

Transportation Challenges: Ensuring Safe Movement of Dangerous Goods in the Supply Chain

Rishabh Lohade¹, Dr. Rupesh Kumar Sinha²

¹Management Students, CMS B School, Jain Deemed-to-be University Bangalore, India 560009

²Associate Professor, & Decision Sciences, CMS B School, Jain Deemed-to-be University Bangalore, India 560009

ABSTRACT

Handling dangerous goods in logistics operations poses multifaceted challenges across various classes of hazardous materials, necessitating rigorous measures to mitigate risks to individuals, property, and the environment. The transportation of such materials is expected to grow significantly due to digitization, rising demand for medical waste management, and the imperative for safer practices, underscored by the COVID-19 pandemic. This study aims to identify challenges in current handling processes, assess awareness levels, and propose mitigation measures. Through a cross-sectional approach involving 30 respondents primarily from DMS Logistics, challenges such as identification/classification, compliance, documentation, security, accidents, and damage to goods were identified. Proposed solutions emphasize training, regulatory compliance, packaging protocols, and safety precautions. Overall, the study highlights the pivotal role of logistics in handling dangerous goods and stresses the importance of ongoing research, innovation, and collaboration to ensure safe and efficient transportation while recommending heightened awareness and comprehensive training to mitigate associated risks.

KEYWORDS: Dangerous Goods, Logistics Operations, Challenges, Transportation, Hazardous Materials, Training, Regulatory Compliance

INTRODUCTION

Logistics, a complex and ever-evolving field, is crucial for the efficient movement of goods and services. Understanding its practical aspects is vital for professionals like myself from a logistics background, as it involves various components and departments. The COVID-19 pandemic underscored the importance of logistics, especially in maintaining global trade amidst disruptions. Handling dangerous goods, classified based on their risks, requires meticulous attention to safety protocols. For instance, explosives pose risks of explosions, while gases can irritate respiratory systems. Flammable liquids and solids, corrosive substances, and radioactive materials each have their own set of hazards, emphasizing the need for proper handling, storage, and transportation procedures. Safety measures include using appropriate containers, providing thorough training for personnel, and ensuring compliance with regulations. Importing and exporting hazardous materials involve additional regulatory requirements, underscoring the need for meticulous documentation and adherence to protocols. Continuous evaluation and improvement of

operational efficiencies are essential for mitigating risks and ensuring the safe transportation of dangerous goods, protecting both human lives and the environment.

Review of Literature

Hazardous materials, also known as dangerous goods, encompass substances that pose risks to human safety and the environment during production, handling, storage, or transportation. Various accidents involving these materials highlight the importance of stringent regulations globally to ensure safe logistics procedures, including delivery, storage, packaging, labeling, and handling. While regulatory approaches play a significant role in risk mitigation, preventive and predictive strategies are also crucial. Research efforts have focused on developing decision support systems and utilizing techniques like the ADR method to enhance the prevention and management of accidents during the transportation of hazardous chemicals. Despite the prevalence of hazardous materials in industrialized nations, comprehensive studies incorporating ADR techniques from various countries remain limited.

RESEARCH GAP

Between 2009 and 2019, the European Union experienced a substantial increase in the value of solid chemical manufacturing, leading to a surge in road freight transportation, which remained dominant. In 2020, this trend persisted, with the EU maintaining its position as a key player in the global chemicals trade, boasting significant trade surpluses. Notably, the COVID-19 pandemic fueled the demand for hazardous goods logistics, particularly for medical supplies, pharmaceuticals, and healthcare-related materials. As a result, the market is expected to witness robust growth, driven by digitization and stringent government regulations promoting safer transportation practices. However, challenges such as the high cost of transportation and complex regulations remain. Despite these obstacles, the logistics market for hazardous goods is poised for expansion, with opportunities emerging in medical waste management and drone-based delivery solutions.

Research Objectives

- To study the problems faced in transportation of dangerous goods
- To examine the loss of product, loss of humans and other accidents.
- To study the risk involved in handling Dangerous goods.

RESEARCH HYPOTHESIS

- Null Hypothesis (H₀): Handled dangerous goods less often, may not be easy to solve the challenges
- Alternative Hypothesis (H₁): Handled dangerous goods very often, may be easy to solve the challenges.

RESEARCH METHODOLOGY

Computation Based on Google Form Testing

CONCLUSION

The Study on the Challenges in Handling Dangerous Goods" focuses on the complexities and risks associated with transporting hazardous materials, especially via vessels, which account for approximately 60% of global dangerous goods transportation. Despite stringent regulations, accidents still occur,

constituting about 4% of global incidents. The COVID-19 pandemic exacerbated existing research gaps and highlighted logistics' critical role in supplying essential goods. This underscores the evolving nature of logistics and its indispensable role in global operations. Ongoing research and innovation are crucial for addressing safety concerns, including technological advancements, regulatory improvements, and enhanced personnel training. By tackling these challenges, the logistics industry can ensure safer and more efficient handling of dangerous goods, bolstering global supply chain sustainability and resilience

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