
Application of Fire Safety Facilities in Residential Buildings in Makurdi Metropolis

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ABSTRACT

The study was undertaken to examine the application of fire safety facilities in residential buildings in Makurdi Metropolis. Two purposes and research questions were raised for the study. The study adopted descriptive survey research design with the total population of 1,107. The sample of 221 was selected using simple random sampling techniques for the study. A checklist was employed to collect data for the study and was validated by one fire safety officer and two builders. Upon successful validation, the instruments were trial tested in a pilot study. The reliability coefficient of the instruments was 0.98. The data collected was analysed using descriptive statistics (simple percentage). The findings revealed that, active and passive fire prevention devices are neither available nor adequate in residential buildings in Makurdi Metropolis. It was recommended that active and passive fire prevention devices should be made available and adequate in residential buildings in Makurdi Metropolis.

INTRODUCTION

Residential fire is a very common disaster that can cause many casualties such as loss of lives, deformity and loss of properties. The National Fire Protection Association (NFPA, 2014) in National Child Traumatic Stress Network (NCTSN, 2014) states that fire departments responded to 412,500 home fires in the United States, which claimed the lives of 2,580 people and injured 12,925. U.S Fire Administration (USFA, 2013) affirms that adults are most vulnerable to fire

disaster because many adults live alone and cannot respond quickly to residential fire disaster. USFA further stressed that more than 3,400 Americans die each year in fires and approximately 17,500 are injured and that overwhelming number of fires occur in residential homes.

World Health Organization (WHO, 2002) reported that in Lagos Nigeria, an armory explosion was caused by the accidental detonation of a large stock of military high explosives at a storage facility in the city of Lagos. The fire created by the

debris from this explosion burnt down a large section of Northern Lagos, and created a panic that spread to other areas. As people fled from the flames, many fell into a concealed canal and were drowned. The explosion was believed to have killed 1,100 people and displaced over 20,000, with at least 5,000 injured and rendering over 12,000 people homeless.

The NCTSN report reveals that at least 80 percent of all fire deaths in US occur in homes as a result of human error, such as leaving cooking stoves, candles or fireplaces unattended to, smoking carelessly or not taking proper care of electrical products. It added that the second leading cause of residential fire and the major cause of fire in commercial properties is arson. NCTSN (2014) also opines that the third leading cause of home fires is a faulty heating system saying that individual homeowners are less likely to have their heating systems maintained than apartment owners are. Having functional and adequate active as well as passive fire prevention facilities dramatically increases the chances of surviving residential fire disaster. The provision of active and passive fire prevention facilities in homes could be as a result of awareness home owners have on fire safety.

In Makurdi metropolis where the study is conducted, the incidence of fire has also been on the increase. Benue State Fire Service (BSFS, 2013)

presented the report of fire outbreak and rescue in Benue State from 2006 to 2013. The report showed that 622 residential fire disasters occurred in the State 20 people were killed, 49 people injured and property worth millions of naira were also destroyed. Out of this incidences, Makurdi metropolis rank highest having 549 out of 622 total cases of fire disaster in the state in the period under review.

Fire safety measures in residential buildings refer to facilities that are installed to prevent, detect, and extinguish fires in homes. It includes education of the occupants of residential buildings about fire hazards and the maintenance and improvement of fire-fighting equipment in residential buildings. It seems that in Nigeria fire departments are concerned only with extinguishing fire in residential buildings. Encyclopaedia Britannica (2014) states that to reduce the impact and possibility of fire in residential buildings, building codes and fire safety acts most be implemented. According to Encyclopaedia Britannica, buildings most be designed, constructed with enough space in accordance with fire safety act or code so that fire will not spread; to incorporate fire prevention devices, alarms, and exit signs; to isolate equipment and materials that could cause a fire or explode if exposed to fire; and to install fire extinguishing equipment at regular intervals

throughout a structure. Fire-retardant building materials have also been developed, such as the paints and chemicals used to coat and impregnate combustible materials, such as wood and fabric should be used.

There are variety of measures used in prevent fires or minimize damage in residential buildings; these includes giving attention to building design and construction materials; enforcement of building codes; installation of alarms, automatic sprinkler systems, smoke detectors, heat-sensitive devices, extinguishers, and exit signs; safety inspections to examine electrical wiring, the installation of active and passive fire equipment in residential buildings and the presence of chemicals and other potential flammable materials (Bello 2012).

Artim (2014) said that fire is very destructive and poses more threats to residential buildings due to the fact that vandalized or environmentally damaged structures can be repaired and stolen objects recovered but items destroyed by fire are gone forever. An uncontrolled fire can obliterate an entire room's contents within a few minutes and completely burn out a building in a couple hours. According to Artim, the first step toward halting a fire is to properly identify the incident, alert the occupant and then notify emergency response professionals. This is often

the function of the fire detection and alarm system.

