

Testing and Inspection Failures as A Contributing Cause to Motor Vehicle Accidents in Kenya

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Abstract

Motor vehicle accidents are a leading cause of death and injury globally, with Kenya recording a high incidence of road traffic fatalities and injuries. Among the various factors contributing to these accidents, failures in vehicle testing and inspection have been reported as a significant underlying cause. This study therefore, evaluated testing and inspection failures as a contributing cause to motor vehicle accidents in Kenya. An extensive review of relevant academic literature, government reports, accident statistics and regulatory frameworks was conducted to identify the factors contributing to testing and inspection failures that increases the risks of motor vehicle accidents. Databases such as Google Scholar, PubMed, Research Gate, Web of Science, Scopus and the Kenya National Library Services were used to conduct an exhaustive bibliographic search to find academic articles, government reports and policy documents. Content analysis was used to evaluate recurring issues, which were then presented thematically. Results indicated a systemic failure in vehicle testing centers, including outdated equipment, corruption, weak enforcement of traffic laws and the importation of second-hand vehicles. These factors contribute to the presence of non-roadworthy vehicles on Kenyan roads, increasing the likelihood of accidents caused by mechanical failures. The study recommends that there is need for NTSA to enhanced anti-corruption measures, increased enforcement of traffic laws and make provision for adequate allocations to revamp targeted inspection centres with the necessary equipment and personnel so as to work better in the delivery of service.

Keywords: Motor vehicle, accidents, inspection practices, NTSA, Kenya

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Introduction

Globally, motor vehicle accidents (MVAs) are a major public health concern, contributing to significant loss of life, injuries and economic burdens (Chatukuta et al., 2021; Cloete, 2019; Chelogoi, 2018; Arora, Belsiyal & Rawat, 2021; Awaluddin et al., 2019). Road traffic crashes cost most countries 3% of their Gross Domestic Product (GDP) (WHO, 2023). These losses stem from the cost of medical treatment, reduced productivity of individuals killed or disabled by their injuries, and the need for family members to take time off from work or school to care for the injured (Másilková, 2017; Blincoe et al., 2002; Ameratunga, Hajar & Norton, 2006; Obhai, 2012; Mohammed et al., 2019). According to the World Health Organization (WHO), approximately 1.19 million people die annually due to road traffic accidents, while an additional 20 to 50 million people suffer non-fatal injuries, often resulting in long-term disabilities (WHO, 2023). The causes of these accidents include speeding which is a major contributor, as higher speeds increase both the likelihood and

severity of crashes, particularly for vulnerable road users like pedestrians and in side-impact collisions (Levulyté et al., 2017; Mutune, Mang'uriu & Diang'a, 2017; Osoro et al., 2011; Taylor, Lynam & Baruya, 2000; Kakkar et al., 2014). Driving under the influence of alcohol and psychoactive substances further exacerbates the risk, impairing driving abilities and significantly raising the chances of fatal accidents, even at low levels of blood alcohol concentration (Jones, Morland & Liu, 2019; Bogstrand et al., 2012; Papalimperi et al., 2019; Chicos & Aghenitei, 2023; Maurer et al., 2021). According to Romanian Police statistics, in 2020 at the national level, Romanian Police statistics indicate that in 2020, 740 drivers nationwide were identified as under the influence of psychoactive substances, resulting in 8 serious road accidents. These incidents led to 6 fatalities, 6 severe injuries, and 7 minor injuries (Chicos & Aghenitei, 2023). The non-use of safety equipment, such as helmets, seat-belts, and child restraints,

also leads to a higher risk of death and severe injuries in crashes, with helmets reducing death risk by six times and seatbelts halving fatality risk (Yellman, West & Sleet, 2024; Babio & Daponte-Codina, 2006; Uibel et al., 2012; Erke, Goldenbeld & Vaa, 2009). Distracted driving, especially due to mobile phone use, quadruples the likelihood of accidents by impairing reaction time and vehicle control, with texting while driving posing a particularly high risk (Shevlin, 2017; Narad, 2014; Wilson & Stimpson, 2010). Unsafe road infrastructure, which lacks proper facilities for pedestrians, cyclists and motorcyclists, further contributes to accidents, emphasizing the importance of adequate footpaths, safe crossing points, and traffic calming measures (Kiran & Saralaya, 2004; Shajith, Pasindu & Ranawaka, 2019; Goniewicz et al., 2016). Unsafe vehicles, particularly those lacking essential safety features like airbags and seatbelts also increases the risks of crash-related injuries (Khan & Das, 2024). Inadequate law enforcement of traffic laws, such as those related to speeding, seatbelts, and drink-driving, reduces compliance and increases the likelihood of accidents, emphasizing the need for strong enforcement and appropriate penalties to curb traffic-related injuries and deaths (Wali et al., 2017; Stanojević, Jovanović & Lajunen, 2013; Eshetu, 2019).

