



Human Security and Infrastructure Failure: Rethinking Fuel Tanker Crashes in Nigeria

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Abstract

This study assessed the persistent issues of fuel tanker crashes on Nigerian roads and its human security nexus, with a focus on understanding the challenges, and potential solutions for improving road transport safety. Over the past decade, Nigeria has witnessed an alarming increase in road accidents involving fuel tankers, often resulting in extensive casualties, environmental degradation, and economic loss. These incidents highlight critical weaknesses in road infrastructure, driver management, vehicle maintenance, regulatory enforcement, and emergency response systems. Objective of the study was to identify the root causes and systemic gaps contributing to these fuel tanker crashes on Nigerian roads. The study adopted a qualitative descriptive research design using thematic document analysis. Data were sourced from secondary sources such as Federal road safety Corps Road Traffic Crashes Reports and published articles. Anchored on the human security theory which shifts the focus of security from territorial protection of the state to protection of individuals. The study revealed that deplorable state of some strategic truck corridors, non-compliance to FRSC Safe-to-load programme checklist by some oil depot as some of the cause for resurging high consequence crash involving tanker trucks. In line with the discovery of the study, it recommends that, there should be liaison with federal and state ministry of transport and works to upgrade road infrastructure, collaboration between FRSC and Oil depots to improve driver training and monitoring systems, and enhancing inter-agency collaboration.

Keywords: Crashes, Failure, Fuel tanker, Human Security, Infrastructure.



1. Introduction

In recent years, Nigeria has witnessed a disturbing increase in fuel tanker crashes resulting in mass casualties, destruction of property, and severe disruption of social and economic activities. These incidents, often involving explosions and fires, have claimed hundreds of lives across different parts of the country, including major highways, urban centers, and rural communities. The common forms of human transportation available are road, air, water and rail out of which road transport account for about 90% of total movements in Nigeria (Oyeyemi, 2018). The country's road network continues to grow due to developments on the economic front and the ever-expanding business environment. The operational deficits of other transport modes within the domestic space continue to contribute substantially in making transportation by road highly dominant in the movement of people and products across the country (CILT, 2020). Tanker trucks have constituted a strategic component of energy supply chain and road traffic system with over 98% of petroleum product haulage in Nigeria and between 6500 to 8000 petroleum tanker trucks travel on Nigeria road daily.

A lot of resources are lost on the highways through Road Traffic Crash (RTC) while huge resources are also committed to treatment of injured victims and burial of the dead. There are also heavy social impacts on the families and relations of the victims, especially those of the dead. In Nigeria, road transportation is the most commonly used, mainly for its relative effectiveness, affordability and availability in the entire country, covering both rural and urban environments (Fanola, 2017). One of the negative externalities of heavy reliance on road transportation as a means of movement of people and goods is road traffic accidents (Independent, 2019). Every year the lives of approximately 1.35 million people are cut short as result of a road traffic crash. Between 20 and 50 million people suffer non-fatal injuries with



many incurring a disability as a result of their injury. 93% of the world's fatalities on the roads occur in low-and middle-income countries, even though these countries have approximately 60% of the World's vehicles (WHO, 2020).

Nigeria has its own fair share of the problem with over 80 fuel tanker explosions between 2020-2025, resulting in at least 555 deaths. Hundreds more were injured, and buildings, vehicles, and other property were destroyed costing millions of naira in losses (FRSC, 2025). Moreover, unsafe practices such as fuel scooping contributed to 411 deaths in 2024 alone. Nigeria loses about 2% of its GDP to RTCs. The impact of the crashes includes, loss of human resources, drain on the national economy, as well as trauma and shock, among others, with negative effects on national development (Ajenge, 2013).