According to Artim the automatic fire sprinklers represent one of the single, most significant aspects of a fire management program. A properly designed, installed, and maintained fire sprinklers systems can overcome deficiencies in fire risk management, building construction, and emergency response in residential buildings. Active fire prevention facilities and passive fire prevention facilities also provide and enhance flexibility of residential building design and increase the overall level of fire safety.

Neufert Architects' data (2004) active fire prevention facilities include fire extinguishers, fire buckets and automatic fire sprinklers systems. Passive fire prevention facilities are Fire detector, fire dampers, flame detector, thermal detector, smoke detector, fire doors. Residential buildings should be constructed with full consideration of the flammability of building materials, duration of fire resistance, the arrangement of escape routes and effective extinguishing of fire so as to prevent the start and spread of fire, smoke and facilitate the escape or rescue of persons and property.

Federal Republic of Nigeria, Fire Safety Act (2004), requires developers to obtain approval before construction of homes. Design and installation of active and passive fire

preventive equipment should be carried out according to the specification of the fire safety code. Section 130, 131 and 132 of the fire safety act recommends strict supervision and inspection by fire fighting officers (stakeholders) to ensure that residential buildings meet fire prevention and controlling requirements before occupying and using the residential buildings.

The Occupational Safety and Health Administration of U.S. Department of Labor (2006) asserted that designers, architects and engineering's should consider the followings while designing, drawing, approving and constructing residential buildings; fire apparatus access, premises identification, fire hydrants, firefighter access, fire protecting signaling systems, water supply and fire extinguishing, automatic fire detection systems, hazards to fire service, sprinkler system; zoning, water control valves and fire pumps. Also to be considered by designers, architects and engineers is fire hose connections, design pressure, pressure regulating devices, smoke alarm, smoke control systems; fire voice alarms systems, location and position of sand buckets, standpipe isolation valves which are commonly used in industrial and some commercial buildings. Aiyetan, Makanjulala and Oke (2009) observed that low awareness of residents on fire safety has resulted to non availability and

inadequacy of fire control facilities in residential buildings.

Statement of the Problem

The incident of fire disaster is becoming worrisome and alarming in Nigeria and Benue State in particular. Fire disaster has caused serious losses in Benue State especially Makurdi metropolis. In the year 2013, 37 cases of fire disasters were reported within two months and the immediate causes of the fire disaster were attributed to electricity surge, arson and illegal storage of fuel. Between 2007 and 2012, the incidences of fire disasters were on the increase ranging from 64 to 118. If nothing is done to mitigate the trend it may become one of the most dreaded causes of death in Benue State. From the report of fire disaster in Benue State, Makurdi metropolis ranked highest having 549 out of 622 total cases of fire disaster in the Benue State. The efforts by government, fire fighting departments and developers in preventing fire disaster in residential buildings and reducing loss of life and property in Makurdi metropolis seems not to be realized. Lack of awareness on fire safety needs to the general public have far reaching implication than imagined on the implementation of fire safety by the occupants of residential buildings in Makurdi metropolis. The problem of this study is what the facilities available for fire prevention and control.

Purpose of the Study

Specifically, the study determined:

- i. The availability and adequacy of active fire control facilities in residential buildings in Makurdi Metropolis.
- ii. The availability and adequacy of passive fire prevention facilities in residential buildings in Makurdi Metropolis.

Research Questions

1. What is the level of availability and adequacy of control fire prevention facilities in residential buildings in Makurdi Metropolis?
2. What is the level of availability and adequacy of passive fire prevention facilities in residential buildings in Makurdi Metropolis?

METHOD

The study is descriptive survey research design. The population consists of 1,107 occupants of former Benue State Government quarters that is kwararafa, Lobi, Old and New Government Reserved Area (GRA) and Manor quarters in Makurdi Metropolis. Twenty percent (20%) of the population (221 occupants) were selected through stratified and random sampling were used as sample for the study.

The instrument used for data collection was checklist drawn from fire safety code. The instrument was designed to collect data for levels of availability and adequacy of active and passive fire prevention facilities. The data was analyzed using percentages.

Research Question Two

What is the level of availability and adequacy of active fire control facilities in residential buildings in Makurdi Metropolis?

Table 1: Frequency count response of availability and adequacy of active fire control facilities in residential buildings in Makurdi Metropolis.