According to WHO (2024), road traffic death rates in Africa have risen sharply over the past decade, with nearly 250,000 lives lost on the continent's roads in 2021 alone. Between 2010 and 2021, the African region saw a 17% increase in road-related fatalities, as noted in the

WHO's 2023 Status Report on Road Safety. According to Mohammed et al. (2019), MVA in Africa are caused by a combination of factors involving human behavior, vehicle conditions and the road environment. Research conducted by Afolabi (2020) on the road traffic crashes causative factors in Ogun state Nigeria revealed that use of fake spare parts and over speeding are the major contributing factors to road accidents. Alcohol and drug use, poor road infrastructure, vehicle defects, poorly enforced or outdated traffic laws are also the most cited causes of MVA in Africa (Das, 2023; Akande et al., 2023; Taumang, Bello & Olutola, 2022; Bulcha, 2024; Abubakar, 2022). According to the WHO (2023), no African country currently has laws that meet international best practices for road safety, particularly concerning the use of seatbelts, helmets, and child restraints. This lack of regulation increases the vulnerability of road users, especially pedestrians and motorcyclists, who represent a significant proportion of road traffic deaths on the continent.

In Kenya, road traffic accidents are one of the leading causes of death and injury costing the country anywhere between 3-5% of GDP (Muguro et al., 2020; Cholo, Odero & Ogendi, 2023). The National Transport and Safety Authority (NTSA) reports that over 3,000 people lose their lives annually in road crashes, while thousands more are injured (Kigotho, 2021; Omar, 2021). According to data from the 2023 economic survey, 4,690 deaths were reported on our roads in 2022 as compared 4,579 in 2021, presenting an increase of 111 fatalities and an increase of 2.4% (Kenya News Agency, 2024). Sadly, and clearly as the statistics from NTSA are showing, these

numbers have been increasing every year. The causes of these accidents are often attributed to speeding, reckless driving, and poor road conditions (Otieno, 2022; Muguro et al., 2020). However, mechanical failures, many of which could have been prevented through proper vehicle inspection, account for a significant proportion of accidents. Vehicle inspection, mandated by national or sub-national governments in many countries, ensures that vehicles comply with safety and emission regulations (Kamugisha, 2020; Yang et al., 2021). Inspections may be periodic, such as annually or biennially, and are necessary for vehicle categories like private, commercial, public service, and school buses (Suwa, 2020; Acharya, 2021). After passing, vehicles receive a Road Worthiness Certificate. Various infractions, including operating without inspection or falsifying certificates, result in severe penalties. Studies (e.g., Hasan, 2007; Odero, Khayesi & Heda, 2003) show that vehicle defects contribute significantly to road crashes, with estimates ranging from 3% to 27%. As a result, vehicle technical inspection (VTI) programs are implemented to detect and correct such defects, potentially preventing accidents (Martín-delosReyes et al., 2021; Hudec & Šarkan, 2022). However, advancements in vehicle safety have led some countries to abolish VTI requirements, preferring economic measures to reduce vehicle age instead. Countries with well-established vehicle inspection programs, such as Japan, Germany, and the United Kingdom, have significantly reduced accidents caused by mechanical failure through stringent regulatory frameworks and advanced testing technologies. These systems also promote the timely maintenance of vehicles by vehicle owners, thereby

reducing the risks associated with mechanical issues. Conversely, countries with weak or poorly enforced inspection systems tend to experience higher incidences of road accidents caused by vehicle defects.