Despite the alarming rate of fuel tanker crashes and the scale of human casualties they cause, Nigeria's policy and governance responses remain inadequate and fragmented (FRSC, 2023; NBS, 2022). Fuel tanker explosions have repeatedly resulted in mass fatalities, displacement, destruction of property, and environmental damage across several states, highlighting systemic weaknesses in road infrastructure, vehicle regulation, and emergency response systems (FRSC, 2023). Yet, there is limited evidence of sustained, preventive, and coordinated long-term strategies, suggesting a disconnect between infrastructure planning, regulatory enforcement, and human security protection (World Bank, 2020). The persistent loss of lives, destruction of livelihoods, and environmental degradation caused by fuel tanker crashes reflect deeper governance and public administration challenges (United Nations Development Programme, 1994; World Bank, 2020). However, existing policy frameworks in Nigeria largely frame tanker crashes as road safety or traffic management issues rather than as broader human security threats (FRSC, 2023). This narrow framing constrains comprehensive policy responses



and allows systemic problems such as deteriorating road infrastructure, weak enforcement of haulage regulations, corruption, and poor inter-agency coordination to persist (NBS, 2022; World Bank, 2020).

The core problem, therefore, lies in the failure to integrate human security considerations into infrastructure planning and fuel transportation governance in Nigeria. The human security framework emphasizes protection from threats to life, livelihood, health, and environmental sustainability (UNDP, 1994). Without reframing fuel tanker crashes through this broader lens, policy responses are likely to remain reactive, fragmented, and insufficient to prevent recurring disasters. Therefore, it is imperative to ask how has fuel tanker crashes influenced human security in Nigeria? Thus, the objective of this paper was to assess the persistent issues of fuel tanker crashes on Nigerian roads and its human security nexus

1.2 Conceptual Clarification

Road Traffic Crash

Road Traffic Crash is an incident, involving at least one moving vehicle that may or may not lead to injury, which occurs on a public road.” (WHO, 2006). It is the collision of a moving vehicle with another vehicle(s), a pedestrian, motorcyclist, cyclist, or stationary object such as road furniture, trees, poles, building, or any form of obstructions in a road environment. It could also be a lone crash such as when a vehicle summersault. RTC could result in loss of lives, injuries or property damage.

Road Safety

Road safety refers to the methods and measures used to prevent road users from being killed or seriously injured from road traffic collisions or crashes. WHO (2018) views road safety as



methods and measures used to prevent road users from being killed or seriously injured, including pedestrians, cyclists, drivers, and passengers. Road traffic safety is the systematic approach to reducing the risk of death and injury on the road network through safer roads, vehicles, speeds, and road user behaviour (United Nation Road Safety Collaboration, 2011).

Infrastructure Failure

Infrastructure failure refers to the inability of physical and organizational infrastructure systems, such as transportation networks, electricity, water supply, telecommunications, and public facilities, to perform their intended functions efficiently and reliably. Infrastructure is fundamental to economic growth, social well-being, and sustainable development. When these systems fail, they disrupt economic activities, reduce public safety, and negatively affect the quality of life of citizens (Grigg, 2010).

Infrastructure failure is the interruption or total breakdown of essential physical structures, networks, or facilities that supports a society's basic needs and economic functions such as power, transportation and water. Beyond physical collapse, it includes operational and financial breakdowns that prevent projects from achieving their stated developmental goals.

Road Traffic Management

Road traffic management is seen often in the context of the planned strategy at ensuring that road users comply with traffic rules. To some, it is policing and monitoring of traffic as well as enforcement of traffic rules and regulations. However, "Road traffic management is the organization, arrangement, guidance and control of both stationary and moving traffic, including pedestrian, bicyclist and all types of vehicles on a particular road network". This is with a view to ensure free flow of traffic, reduce congestion and delay, increase road capacity



and mostly prevent road crashes.

Oyesiku (2006) is of the opinion that road traffic management is concerned with the application of range of traffic engineering and administrative techniques. Asiyanbala, Osoba & Adewale (2012), sees traffic management could be regarded as a systematic and sustained effort aimed at directing and controlling all traffics on our roads to make them free of the negative effects of the transport system. It therefore means that road traffic management is; a conscious effort to ameliorate problems resulting from automobile use and systematic and sustained effort of directing and controlling traffic, and the application of range of traffic engineering and administrative techniques.

