

Investigating Fire Safety Practices by Assessing Fire Service Facilities and Equipment in Ondo State

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Abstract

The purpose of this study was to investigate fire safety by assessing fire service facilities and equipment in Ondo State. It was expected that the outcome of the study would be useful in preventing fire outbreaks through provision of adequate facilities and equipment. Three research questions relating to availability, adequacy and utilization of fire service facilities and equipment were raised and answered. The population consisted of heads of all the seven fire station in Ondo State. The descriptive survey research design was adopted for the study because the researcher only assessed the state of the facilities and equipment. The research instrument used was checklist. The checklist was validated by two experts from fire station. The data collected was analyzed and the findings revealed that out of the 105 facility items and equipment required, only an average of 61.25% were in good condition; while an average of 23.75% were not put to use. To rescue the system from total collapse, it was recommended that prompt action should be taken to effect emergency repairs and subsequently provision made for those not available.

Keywords: Fire safety, Fire service, *Facilities and Equipment*

Introduction

Fire is the rapid oxidation of materials in the exothermic chemical reaction of combustion, which results in the release of heat, light, and a variety of reaction products. In its most basic form, fire can cause conflagration, which has the capacity to cause physical damage through the process of burning. There are several dangers associated with flames. According to a 1994 survey by the National Fire Protection Association (NFPA), the leading cause of death in structure fires is smoke, which accounted for 73% of fire-related deaths in 1990. However, fires can also result in the structural collapse of structures, and burns account for the balance of fire-related deaths. Numerous items present in a building contribute to the spread of fire. For example, furniture, window and wall coverings, and other interior finishes, as well as wood structural parts in structures, all sustain flame and smoke. Building codes, on the other hand, mandate that numerous elements in a residential or commercial building withstand the spread of flame and the production of smoke. These same rules demand that structures within buildings (e.g., walls and floor-ceiling assemblies) withstand flame and smoke passage for a lengthy period of time. Fire hazards in a work environment such as an Auto Mall are often classified into four categories: (i) ignition sources, (ii) materials, (iii) structure hazards, and, most critically, (iv) personnel hazards.

Firefighting is a term that encompasses the strategies and equipment used to extinguish fires and minimize the damage they cause. Firefighting entails either removing one or more of the three main components of combustion—fuel, heat, and oxygen—or disrupting the chain reaction of combustion. Safety is defined as the protection of a building's occupants (and, to a lesser extent, their property) from accident. Security is interpreted to include protection from deliberate attack on these inhabitants and the property they may lose as a result of a fire outbreak (Marsh, 1985). Safety is concerned with chance, but security is concerned with someone's deliberate intent. Fire is thus a gray area, as it is frequently accidental and is considered a safety issue. Building fires are almost invariably accidental, stemming from human error or negligence. Despite its apparent sophistication, modern living does not eliminate the risk associated with the abuse or accident of fuel for fire in cooking, warming, and lighting.

Generally, man values fire highly (Money, 2003), particularly under regulated conditions. Man use fire for cooking, providing heat and light, removing waste, signaling, and propulsion. When fire is allowed to burn unchecked, it may wreak havoc on people, property, and the environment (Lentile, 2006). Fire outbreaks have been blamed for contaminating water, eroding soil, polluting the atmosphere, and posing a threat to human life and property. Fire has wreaked damage in a variety of countries worldwide. According to United States Fire Administration (USFA) statistics issued in 2010, there were 362,100 fire occurrences in residential buildings in the United States in 2010. These incidents resulted in the deaths of 2,555 people, 13,275 injuries, and \$6,646,900,000 in property damage. Additionally, there were 84,900 fire occurrences in non-residential buildings, resulting in 80 fatalities, 1375 injuries, and \$2,400,700,000 in total loss. Globally, the cost of fire loss is growing increasingly frightening in terms of property damage, personal injury, and death.

