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Oil Tanker Explosions on Nigerian Roads: A Review of Causes and Preventive Measures

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Abstract **Review Article**

The prevalence of oil tanker explosions in Nigeria from 2009 to early 2025 has resulted in significant loss of life, property, and ecological damage. These incidents stem from a mix of human error, technical faults, poor infrastructure, and weak regulatory enforcement. Despite existing safety rules, poor implementation has limited their impact. Recent measures like tanker size limits and night-time bans are positive steps but face enforcement and infrastructure challenges. This study calls for advanced technologies, improved driver training, designated parking zones, and nationwide awareness campaigns. A coordinated, technology-driven, and multi-sectoral policy approach based on global best practices is essential to prevent future tanker disasters in Nigeria.

Keywords: *Oil tanker explosions, Nigeria, Mortality, Causes, Policy interventions.*

1.0 Introduction

Oil tanker explosions on Nigerian roads represent a critical public safety and environmental issue characterized by multifactorial causation and severe consequences (Anadolu Agency, 2025; Na'inna, 2024; Tribune Online, 2025). Epidemiological data on road-based oil tanker disasters in Nigeria indicate a disturbing trend of frequent and fatal incidents over the past fifteen years. Between 2009 and early 2025, approximately 169 oil tanker accidents were reported, resulting in over 1,600 fatalities (Na'inna, 2024; Tribune Online, 2025; Anadolu Agency, 2025). While annual death tolls have varied, recent years have witnessed notably high mortality rates. The year 2019 recorded the highest number of accidents and associated deaths, with 29 incidents causing 203 fatalities. More recent catastrophic events, such as the October 2024 explosion in Majia, Niger State which alone accounted for 181 deaths have contributed to 2024 becoming the deadliest year on record, with a total of 266 fatalities (Anadolu Agency, 2025; Na'inna, 2024; Vanguard Nigeria, 2025).

Key epidemiological characteristics of these disasters include elevated mortality rates, frequent involvement of fuel scavenging activities that exacerbate fatal outcomes, and a predominance of human error and vehicular collisions as principal causative factors. Geographically, states with dense road networks and significant tanker traffic volumes exhibit higher incidence rates. Notably, following the removal of fuel subsidies in 2023, a sharp increase in tanker accidents and fatalities was observed, with 28 incidents and 468 deaths reported shortly thereafter (Anadolu Agency, 2025; BusinessDay Nigeria, 2025; Tribune Online, 2025).The significance of investigating oil tanker explosions in Nigeria stems from the preventable

nature of these disasters, which result in high mortality, severe injuries, and extensive environmental degradation (Nnaji, 2025; NMDPRA, 2025a; Global Rights Nigeria, 2025; The Conversation, 2025). This study aims to identify the primary causes of oil tanker explosions on Nigerian roads by examining human, technical, and policy-related factors contributing to these incidents.

Furthermore, the research seeks to evaluate the adequacy and enforcement of existing regulatory frameworks and emergency response mechanisms, and to propose effective preventive measures to reduce the recurrence of such catastrophic events.

2.0 Key Factors Contributing to Tanker Explosions in Nigeria

The incidence of oil tanker explosions in Nigeria is attributable to a complex interplay of human, technical, infrastructural, and policy-related factors. A comprehensive understanding of these contributory elements is essential for devising effective mitigation strategies (National Institute for Legislative and Democratic Studies (NILDS, 2025; Vanguard Nigeria, 2025; The Conversation, 2025; Guardian Nigeria, 2025; Anadolu Agency, 2025).

2.1 Human Factors

Human behavior remains a primary contributor to tanker-related disasters. A significant proportion of tanker drivers are either inadequately trained or lack proper qualifications, resulting in reckless driving practices such as over speeding and unsafe maneuvering. Moreover, impairment due to alcohol or substance use further exacerbates the risk of loss of vehicle control, leading to accidents. Additionally, the widespread practice of fuel scavenging whereby bystanders collect spilled fuel using metal containers and mobile phones poses a critical hazard. This activity frequently generates sparks that ignite fires, substantially increasing the likelihood and severity of explosions (Vanguard, 2025; Mohammed, 2025; The Conversation, 2025).