Kenya's vehicle inspection regime is regulated under the Traffic Act and overseen by the NTSA (Mula, 2023; Wanjiru, 2018). The law requires vehicles, especially those used for public transport and commercial purposes, to undergo regular inspections to ensure roadworthiness. However, the effectiveness of these inspections has been called into question due to systemic failures. Many vehicles on Kenyan roads have not undergone proper inspection, with some inspections being conducted superficially or not at all. The failure of vehicle testing and inspection in Kenya has dire consequences for road safety. This not only endangers the lives of passengers but also poses a risk to other road users, including pedestrians and cyclists. The Kenyan government has made several attempts to improve the vehicle inspection process and reduce accidents caused by mechanical failures. In recent years, the NTSA has partnered with private entities to establish automated inspection centers, which are designed to remove human discretion from the inspection process. The Kenyan Ministry of Health, the National Transport and Safety Authority, the World Health Organization [WHO] and Bloomberg Philanthropies in 2022 launched a new national initiative in Kenya, to reduce deaths and serious injuries from road traffic crashes by strengthening laws, policies and actions that are proven to save lives. The launch of the Bloomberg Philanthropies Initiative for Global Road Safety in Kenya, comes as the government finalizes a new National Road

Safety Action Plan that aims to halve deaths from crashes by 2030 (WHO (2022)). However, despite these efforts, the road safety situation remains dire. As such, addressing the failures in vehicle testing and inspection must remain a top priority for policymakers and stakeholders if Kenya is to significantly reduce its road traffic fatalities and improve overall road safety. Hence, this study evaluated testing and inspection failures as a contributing cause to motor vehicle accidents in Kenya.

Theoretical Framework

Systems Theory

This study was guided by systems theory. The systems theory was originally advanced by Von Bertalanffy in the 1930s) who sought to understand the dynamics and complexities of life in both plants and animals (Bertalanffy 1969). He developed a framework that viewed these entities as systems with interconnected parts, each influencing the other to maintain the organism's functionality. Bertalanffy's goal was to create a general theory that could be applied across various fields to explain how systems operate, adapt, and evolve in complex environments (von Bertalanffy, 1950). His work emphasized the holistic nature of systems, arguing that the whole system is greater than the sum of its individual components.

Building on Bertalanffy's work, Katz and Kahn (1966) introduced Systems Theory into the field of management. They viewed organizations as open systems interacting with their environment and comprised of interdependent components that function together to achieve a common purpose. Hence, Systems Theory has become tool for understanding how different organizational processes and

units interact, adapt, and influence overall performance.

Systems Theory is an interdisciplinary approach that investigates how various frameworks relate to each other within a larger, more complex structure (Yawson, 2013). It examines organizations or entities as living organisms with interconnected parts, each performing specific functions and holding interrelated responsibilities. One of the core principles of Systems Theory, regardless of its application, is that the system as a whole is more significant than the sum of its individual parts (Walker, 2015). This implies that isolating individual components in an organization or system will not give a full understanding of its operations; instead, one must analyze the interactions between the parts to comprehend the system's functioning.

Methodology

Databases such as Google Scholar, PubMed, Research Gate, Web of Science, Scopus and the Kenya National Library Services were used to conduct an exhaustive bibliographic search to find academic articles, government reports, and policy documents related to motor vehicle inspections, road safety and accident causation. The following keywords were included in the searches and combined with the corresponding Boolean operators (AND and OR): "motor vehicle accidents," "vehicle inspection," "road safety in Kenya," "testing failures," and "accident causation" were used to maximize the breadth of relevant literature. To ensure the relevance and quality of the included studies, specific inclusion and exclusion criteria were established. Studies published in the last two decades (2000-2023) that focus on

motor vehicle inspections and their impact on road safety were included. Literature that lacked empirical evidence, focused solely on non-Kenyan contexts, or did not address the relationship between inspection failures and accidents risks was excluded from the review. The synthesis of the literature was conducted through content analysis, which involved identifying themes and trends related to testing and inspection failures as a contributing factor to motor vehicle accidents in Kenya.

Findings

Motor vehicle inspection practices in Kenya

Vehicle Inspection is the systematic examination of a vehicle to ensure compliance with specific safety, emissions, and operational standards mandated by national or local regulations (Vlachos et al., 2014; Yang, Muncrief & Bandivadekar, 2017). The inspection process typically involves checking various components, including safety features such as brakes, lights, tires and seat belts to ensure their proper functioning; emissions compliance by testing the vehicle's exhaust to meet environmental regulations aimed at reducing air pollution; and assessing the overall mechanical condition, including the engine, transmission, and suspension systems, to identify any defects or necessary repairs. Inspections can occur at specified intervals (periodic inspections), during the transfer of vehicle ownership, or following significant repairs. In many jurisdictions, vehicles that pass inspection receive a certificate or sticker indicating compliance, while those that do not must be repaired and re-inspected. The primary

goal of motor vehicle inspection is to enhance road safety, reduce the risk of accidents caused by vehicle malfunctions, and protect public health and the environment (Suwa, 2020; Acharya, 2021).

