuel tank fires are seldom seen actually so the fuel tank fire-fighting experience is obviously insufficient. Therefore, the tank fires study and provide quantitative data is very important.

This study uses Fire Dynamics Simulator (FDS) to simulate the conflagration of the petroleum storage tanks. Computational simulation has been derived and analyzed with different diameter of the tank, safety spacing between tanks, and oil burning under different wind velocities. The simulation result obtains the best appropriate safety spacing between the tanks when the fire happened.

Key words: Storage tanks, Heavy Fuel, Fire, Computer simulation.

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