The outbreaks have lately been a phenomena in Nigeria; according to the Federal Fire Service (FFS) (2013), the annual number of fire outbreaks is estimated to be about 7, 000, with over 1,000 fatalities and billions of naira in property loss. If fire outbreaks are correctly handled, this enormous sum of money can be used to enhance critical sectors of the economy, such as youth empowerment and job development. Ijalaye (1992) reported that fire breakouts were frequent in Ondo State, prompting the promulgation of Bush Burning Control Edict No. 4 of 1989, which made it illegal to set fire to a bush or for someone to do so. Annual reports of fire events in the state (Totofari, 2012) show little sign of abatement. Aborisade (2010) claimed that in 2010, a fire overtook the state capital's largest market, popularly known as Oja Oba, resulting in the loss of multimillion-naira property. In 2012, a fire burned the Federal Radio Corporation of Nigeria's (FRSC) positive FM Akure, destroying all engineering facilities and equipment. In November 2020, a fire breakout at Ijomu intersection in Akure, Ondo State's capital, destroyed goods worth millions of naira. In February 2021, a fire outbreak destroyed a residential structure adjacent the Ondo State Ministry of Works complex in Akure, destroying property worth millions of naira.

According to a fire department officer, the equipment's failure to function was not malicious. These are only a few of the recent fire events throughout the state. This circumstance has wreaked havoc on the victims, with many becoming homeless and others losing their jobs. Ellana (2007) reported the following effects of these factors: cardiorespiratory diseases, cold injury, mental illness, sleep deprivation, physical and sexual assault, increased mortality rate, loss of self-esteem, increase in substance abuse, development of behavioral problems, and loss of ability and will to care for one self. The experts are concerned about the damage caused by this constant fire outburst, which is why the study is necessary. The question is why, with the state's existing fire services facilities and equipment, we continue to see so many outbreaks and losses of lives and property? Is it because the fire department lacks the infrastructure and equipment necessary to prevent and combat such outbreaks, or because the facilities and equipment are insufficient or underutilized? The researchers chose to explore the availability, adequacy, and utilization of fire services facilities and equipment in Ondo State as a result of this.

Research Questions

To guide the study, the following research questions were posed:

1. How adequate are Ondo State's fire service facilities and equipment?
2. What is the level of facility and equipment utilization in Ondo State's fire services?
3. What is the percentage of facilities and equipment that are utilized in Ondo State fire stations?

Materials and Methods

The descriptive survey research design was used in this study. It was descriptive in nature because it only assessed the state of existing facilities and equipment without manipulating the relevant factors. The study's population comprised of the chiefs of seven fire stations in Ondo State. Ondo State is divided into eighteen Local Government Areas, each of which is divided into three senatorial districts: Ondo North, Ondo Central, and Ondo South. A check list was used as the research instrument in this study. The check list is divided into two categories, A and B. Section A contains general information on fire stations, whereas Section B contains questions about the availability, sufficiency, and utilization of fire services facilities and equipment in Ondo State. The buildings and equipment chosen met the minimum requirements for meeting the fire service's objectives in Ondo State. Two specialists from the Department of Health, Safety, and Environmental Education, as well as the head of the University of Benin's fire unit, validated the checklist items. The researcher administered the instrument with the assistance of five trained research assistants. The computed data were interpreted and discussed in terms of the following categories: adequate (90 percent and above), fairly adequate (80-89 percent), insufficient (60-79 percent), highly insufficient (50-59 percent), and grossly insufficient (49 percent and below); the same holds true for the level of utilization (Nwadiani & Ugolo 2011).

RESULTS AND DISCUSSION

Research Question 1

How adequate are the Fire Service Facilities and equipment in Ondo State Fire Stations

Table 2: Percentage adequacy of available fire facilities and equipment in ondo state

S/N	facilities and equipment	Quantity Required	Quantity Available	% of adequacy	Remark
1.	Fire engine	14	11	79	Inadequate
2.	Training room	07	04	57	Highly inadequate
3.	Apparatus Bay	14	07	50	Highly inadequate
4.	Offices	35	24	69	Inadequate
5.	Equipment room	7	02	29	Grossly inadequate
6.	Water source	14	09	64	Inadequate
7.	Water source outside station	14	06	43	Grossly inadequate
8.	Power source	14	12	86	Fairly adequate
	Total	119	75	59.6	Highly inadequate

Source: Data from field study

Research Question 2: What is the percentage of facilities and equipment in good condition?