Kenya's vehicle inspection regime is regulated under the Traffic Act and overseen by the NTSA (Mulaa, 2023; Wanjiru, 2018). NTSA in 2022 rolled out The Motor Vehicle Inspection Regulations, 2022, enacted under the authority of the Traffic Act (Cap 403) of Kenya, which stipulate the requirements and procedures for inspecting vehicles to ensure compliance with safety and operational standards (NTSA, 2022). However, the regulations are still not operationalized and NTSA has called for the Submission of Memoranda for the regulations. The proposed Regulations mandate that all private vehicles over four years old undergo inspection every two years, while commercial vehicles, public service vehicles, and school buses must have pre-registration inspections and annual checks thereafter. Additionally, salvage vehicles and those involved in accidents are subject to specific inspections. The regulations clarify that certain vehicles, including military and agricultural vehicles, are exempt from inspection requirements. The Motor Vehicle Inspection Tests in Kenya require all motor vehicles to undergo inspections as per the Kenya Standard 1515 or other applicable standards. Inspection centers and inspectors must adhere to the standards outlined in the Second Schedule, as well as any other standards established by the Kenya Bureau of Standards. If any part of the vehicle fails to meet the prescribed standards or is missing, the vehicle will not receive an inspection certificate. Upon passing the inspection, an inspection report and

certificate are issued, while vehicles that fail will receive a defects inspection report. In the case of a failed inspection, the vehicle owner is required to complete necessary repairs and return the vehicle for re-inspection within fourteen days at no additional cost. If the re-inspection occurs after this period or at a different center, the owner must pay the prescribed inspection fee. Vehicles may operate for up to fourteen days post-inspection for repair purposes, but this does not apply to public service or commercial vehicles carrying passengers or goods. Only licensed inspectors can conduct vehicle inspections. To obtain an inspector license, applicants must meet specific qualifications, including relevant educational backgrounds and industry experience, and pass an entry exam. The license is valid for one year and can be renewed upon meeting necessary conditions. Inspectors are responsible for verifying registration details, conducting inspections according to the set standards, and properly issuing inspection certificates and reports. They must also produce their licenses upon request from authorized personnel. The Authority has the power to suspend or revoke an inspector's license for various infractions, such as false statements in applications or engaging in corrupt practices, ensuring a fair opportunity for the inspector to respond to any proposed actions. Quality assurance officers may be authorized to inspect inspection centers to ensure compliance with regulations, including the adequacy of record management and inspector qualifications. Privately owned vehicle inspection centers must be licensed by the Authority, and they are required to operate independently of vehicle repair services. The centers' licenses are valid for three years and can only be renewed after

inspection to verify compliance with the regulations. Operators of these centers are responsible for ensuring that inspection fees align with prescribed rates, that inspections are only conducted by licensed inspectors, and that proper records are maintained. A center is subject to regular inspections by the Authority, which may audit operations without prior notice to ensure compliance. Transfer of inspection certificates from one vehicle to another is prohibited, and violations of inspection regulations may result in fines or imprisonment. The schedule of inspection fees is established, detailing specific charges for various vehicle types and conditions.

Factors contributing to vehicle inspection failures in Kenya

Outdated equipment

Use of obsolete and inefficient equipment in inspection centers could be among the reasons for the failure of vehicle inspections in Kenya. A report from Daily Nation (2020) revealed that several of the equipment used by the National Transport and Safety Authority (NTSA) in vehicle inspection was obsolete, prompting the government to allocate Sh 2 billion to revamp its inspection centers. However, despite the planned revamp, the situation remains dire. According to Business Daily (2024), an audit of NTSA's operations shows that equipment in at least 10 inspection centers across the country was considered no longer useful. As a result, NTSA officers are forced to perform manual inspections, increasing the likelihood of errors in detecting mechanical problems. These deficiencies in testing and inspection procedures mean

that non-roadworthy vehicles are often issued compliance certificates, allowing them to continue operating on Kenyan roads. Consequently, such vehicles contribute to motor vehicle accidents, as mechanical failures stemming from undetected issues go unresolved. Modern vehicle inspection systems in many countries utilize advanced diagnostic tools, which accurately assess the mechanical state of vehicles, including emissions testing, brake efficiency, and tire wear. Without these technologies, inspectors are unable to detect critical issues such as brake malfunctions, suspension problems, or steering defects, leading to dangerous vehicles being certified as roadworthy.