1.3 Empirical Review

Durotoluwa and Mogaji (2025) examined oil tanker explosions on Nigerian roads and found that the disasters result in significant loss of lives, destruction of property, and environmental degradation. The study attributed tanker explosions to human error, technical faults, poor road infrastructure, and weak regulatory enforcement. It recommended technological innovations, improved driver training, designated parking areas, and public awareness campaigns to reduce future occurrences. While the study identified poor infrastructure as one of the causes of tanker crashes, it primarily focused on accident prevention strategies. It did not examine the broader implications of tanker crashes from a human security perspective, particularly how infrastructure failure undermines the security and well-being of affected communities. Furthermore, it did not adopt a qualitative thematic document analysis approach.

Na'ina et al. (2025) conducted a regional and state-level analysis of petroleum tanker fire and explosion accidents in Nigeria between 2019 and 2024 using a mixed-method approach. The



study statistically analyzed 171 accident cases and established significant regional variations in accident frequency and fatalities. It recommended prioritizing safety interventions in identified high-risk regions and states. The study concentrated on the geographical distribution and statistical analysis of tanker accidents without exploring how these incidents threaten human security through displacement, livelihood disruption, environmental insecurity, and public health risks. Its emphasis remained quantitative and spatial rather than interpretive, leaving limited understanding of the structural relationship between infrastructure failure and human security.

Na'inna (2024) reviewed petroleum tanker fire and explosion accidents in Nigeria from 2009 to 2024 and established that inadequate national data has hindered effective policy responses. The study identified aggravating factors such as fuel scooping, collisions, human error, and fuel type as major contributors to accident severity. Although the study provides a valuable historical overview of tanker accidents, it largely documents accident trends and causal factors. It does not interrogate the implications of recurring tanker crashes for Nigeria's human security architecture nor critically analyze how deteriorating transport infrastructure contributes to these recurring disasters from a qualitative policy perspective.

Chukwuemeka, Kenneth, and Barinyima (2024) investigated the root causes of fuel tanker truck accidents using accident records obtained from the Federal Road Safety Corps and the Petroleum Tanker Drivers branch of NUPENG. Applying Monte Carlo reliability analysis, the study found increasing accident rates and identified human factors as the dominant cause of tanker crashes. It recommended improved maintenance policies, enhanced driver sensitization, and stronger regulatory monitoring. The study employed an engineering and reliability analysis framework that focused on operational efficiency and accident causation. Consequently, it



overlooked the wider human security consequences of tanker crashes, including threats to community safety, public health, environmental sustainability, and socioeconomic resilience. It also paid limited attention to infrastructure failure beyond vehicle maintenance.

Abiodun (2021) examined the operational risks associated with crude oil transportation and observed that despite advances in tanker design and fire prevention technologies, fuel tanker crashes remain prevalent in Nigeria. The study attributed accidents largely to human error, poor road conditions, and brake failure and recommended stricter highway safety regulations and improved tanker standards. Although the study acknowledged poor road conditions as a contributing factor, its analysis was largely technical and safety-oriented. It did not conceptualize tanker crashes within the broader human security framework or examine how chronic infrastructure deficiencies expose citizens to recurring risks, insecurity, and vulnerability.

1.4 Gap in the Literature

The reviewed studies have substantially contributed to understanding the causes, frequency, geographical distribution, and prevention of fuel tanker crashes in Nigeria. Most of the existing studies employ quantitative, statistical, engineering, or mixed-method approaches, focusing on accident trends, human error, vehicle reliability, and regulatory compliance. While some studies acknowledge poor road infrastructure as a contributing factor, infrastructure failure is generally treated as one of several accident causes rather than as a structural governance challenge. More importantly, there is limited scholarly attention to the human security dimensions of fuel tanker crashes. Existing studies rarely examine how recurring tanker accidents affect the core elements of human security, including personal security, economic security, health security, environmental security, food security, and community security.



