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STATISTICAL ANALYSIS OF MAJOR ACCIDENT HAZARDS DATA: LEARNING FROM THE PAST TO DEVELOP A SAFETY CASE

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ABSTRACT

This paper discusses the compliance requirements that Oil & Gas Operators must adhere to under the UK Offshore Installations' Safety Case Regulations 2015 (SCR 2015) that came into force on the 19th of July 2015 - with an aim to decrease the major accident hazards (MAHs) linked with the oil and gas offshore exploration and production activities. The emphasis will be on the analysis of MAHs data, learning from past and present undesirable events, and sharing the lessons learned as partial compliance with the SCR 2015.

Keywords: major accident hazards, safety case, license to operate.

INTRODUCTION

Oil and gas exploration and production (EP) operations are hazardous; they cause air pollution due to the emission of toxic substances, marine pollution from massive oil spills, and release of dangerous gases and liquids with potential to cause fires and explosions. Impacts of these catastrophic events are not limited to workers' injuries and fatalities, capital assets and revenue losses, damage to the environment and harm to organization's reputation on an internal level only. Rather, in many cases, the global and surrounding communities had paid the more significant price when oil and gas EP operations went wrong.

Examples of catastrophic events that resulted in high fatalities include Piper Alpha accident that killed 167 workers off the coast of Aberdeen (1988), and Texas City Refinery explosion that killed 15 workers and injured at least 180 others (2005). Impacts on global and local communities include a substantial contribution to global warming through emissions from combustion of carbon dioxide (CO₂), environmental pollution from massive oil spills - such as Exxon Valdez oil spill in Alaska (1989) and BP Deepwater Horizon in the Gulf of Mexico (2010).

MAJOR ACCIDENT HAZARDS ANALYSIS

The UK Health and Safety Executive (HSE) (2015) defines a MAH as:

- (a) An event involving a fire, explosion, loss of well control or the release of a dangerous substance causing, or with a significant potential to cause, death or serious personal injury to persons on the installation or engaged in an activity on or in connection with it;
- (b) An event involving major damage to the structure of the installation or plant affixed to it or any loss in the stability of the installation causing, or with a significant potential to cause, death or serious personal injury to persons on the installation or engaged in an activity on or in connection with it;

- (c) Failure of life support systems for diving operations in connection with the installation, the detachment of a diving bell used for such operations or the trapping of a diver in a diving bell or other subsea chamber used for such operations;
- (d) Any other event arising from an activity involving death or serious personal injury to five or more persons on the installation or engaged in an activity on or in connection with it;
- (e) Any major environmental incident resulting from any event referred to in paragraph (a), (b) or (d). (p. 18).

We have studied the databases available from the electronic Major Accident Reporting System (eMARS), which is the official network for submitting accident reports to the European Commission (2016). Our research goals were to define the existing MAHs databases, evaluate the current reporting mechanisms against the requirements stipulated in the SCR 2015, search for possible gaps and recommend associated gap-closure strategies.

RESULTS AND CONCLUSIONS

Our analysis of the MAHs statistics matches the conclusions in the report published by the European Commission's Joint Research Center (2012). In addition, we have concluded that:

- There is a need for tactical guidelines to “how-to” satisfy the SCR 2015;
- In some cultural contexts, information sensitivity hindered transparent MAHs reporting, incident investigation, and lessons-learned communication mechanisms;
- The adoption of programs that focus on risk prevention and mitigation is confronted by the beliefs that these programs are a duplication of the classical maintenance and inspection programs, which are existing and sufficient for the management of equipment reliability and productivity as well as safety of operation;
- Self-regulatory and state-owned organizations are demanded to prove commitment to CSR by sharing their MAHs data, relating analysis and lessons learned;
- Utilizing computer-aided systems for establishing a systematic approach to MAHs' reporting, analysis, and lessons-learned dissemination is becoming an essential need;
- Utilizing the existing risk registers, incident investigation databases and safety performance reporting tools for the creation of the proposed MAHs database could help reduce resistance to using this MAHs database as a tool for knowledge sharing, learning from previous catastrophic events and consequent prevention of future similar occurrences.

The full-paper corresponding to this abstract will provide guidelines to assist in creating MAHs database and Risk Register as two integral tools for the management of MAHs in oil and gas operations.

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