Corruption and bribery

Corruption is a widespread issue in Kenya's in general. According to reports by the Ethics and Anti-Corruption Commission (2006), inspectors often accept bribes to certify vehicles as roadworthy even if they do not meet the necessary safety standards. This results in unfit vehicles being allowed on the roads, increasing the chances of accidents due to mechanical failures such as defective brakes or steering systems. A study by Raynor and Mirzoev (2014) found that bribery is commonplace, particularly among drivers of public service vehicles (PSVs). These drivers often bribe both vehicle inspectors and traffic police officers to avoid maintaining their vehicles or addressing safety violations. Even when vehicles are inspected and found to comply with safety standards, traffic officers may still fabricate issues to solicit

bribes. This corruption compromises the entire vehicle inspection system and contributes to the persistence of unsafe vehicles on the road. However, Kingori (2012) sought to examine the impact of motor vehicles inspection in reduction of road fatality in Kenya. Findings of the study revealed that there is no causality between fatality rate and the proportion of the number of inspected motor vehicles. The findings of this study are backed up by findings of Raynor and Mirzoev (2014) study. The study revealed that motor vehicle inspection and certification does not have much impact on the reduction of road accidents on the Kenyan roads. The study which involved structured interviews with 20 matatu drivers revealed that 18 out of the 20 matatu drivers had bribed police on road block checks which is a norm on the Kenyan roads. The matatu drivers revealed that it is normal to pay bribes even when the PSVs have been inspected and complied with the required safety standard. According to the drivers even when the PSVs are maintained as required by law, traffic police conjecture non-existent problems to receive bribes. Therefore, it is easier to bribe police rather than incur expenses to properly maintain the vehicles

Inadequate enforcement of Traffic Laws

Even when vehicle inspections are carried out effectively, weak enforcement of traffic laws exacerbates the problem. In Kenya, vehicles that fail inspection or are deemed non-compliant with safety standards are sometimes allowed to continue operating. Corrupt traffic police officers often accept bribes from vehicle

owners, permitting non-compliant vehicles to remain on the road without addressing the identified issues. Otieno (2022) assessed the impact of traffic law enforcement on reducing road accidents along the Salgaa-Mau Summit Highway. The study found that the annual mandatory motor vehicle inspections help ensure that vehicles operating on the highway are mechanically sound, fully functional, and meet all necessary safety standards, thereby reducing the risk of accidents. However, the research also revealed that bribery of traffic police officers during roadside inspections allows unroadworthy vehicles to continue operating on the highway, undermining the effectiveness of these inspections.

Importation of second-hand vehicles

The importation of second-hand vehicles into Kenya is another major factor that contributes to vehicle inspection failures. Many of these vehicles already have significant mechanical defects when they arrive in the country, making them more prone to failures and accidents. According to Lewis (2013), approximately 15% of road accidents in Kenya are caused by unroadworthy vehicles, many of which are second-hand imports with dangerous mechanical conditions. Without stringent inspection procedures in place, these vehicles are often certified as roadworthy despite their inherent safety risks. A similar trend has been observed in other countries, such as Croatia, where older vehicles that fails, regular inspections are linked to a higher rate of accidents (Zovak et al., 2016). Kenya's failure to implement a more rigorous inspection process for

second-hand vehicles results in an influx of dangerous vehicles onto its roads.

Conclusion and Recommendation

Kenya's vehicle inspection regime is regulated under the Traffic Act and overseen by the NTSA. The law requires vehicles, especially those used for public transport and commercial purposes, to undergo regular inspections to ensure roadworthiness. However, the effectiveness of these inspections has been called into question due to systemic failures such as outdated equipment, corruption, weak enforcement of traffic laws, and the importation of second-hand vehicles. These factors contribute to the presence of non-roadworthy vehicles on Kenyan roads, increasing the likelihood of accidents caused by mechanical failures. The study recommends that there is need for NTSA to enhanced anti-corruption measures and increased enforcement of traffic laws to ensure that only roadworthy vehicles are allowed on the roads. Also, work out modalities for privatizing the inspection function of the ministry borrowing from experiences of other countries such as South Africa. In the short run, NTSA should make provision for adequate allocations to revamp targeted inspection centres with the necessary equipment and personnel so as to work better in the delivery of service.

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