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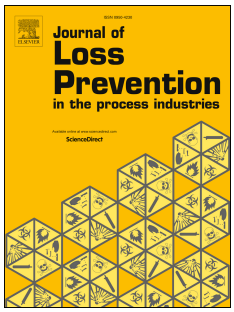

In search of causes behind offshore incidents: Fire in offshore oil and gas facilities

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In Search of Causes Behind Offshore Incidents: Fire in Offshore Oil and Gas Facilities

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ABSTRACT

In order to eliminate fire incidents from occurring onboard offshore oil and gas facilities, it is crucial to have a better understanding of the causes behind them. Such understanding can be achieved through identification of the underlying causes that led to the previous incidents. Current paper focuses on analyzing investigation reports of 137 fire incidents reported to Bureau of Safety and Environmental Enforcement (BSEE) by oil and gas facilities located in the outer continental shelf of the US. The analysis digs as far as possible into the investigation reports to provide a statistical representation of the technical, operational, human and organizational factors that contributed to these incidents and to identify the lagging causes and the leading measures that needs to be tackled in order to prevent future disasters. Although the investigation reports indicated equipment failure and human error as the most common direct causes, further analysis showed that job safety analysis, procedure and maintenance related issues were the top contributors to such incidents.

Keywords: Offshore Facilities, Incident Investigation, Causes, Fire, Human and Organizational Factors

1. INTRODUCTION

Offshore platforms are generally characterized by a high degree of congestion created by a network of pipelines and other equipment essential for the operations. Also, the rigs have limited ventilation and difficult escape routes, which increase the risk of working in these environments. Under these circumstances, a minor event can quickly accelerate into a catastrophe. Many such incidents have occurred in the past that have led to large loss of assets and human life and tremendous damage to the environment in terms of pollution. The Deepwater Horizon oil spill in the Macondo oil well and the Piper Alpha disaster in the North Sea are few examples of events that had far-reaching effects on the society. Some of the known incident scenarios in offshore facilities include blowouts, liquid and vapor leaks, fires and explosions, vessel collisions, dropped objects and structural failures [1]. It is thus essential to understand why these incidents occur in order to develop an awareness of conditions that have the potential to lead to disasters. This will enable timely measures to be taken to prevent them from occurring.

Over the years, researchers have indicated the need to investigate incidents and near misses to harness the information to prevent recurrences[2-4]. Many authors have been involved in examining the causes behind past industrial incidents. Kidam et. al. analyzed 364 chemical process industry (CPI)-related incidents that occurred from 1964-2003 [5]. They used a database that contained extensive information to determine the frequency and importance of various contributing factors behind the incidents. They found that human and organizational factors were the largest contributors (19%). Okoh et al. analyzed major