Table 2: Percentage of available fire facilities and equipment in good condition

S/N	Facilities and equipment	Available	In Good Condition	% in Good Condition
1.	Fire engine	11	05	42
2.	Training room	04	01	25
3.	Apparatus bay	07	04	57
4.	Offices	24	22	92
5.	Equipment room	02	02	100
6.	Water source	09	08	88
7.	Water source outside station	06	05	83
8.	Power source	12	12	100
	Total	75	59	% = 61.25

Source: Data from field study

Research Question 3: What is the percentage of utilization of facilities and equipment in Ondo State fire stations?

Table 3: Percentage of available fire facilities and equipment utilized in Ondo State

S/n	Facilities and equipment	Quantity Availability	Quantity Utilised	Level of utilization(%)
1.	Fire engine	11	05	45
2.	Training room	07	04	57
3.	Apparatus Bay	14	07	50
4.	Offices	35	24	69
5.	Equipment room	7	02	29
6.	Water source	14	09	64
7.	Water source outside station	14	06	43
8.	Power source	14	12	86
	TOTAL			55.4

Source: Data from field study

Discussion of Results

The study examined fire safety procedures by examining the availability, sufficiency, and utilization of physical facilities and equipment in Ondo State fire stations. Eight fire service facilities and equipment, as defined by the National Fire Protection Association (2003), were identified for this study in each of the state's fire stations. The investigation determined that fire station buildings and equipment were woefully inadequate. For example, of the 105 (necessary) fire facilities and equipment selected for this study, only an average of 75 (59.6) were available, suggesting severe insufficiency. Out of the quantity available, an average of 38.75 percent were in poor condition, while 44.6 percent were never used due to poor condition or a lack of equipment or resources.

These findings are undeniably illuminating and critical for Ondo State's decision-making. This situation corroborates Shields and Shilcock's (1987) thesis that insufficiency of fire service resources has continuously harmed firefighting success in Nigeria. Additionally, it is consistent with the results of Yushau (2009) and James (2012) that required infrastructure and equipment are in acute shortage in Ondo State, allowing fire outbreaks to proliferate. When each facility and piece of equipment was isolated for the investigation, the deficiency became more obvious. For example, only 11 (79 percent) of the 14 fire engines required for the seven fire stations were available, indicating an insufficient supply. This requires the addition of three additional fire engines. While a fire engine is generally used for firefighting operations, when they are insufficient, it is obvious that firefighters would be stuck while the fire burns. This conclusion corroborated Olabanji, Oginni, Bankole, and Olaseinde's (2003) discovery that the Nigerian fire service operates seven fire stations throughout the Federal Capital Territory, but none of them has more than one operational fire engine. The unifying feature of these stations is the strewn-about corpse of a fire engine. However, the finding contradicts Brook and Brook's (2009) finding that Kansas City fire stations are well-equipped with fire engines. Only four (57 percent) of the seven training rooms required in the fire stations studied were available, indicating a severe lack of capacity. This research corroborates Okebiorun's (2010) findings that training rooms, fire resistant garments, fire rate locks, fire blankets, first aid kits, and helicopters were in poor supply, if available at all.

