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Risk assessment for safe transportation of petroleum products

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Abstract

After petrol and diesel price de-regulation in 2014, Indian roads are witnessing rapid increase in the transportation of hazardous products like petrol and diesel, due to increased demand of fuels by market users, thus it has enhanced the accident potential during transit. Also rapid industrialization has seen increased requirement of fuels for various applications in industry and also by end users or consumers. The key risks involved in the road transportation of fuels can be a road accident of tanker, leak or spill of fuel, non-compliance to legal requirements, major accident involving fire or explosion effecting communities around, disruption of business and other related effects. Availability of information on the hazards and establishing control measures at the time of emergency is vital for minimizing the effect of such accidents.
Thus proper risk management of all hazards related to land transport is important part of road safety management for operators.

Keywords: *Rapid industrialization, increased demand of fuels, risk involved in transportation, hazards identification and controls measures.*

1. Introduction

Road transport is a critical structure for economic development of a country. It influences the pace, structure and pattern of development. However, Road safety is an issue of national concern. Surge in population and motorization in the country along with expansion of road network contributes to the number of road accidents, injuries and fatalities. As per report from Ministry of Road Transport there were around 4.89 lakhs road accidents which killed about 1.40 lakh people and injured more than 4.93 lakh persons in India during 2014.

Indian Transport industry is witnessing number of incidents involving road tanker with people or environment consequence. Most of these incidents and related hazards can be eliminated or limited to a minimum through the proper controls and barriers. Thus hazard identification and risk assessment is a powerful took risk management to minimize the incidents and improve business performance.

2. Objective and Scope

The paper is focused on following four objectives:
1. Identification and assessment of hazards in road transportation of petroleum products.
2. Establishing appropriate controls and mitigations for reduction in incidents.
3. Identify and emphasize on key legal requirements for transportation of dangerous goods in India.
4. Suggest best practices based on study and information gathered.

The Scope of risk assessment study is covering land transport management of fuels (bulk fuel highway transportation in India) from terminal or depot to various customers or retail stations. Exclusion is operation related risk assessment inside terminal, depot retail outlets.

3. Research Methodology

The study involved going thru legal requirements, applicable standards and interaction with transporters, drivers, and road transport manager and also interaction with external local authorities, mutual aid groups along with site visits. Thus getting insight of various controls and recovery measures followed at different levels.

4. Material for research and analysis

The analysis is done using information available in:

- The Ministry of transport and highways reports, portal,
- Oil Industry safety directorate publications,
- WHO global reports, Media releases, incident news,
- National Disaster Management Authority reports,
- Risk assessment approach adopted by transporters
- Guide to safe road transport of hazardous chemicals ,Ministry of Environment & Forests,
- The Central motor vehicle rules,
- Industrial disaster risk management publications – Safety in transportation of hazardous substance by road.

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5. Risk Assessment

It is essential that business Road transport manual is based on a detailed analysis of its own operations. Identifying and proactively managing the adverse effects of Road Transport operations is essential and the Hazards and Effects Management Process is designed to do this. The basic steps in hazard management are:

Identify – what could go wrong, i.e. hazards, hazardous events and threats

Assess – assess the risk, the potential consequences i.e. how serious an accident could be and the probabilities of it happening

Control – the situation as far as practical by identifying proactive ways to prevent or minimise the likelihood of the event occurring

Recover from – an accident situation by limiting the consequences as much as possible by having well-understood and rehearsed emergency plans in place and recovery equipment immediately available.

6. Conclusions

The objective of the study is identification of key risk areas and recommending controls and recovery measures. The risk assessment carried out during the study gives results with conveys the high risk areas. These require more attention from operators and transporters.

The main results and conclusions of this work are summarized to the following points:

Driver management controls like driver screening, selection, driver induction and onboarding, defensive driving course with in-cab assessment, driver duty, driving and rest hours are controlled and tracked.

Journey management controls like preparation and implementation of journey management plan, route hazard mapping and communication and training to crew.

Vehcile management controls like vehicle designed as per standards and induction checklist, vehicle maintained as per specifications and legal requirements.

Legal requirements include The Petroleum Rules, The Central motor vehicle rules, Oil Industry standard directorate (OISD) standards and recommendations, The Legal Metrology Act specifies requirements for calibration of tanks, Rules of the Road Regulation, and 1989 are rules for drivers, Chemicals accident rules (National disaster management and Code of Practice – Emergency response released by Petroleum and Natural Gas Regulatory Board (PNRGB).

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