2.2 Technical and Vehicle-Related Factors

Technical deficiencies in tanker operations significantly elevate accident risk. Poor maintenance regimes often result in mechanical failures, including brake malfunctions, which are commonly implicated in tanker crashes (The Value chain Nigeria 2025; WV Attorneys, 2025). Overloading of tankers beyond their designed capacity is another critical issue; tankers routinely carry loads exceeding 33,000 liters, with some reports indicating volumes as high as 60,000 liters. This practice compromises vehicle stability and control, thereby increasing the incidence of rollovers and spills. Furthermore, the continued use of aging tanker fleets with worn-out components such as brakes and tires further predisposes these vehicles to accidents (The Value chain Nigeria 2025; WV Attorneys, 2025; Independent Nigeria, 2025)

2.3 Infrastructural Deficiencies

Nigeria's road infrastructure presents substantial challenges to tanker safety. Deteriorated road surfaces characterized by potholes, narrow lanes, and uneven terrain contribute to loss of vehicle control and subsequent accidents. The absence of designated tanker parking and rest areas forces drivers to stop on road shoulders or within active traffic lanes, elevating the risk of collisions and spills, (Vanguard Nigeria, 2025; The Value Chain Nigeria,2025).

2.4 Policy and Regulatory Challenges

Although regulatory frameworks governing tanker safety exist, enforcement remains weak and inconsistent. This regulatory laxity allows the continued operation of overloaded and poorly maintained tankers. Recent governmental attempts to restrict tanker load capacities face significant compliance issues. Additionally, the proximity of fuel stations to residential neighborhoods exacerbates risks to local populations in the event of tanker explosions (BusinessDay Nigeria, 2025; NAN News, 2025).

2.5 Environmental and Economic Context

The removal of fuel subsidies and the resultant increase in fuel prices have indirectly influenced hazardous behaviors, particularly fuel scavenging. Economic hardship has compelled individuals to engage in this perilous activity around tanker spills, thereby increasing the frequency and fatality of explosion incidents (Abdul K, et al, 2025)

3.0 Policy and Regulatory Challenges in Preventing Tanker Explosions in Nigeria

Policy and regulatory challenges remain central to the persistent occurrence of oil tanker explosions in Nigeria, despite various governmental initiatives aimed at mitigating these tragedies. Several interrelated factors contribute to the limited effectiveness of existing frameworks (Arise TV, 2025; Ejalonibu G, *et al*, 2025).

3.1 Inconsistent Enforcement and Compliance

Although Nigeria possesses safety regulations governing the transportation of petroleum products, enforcement is frequently weak and inconsistent. For example, the Federal Government instituted a ban effective from March 2025, prohibiting fuel tankers exceeding 60,000 liters, with plans to further reduce this limit to 45,000 liters later in the year. However, ensuring comprehensive compliance has proven difficult due to monitoring and policing challenges, allowing oversized and overloaded tankers to continue operating on Nigerian roads (Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA, 2025b; Ogbugo Ukoha, 2025).

3.2 Fragmented Institutional Coordination

Responsibility for tanker safety is distributed among multiple agencies, including the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), Federal Road Safety Corps (FRSC), and National Emergency Management Agency (NEMA). Coordination deficiencies among these institutions hinder effective regulatory oversight, emergency response, and public education. Although collaborative efforts have increased in recent years, they remain insufficient to comprehensively address systemic safety vulnerabilities (NMDPRA, 2025c; NEMA, 2025a).

3.3 Insufficient Infrastructure and Supportive Policies

Policy frameworks often inadequately address critical infrastructural needs. For instance, the absence of designated tanker parking bays contributes to driver fatigue and roadside stops in hazardous locations, thereby increasing accident risk. Poor road maintenance, the presence of unregulated roadblocks in challenging terrains, and limited investment in infrastructure exacerbate these risks, yet these factors receive insufficient attention in policy actions (Cheetah Institute, 2024; Nigerian Institution of Safety Engineers (NISafetyE), 2025).

3.4 Public Awareness and Behavioral Challenges

Human behavior, particularly fuel scavenging, constitutes a significant risk factor that is insufficiently addressed through policy and education. Although regulatory bodies have initiated public awareness campaigns highlighting the dangers of fuel scooping, sustained nationwide sensitization and enforcement efforts are necessary to effect behavioral change and reduce unsafe practices at accident scenes (Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), 2025d; National Emergency Management Agency (NEMA), 2025a).

3.5 Technological and Safety Standards Gaps

The adoption of advanced safety technologies, such as inert gas systems to mitigate explosion risks and GPS-based vehicle tracking, remains limited, reflecting policy gaps in mandating modern safety equipment. Furthermore, regulatory standards concerning routine vehicle maintenance and driver training require strengthening and consistent enforcement to address mechanical failures and improve operational safety (Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), 2025b; Ejalonibu, 2025).

3.6 Reactive Rather than Proactive Policy Approach

Most policy measures tend to be reactive, implemented in response to high-profile tanker accidents rather than as part of a continuous, proactive strategy. Safety reforms and operational bans are often introduced only after mass casualty events, highlighting the need for sustained and anticipatory road safety and transport management policies aimed at preventing accidents before they occur (Nnaji, 2025; Ejalonibu, 2025).