Another critical component of fire stations is the apparatus bay, which protects the fire engine's components from rusting due to exposure to sunlight and rain. However, it was discovered that many fire stations neglected to provide facilities and equipment, with only 07 (50 percent) available, indicating severe inadequacy. This will result in the fire engine rusting and decaying. Thus, the findings of this study verify the reports of Olabanji et al. (2003) and Oluwatosin (2004) that the buildings in fire stations are in a state of disrepair. According to the fire station investigated, 35 offices were necessary, but only 24 (69 percent) were available, indicating that they are insufficient in quantity. It was alarming to discover that, as critical as water sources inside and outside the station are, only 9 (64%) and 6 (43%), respectively, were available. In this situation, a little fire will destroy property worth billions of naira due to the inadequacy of water, the most effective and readily available extinguishing agent. This condition corroborates Agbili's (2013) findings that water, the most effective preventive agent, is insufficient in Nigerian fire stations, increasing the stress associated with firefighting.

Additionally, it was determined that the power sources were adequate, since 12 (86 percent) were available. According to Joseph and Egor (2016), this conclusion is intriguing because no machine in fire stations can function without power. Even water, the most effective agent for preventing fires, will be a mirage in the absence of power. The offices, training rooms, apparatus bays, and equipment rooms, as well as other facilities and equipment at the fire station, will not be conducive, affecting the level of output of firemen. The findings of this study contradict Ballam (2013), who stated that obtaining power is a significant difficulty for Nigerian fire stations. Provided fire service infrastructure and equipment required routine maintenance to be in excellent condition. Where available facilities and equipment are insufficient in quantity and many are in poor shape, the state of availability is exacerbated (Nwadiani, 2011). This is the case in Ondo State, which has recently

seen many fire outbreaks. For example, 55% of accessible fire engines require repair due to their poor state, which is consistent with Okebiorun's (2010) conclusion that a prevalent feature of Nigerian fire stations is the presence of dead fire engines cluttering its grounds. Additionally, of the available training rooms and apparatus bays, 03 (75 percent) and 3 (43 percent) were in poor condition. Of the offices, equipment room, and water source that were available, 22 (92 percent), 2 (100 percent), and 08 (88 percent) were in good condition, respectively. This contradicts the conclusions of Ollorwi (2013) and Olaitan and Dairo (2006), who concluded that Nigerian fire stations lacked modern equipment and inadequate training facilities. The data indicated that 05 (83 percent) and 12 (100 percent) were used as a water source outside the station and a power source, respectively. According to the findings, Ondo State's fire infrastructure and equipment are in disrepair, and as such, immediate care is essential to avoid the situation from deteriorating further. Appropriate exploitation of fire facilities and equipment is a function of successful management, but it is significantly aided by the status of such facilities and equipment. Due to the fact that poor condition of facilities and equipment is a direct indicator of non-use, it's unsurprising that the study discovered a sizable percentage of accessible fire facilities and equipment was not being used. For example, 55% of available fire engines, 75% of available training rooms, 29% of available equipment bays, 5% of available offices, 17% of accessible water sources outside the station, and 9% of available power sources were not in use. This corroborates Taire's (1992) observation that certain facilities and equipment in fire stations are underutilized due to poor condition. This has harmed the usage of these facilities and equipment, and if their use continues, accidents will happen.

Conclusion

The state of insufficiency of fire service infrastructure and equipment is severe enough to jeopardize the achievement of fire fighting's primary purpose of life and property protection. These shortcomings contribute to the destruction of property in the presence of fire officials. Given the high expectations placed on fire departments (to save lives and damage), funding agencies must make an unwavering effort to supply fire stations with the necessary facilities and equipment in an acceptable number and quality. Without a doubt, lack of fire facilities and equipment in this period of technical innovation portends negative safety results that Nigeria and Ondo State in particular must work to overcome.

Recommendations

The following recommendations were given in light of the findings of this study:

Due to the poor condition of many of the given facilities and equipment, Ondo State Government should immediately repair and/or renovate different worn-out facilities and equipment;

The government should make available previously unavailable fire facilities and equipment in sufficient quantity and quality.

Public-private partnerships should be fostered so that the government is not solely responsible for supporting these facilities and equipment.

Experts with a thorough understanding of the offered facilities and equipment should be hired to ensure their proper utilization.