Similarly, little attention has been given to understanding how infrastructure failure interacts with governance weaknesses to produce recurring tanker disasters and heighten citizens' vulnerability.

Accordingly, this study seeks to fill this gap by adopting a qualitative descriptive research design and thematic document analysis to critically examine the nexus between human security and infrastructure failure in relation to fuel tanker crashes in Nigeria. By moving beyond accident statistics and technical causation, the study provides a broader human security interpretation of tanker crashes and contributes to policy discussions on infrastructure governance, public safety, and sustainable transport management in Nigeria.

1.6 Theoretical Framework: Human Security Theory

The foundational framework for this study is the Human Security Theory as articulated in the United Nations Development Programme (UNDP) 1994 Human Development Report. Human security shifts the focus of security from territorial protection of the state to protection of individuals. It identifies seven dimensions of security; economic security, food security, health security, environmental security, personal security, community security, and political security. Fuel tanker crashes in Nigeria directly threaten at least four of these dimensions such as personal security (loss of life), health security (burn injuries, toxic exposure), environmental security (soil and water contamination) and economic security (loss of livelihoods and properties)

Relevance of Human Security Theory to the Study

The research titled “Human Security and Infrastructure Failure: Rethinking Fuel Tanker Crashes in Nigeria” can be effectively analysed through the lens of human security theory, which prioritizes the protection of individuals rather than the state. The research paper reframes



tanker crashes not just as traffic accidents, but as human security failures linked to infrastructure breakdown. From a human security perspective, this represents a failure to protect individuals from physical violence and sudden harm, which is a core component of personal security. The theory views infrastructure as part of the system that sustains human wellbeing. When it fails, it creates systemic insecurity. Human security focuses on safeguarding people from chronic threats such as poverty, environmental hazards, and unsafe living conditions. Fuel tanker crashes in Nigeria represent a recurring crisis with severe human consequences, including mass deaths, injuries, and destruction of livelihoods. Studies show that these incidents are not isolated accidents but systemic failures linked to infrastructure, governance, and socio-economic conditions.

Existing Nigerian policy frameworks treat tanker crashes primarily as traffic safety incidents. However, Human Security Theory argues that threats to life and livelihood caused by systemic governance failure should be treated as broader security challenges. Thus, this theory allows the study to reframe tanker crashes as structural insecurity, expand analysis beyond road safety, and evaluate state responsibility for citizen protection. The theory provides the normative justification for integrating welfare, infrastructure, and governance.

1.7 Methodology

The study employed a qualitative descriptive research design using thematic document analysis. This design is appropriate because the study relies entirely on pre-existing administrative reports, institutional frameworks and published literature to explore the intersection of human security and infrastructure failure. The design allows for a deep contextual analysis of official records to uncover recurring patterns, challenges, and systemic gaps.



Trends of Road Traffic Crash in Nigeria

The WHO Traffic Injury report 2014 recognize that Road Traffic Crashes are a global health problem. It acknowledges that the situation is even worse in developing countries, with the situation being very critical in the African region. In Nigeria, the challenge is also enormous.

Table 1 shows the trends of tanker/truck accidents in Nigeria from 2007-2017.

Table 1: Trends of Tanker/Truck Accidents in Nigeria from 2007-2023

Year	No of Trailers Involved	No of Tankers Involved	Total Persons Killed	Total Persons Injured	Total Casualty
2007	703	273	805	269	1074
2008	1192	463	1221	3891	5112
2009	1272	495	1085	3714	4799
2010	1186	461	965	3220	4185
2011	464	180	1090	4117	5207
2012	462	179	1097	3935	5032
2013	1180	315	1178	4006	5184
2014	727	271	1079	3206	4285
2015	761	331	979	3048	4027
2016	657	359	910	3516	4426
2017	624	308	737	2622	3359