3.7 Emergency Response Mechanisms

The efficacy of existing emergency response mechanisms to oil tanker explosions in Nigeria is significantly limited by resource constraints, delayed response times, and a lack of effective coordination among key agencies, including the National Emergency Management Agency (NEMA) and local healthcare providers. The catastrophic consequences observed during incidents such as the 2025 Suleja fuel tanker explosion highlight critical deficiencies in preparedness and crisis management frameworks. These shortcomings underscore the urgent need for enhanced emergency protocols and comprehensive disaster risk reduction strategies to mitigate the impact of future tanker-related disasters (National Emergency Management Agency [NEMA], 2025b; Aljazeera, 2025)

4.0 Policy and Practical Interventions for Preventing Recurring Tanker Explosions in Nigeria

Preventing the recurrence of oil tanker explosions in Nigeria necessitates a comprehensive, multifaceted approach that integrates regulatory enforcement, infrastructural development, technological adoption, behavioral change, public awareness, and emergency preparedness.

4.1 Policy Interventions

One of the foremost policy measures enacted by the Nigerian government is the prohibition of fuel tankers exceeding 60,000 liters, effective from March 2025, with plans to further reduce the maximum allowable capacity to 45,000 liters within the same year (Nigerian Midstream and Downstream Petroleum Regulatory Authority [NMDPRA], 2025b). This policy seeks to mitigate accidents associated with vehicle overloading and subsequent loss of control. Complementing this, the government has also imposed a ban on the nighttime movement of fuel tankers to decrease accident rates linked to poor visibility and driver fatigue. However, this policy requires rigorous enforcement and careful management to avoid unintended consequences, such as increased daytime traffic congestion (Nigerian Midstream and Downstream Petroleum Regulatory Authority [NMDPRA], 2025b; Ejalonibu G, et al, 2025).

Further policy efforts focus on enhancing vehicle safety and operator competence through mandatory routine safety inspections and comprehensive driver training programs. These initiatives aim to address the dual challenges of mechanical failure and human error, which are prominent contributors to tanker accidents (Nigerian Midstream and Downstream Petroleum Regulatory Authority [NMDPRA], 2025b; Ejalonibu G, *et al*, 2025). Additionally, the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA) is actively reviewing existing safety regulations and fostering collaboration with key stakeholders, including transport unions and petroleum marketers, to improve regulatory compliance and promote safety awareness.

4.2 Practical Interventions

Practical measures complement policy initiatives by addressing infrastructural and technological needs. The establishment of dedicated parking and rest areas for tankers is critical in combating driver fatigue, reducing illegal roadside stops, and minimizing accident risks associated with unscheduled halts. Infrastructure improvements such as the removal of hazardous roadblocks, rehabilitation and upgrading of road networks (particularly in challenging terrains), and the redesign of built environments to accommodate heavy tanker traffic are essential components of a safer transportation system (Nnaji, 2025; Nigerian Midstream and Downstream Petroleum Regulatory Authority [NMDPRA], 2025b).

The adoption of advanced safety technologies plays a pivotal role in accident prevention. These technologies include inert gas systems designed to suppress flammable vapors, explosion-resistant fuel containers, GPS tracking, real-time vehicle monitoring, and automated alert systems. Together, these innovations enhance operational oversight and facilitate prompt intervention during emergencies (Nigerian Association of Road Transport Owners [NARTO], 2025; Nigerian Midstream and

Downstream Petroleum Regulatory Authority [NMDPRA], 2025b).

Public awareness campaigns, spearheaded by agencies such as the National Emergency Management Agency (NEMA), aim to educate the populace about the dangers of fuel scavenging and promote safe behaviors in the vicinity of fuel spills. In parallel, emergency preparedness training programs target both communities and tanker drivers, equipping them with the knowledge and skills necessary for rapid response to fire outbreaks and accident scenarios, thereby reducing casualties (National Emergency Management Agency [NEMA], 2025c).

4.3 Integration of International Best Practices

Nigeria is also drawing on successful global models to bolster its tanker safety framework. Countries such as Japan, Germany, and Tanzania exemplify the integration of smart transportation systems characterized by stringent regulatory regimes, technological innovation, and comprehensive educational outreach. Adapting these international best practices to the Nigerian context presents an opportunity to significantly enhance the safety and management of oil tanker transportation within the country (Nigerian Midstream and Downstream Petroleum Regulatory Authority [NMDPRA], 2025d).

5.0 Conclusion

Oil tanker explosions in Nigeria pose serious safety and environmental risks, causing significant loss of life and damage. These incidents stem from human error, mechanical failure, poor infrastructure, and weak regulation. While recent government measures such as tanker size limits, nighttime bans, and stricter safety protocols aim to reduce the threat, their effectiveness relies on consistent enforcement, better infrastructure, safety technology, and public awareness. A coordinated, multi-sectoral approach is essential to prevent future disasters and minimize their impact.

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