The government should conduct regular in-service training for career fire fighters to ensure they understand how to operate some of the more complex fire engines that have been developed as a result of technical advances. Ondo State fire service and Ondo State water cooperative should collaborate to establish fire hydrants along key streets, residential and industrial estates, factories, and markets.

References

- Ballam, S.P. (2013, August 20). Overcoming fire hazard in Nigeria. *The nation newspaper*.
- Braidwood, J. (2009). *On the construction of fire engines and apparatus, the training of firemen and the method of proceeding in cases of fire*. Edinburgh: Bell and Bradford.
- Brook, S.M. & Brooks, N.A. (2009). *Fire protection strategies*. In C.K Charles (Ed.), *Handbook of urban service*. Kansas City Jones & Bartlett Publishers.
- Ellana, M. (2007). *Glossary: delivery health care to the homelessness*. Retrieved from <http://www.med.uottawa.ca/homeless/tools/glossary-e.html>>.
- Ijalaye, D.A. (1992). *Nigeria and the challenge of knowledge*. Essay in honour of Jonathan OlusesanDipeolu. Retrieved from searchworks.stanford.edu/view/2747219.
- International Code Council (2012). *International fire code*. Washington; Code publish company.
- International Standard Organization (2013). *Information security standard (IEC, 2001)*. Retrieved from en.wikipedia.org/.../IEC-27001:2013.
- James, U. (2012, November 9). Nigeria fire service ill equipped to contain disaster. *Leadership Newspaper*. Retrieved from www.ng/gov/news/editor-nigeria-fire-service.
- Lentile, O. (2006). *Science in fire fighting*. New York: S.L. Parson & co.
- Marsh, P. (1985); *Security in Buildings*: Longman Inc., New York. pp.45
- Money, F.O. (1995). *Introductory Safety Education*. [2nd edition] Warri; COEWA Publishers.
- Mustapha, M. (2014). An Appraisal of manpower adequacy of MIS units in managing information in Nigeria universities. *Information and Knowledge Management*, 4(12), 87-103.
- National Fire Protection Agency (NFPA) 1994: Standard on Protective Ensembles for Chemical/Biological Terrorism Incidents, 2001 Edition.
- NFPA (2003). NFPA 1901: *Standard for automotive fire apparatus mobile water supply fire apparatus*. www.nfpa/standard-for-automotive-fire-apparatus-mobile-water-supply-fire-apparatus.

- Nwadiani, M. & Ugolo, S.P. (2011). Availability, adequacy and utilisation of physical facilities and equipment in public secondary schools in Bayelsa State. *African Journal of Studies in Education*: 8(1 & 2), 34-42.
- Okebiorun, O.J. (2013). *Nigeria fire service and disaster management challenge*. A paper presented at the 2013 International Fire Fighting Day. Abuja.
- Olabanji, J.K., Oginni F.O., Bankole, J.O. & Olaseinde, A.A. (2003). A ten year review of burn cases seen in a Nigeria Teaching Hospital. *Journal of burns and wounds*, 2,1-11.
- Olaitan, P. & Dairo M. (2013). Domestic fire accidents in a developing Country” reducing mobility/mortality by modifying the bunglar proofs. *Internet Journal of Rescue and Disaster Medicine*. 6(1), 28-40.
- Oluwatosin O.M. (2004). Burns in Africa. *African Journal of Trauma*, 2(1), 32-40.
- Peter .S. O. & Egoh. J. O. (2016). Availability, Adequacy and Utilization of fire service facilities and equipment in Ondo State. *Nigerian Journal of Health Education*. Vol 20, No 1,
- Shields, T.J, and Silcock, G.W.N. (1987); *Buildings and Fire*: Longman Group Ltd U.K. pp. 20-88
- Taire, A.A. (2017). Strategies for coordinating, monitoring and evaluating human resources development agencies and institutions in Nigeria. *African Journal of Social Sciences*, 22(15), 5-13.
- Yushau, S. (2009), *NEMA and challenges of managing disaster in Nigeria*. Abuja press release.