Source: FRSC Road Traffic Crash Data (2007-2017)

Table 1 above shows that Nigeria has recorded several cases of road traffic crashes involving tankers/ trailers with an increase in casualty from 1074 in 2007 to 3359 in 2017. This represents a clear indication that fuel tanker crash is a worrisome situation that must be addressed to prevent casualties. A limitation to the study lies in the inability to obtain data on articulated vehicle/tanker crashes between 2018 to 2025. However, FRSC (2026) maintained that about 80 tankers and trailer related road crashes claimed at least 555 lives across Nigeria between 2020 and 2025, highlighting the devastating human cost of articulated vehicle accidents despites efforts by Nigerian government to improve road safety.



1.8 Summary of Findings

The study found out that lack of technical competence and unsafe attitudinal disposition causes fuel tanker crashes as some drivers' hand over trucks to motor boys when fatigue sets in and such motor boys may lack the technical competence. Mohammed (2025) maintained that 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. Abiodun (2021) further asserts that human behavior remains a primary contributor to tanker-related disasters. that human errors, bad road and break failures were the cause of the accidents during loading operations and movement of petrol tankers.

There was also the issue of non-adherence to safe laden/haulage practices/standards (including vehicle's) by stakeholders in spite of practice guidance. In most cases, standards are not fully enforced before loading, during loading, on transit and off-loading of petroleum products at all tank farms which poses a challenge. 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.

The study also found out that there was non-adherence to standards by operators and by tank constructors. 45,000litres is the maximum tanker capacity allowed but 65,000 & 70,000 capacity are re-surfacing at the depots. Large tank capacity increases propensity to surge and loss of control and destroys the road. 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; Independent Nigeria, 2025) Overfilling



is the most frequent falling and an explosion of petrol tankers. When a tank containing flammable liquid overfills, fire or explosion is usually unavoidable. Any spark nearby may ignite flammable vapours released from the tank. 13 out of 15 overfilling cases led to fire and explosion. In a 1975 incident, vapours from an overfilled internal floating crude oil tank travelled to a boiler stack where they were ignited (Persson and Lonnermark, 2004). Most overfilling cases lead to fire and explosion.

State of the nation's roads was also found to be deplorable as some strategic truck corridors is a major challenge affecting fuel tanker crashes in Nigeria. 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). Parking on unauthorized location along the road. Indiscriminate parking of tankers along truck corridors is yet another factor that causes fuel tanker crashes in Nigeria. According to the study by IRU (2007), 5% of accidents are related to road conditions, but the road type has also an influence. Petrol tankers are more likely to be involved in accidents on highways than other drivers (Bast, 2004).

Failure to install speed limiting device on some tankers and lack of compliance of some depot in the installation of speed limiting device which would have aided or regulated the speed of tankers was a challenge. FRSC reports of 2025 show that speed violation is consistently identified as the leading cause of road traffic crashes in Nigeria. Speed violation accounted for 41 percent of all identified caused of road traffic crashes in December 2025 (FRSC, 2025)



1.9 Conclusion and Recommendations

This study presents an examination of fuel tanker crashes in Nigeria and its nexus with human security and infrastructure failure. Fuel tanker crashes in Nigeria pose serious safety and environmental risks, causing significant loss of life and damage. The federal government strives to eradicate road traffic crashes and create a safe motoring environment in Nigeria through the FRSC and other relevant agencies in the transportation industry. If this must be achieved, government no doubt must be able to address the question of how do traffic crashes occur, why do they occur and what should be done to prevent them.

Based on the discovery of the study, it recommends that:

- i. There should be liaison with federal and state ministry of transport and works to upgrade road infrastructure:
- ii. There should be collaboration between FRSC and Oil depots to improve driver training and monitoring systems, and enhancing inter-agency collaboration on enforcement of traffic regulations.
- iii. There should be full monitoring and enforcement of speed limiting device to regulate the speed of articulated vehicles.

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