S/N	Statement	AV (%)	NA (%)	AD (%)	IA (%)	GI (%)	Remarks
1	Automatic sprinkler system	40 (11.1)	319 (88.9)	0 (0)	26 (7.2)	333 (92.8)	NA/GI
2	Portable fire extinguishers	87 (24.2)	272 (75.8)	0 (0)	25 (7.0)	334 (93.0)	NA/GI
3	Fire hose reel	14 (3.9)	345 (96.1)	0 (0)	2 (0.6)	357 (99.4)	NA/GI
4	Dry riser	40 (11.1)	319 (88.9)	0 (0)	2 (0.6)	375 (99.4)	NA/GI
5	Wet riser	40 (11.1)	319 (88.9)	0 (0)	1 (0.3)	358 (99.7)	NA/GI
6	Fire hydrant	14 (3.9)	345 (96.1)	0 (0)	5 (1.4)	354 (98.6)	NA/GI
7	Fire buckets	63 (17.5)	296 (82.5)	0 (0)	3 (0.8)	356 (99.2)	NA/GI
8	Fire drenchers and wall wetting sprinkle	63 (17.5)	296 (82.5)	0 (0)	8 (2.2)	351 (97.8)	NA/GI

Key: AV=Available, NA=Not Available, AD=Adequate, IA=Inadequate, GI=Grossly Inadequate

Table 1 shows the frequency count response of the respondents on the availability and adequacy of active fire prevention facilities in residential buildings in Makurdi Metropolis. Available, not available, adequate, inadequate and grossly inadequate were used as response format. 50% was set as a bench mark to ascertain decision of the respondents on availability and adequacy of active fire control facilities in residential buildings in Makurdi Metropolis. From table 1, item 1 to 8 have not available with the percentage more

than 50 and grossly inadequate also with the same percentage, meaning that active fire prevention facilities in residential buildings are not available and grossly inadequate.

Research Question Two

What is the level of availability and adequacy of Passive fire prevention facilities in residential buildings in Makurdi Metropolis?

Table 2: Frequency count response of availability and adequacy of passive fire prevention facilities in residential buildings in Makurdi Metropolis.

S/No	Statement	AV (%)	NA (%)	AD (%)	IA (%)	GI (%)	Remarks
1	Smoke detector	3 (0.8)	356 (99.2)	0 (0)	21 (5.8)	338 (94.2)	NA/GI
2	Heat detector	1 (0.3)	358 (99.7)	0 (0)	27 (7.5)	332 (92.5)	NA/GI
3	Flame detector	1 (0.3)	358 (99.7)	14 (3.9)	24 (6.7)	321 (89.4)	NA/GI
4	Fire alarm	24 (6.7)	335 (93.3)	14 (3.9)	27 (7.5)	318 (88.6)	NA/GI
5	Halon gas system	1 (0.3)	358 (99.7)	13 (3.6)	22 (6.1)	324 (90.3)	NA/GI
6	Fire door	2 (0.6)	357 (99.4)	12 (3.3)	25 (7.0)	322 (89.7)	NA/GI
7	Fire exits sign	0 (0)	359 (100)	6 (1.7)	33 (9.2)	320 (89.1)	NA/GI
8	Emergency lighting system	1 (0.3)	358 (99.7)	10 (2.8)	25 (7.0)	324 (90.3)	NA/GI
9	Fire safety signs	25 (7.0)	334 (93.0)	14 (3.9)	22 (6.1)	323 (90.0)	NA/GI
10	Escape routes	24 (6.7)	335 (93.3)	14 (3.9)	25 (7.0)	320 (89.1)	NA/GI
11	Smoke exhausts Systems	1 (0.3)	358 (99.7)	14 (3.9)	24 (6.7)	321 (89.4)	NA/GI
12	Fire dampers	0 (0)	359 (100)	14 (3.9)	24 (6.7)	321 (89.4)	NA/GI

Key: AV=Available, NA=Not Available, AD=Adequate, IA=Inadequate, GI=Grossly Inadequate

Table 2 shows the frequency count response of the respondents on the availability and adequacy of passive fire prevention facilities in residential buildings in Makurdi Metropolis. Available, not available, adequate, inadequate and grossly inadequate were use as response format. 50% was set as a bench mark to ascertain decision of the respondents on availability and adequacy of passive fire prevention facilities in residential buildings in Makurdi Metropolis.

From table 2, item 1 to 8 have not available with the percentage more than 50 and grossly inadequate also with the same percentage, meaning that passive fire prevention facilities in residential buildings are not available and grossly inadequate.

DISCUSSION OF FINDINGS

The findings in table 1 and 2 above revealed that active and passive fire prevention devices are not available and neither adequate in residential buildings in Makurdi Metropolis. This corroborate with the view of Aiyetan, Makanjuola and Oke (2009) which states that, lack of active and passive fire prevention devices are responsible frequent cases of fire disaster in residential buildings.

CONCLUSION

The study concludes that fire safety awareness should be carried out by fire safety officers and other relevant agencies to reduce fire disasters in residential buildings in Makurdi Metropolis. Architects,

builders should complement the effort of fire safety officers by prevailing on their clients to install and use fire safety facilities in their homes. Active and passive fire prevention devices should be made available and adequate in residential buildings while occupants and fire fighter should take the inspection of fire safety facilities very serious so as to mitigate fire incident in residential buildings

RECOMMENDATIONS

1. Active fire control devices should be made available and adequate in residential buildings in Makurdi Metropolis.
2. Passive fire prevention devices should be made available and adequate in residential buildings in Makurdi Metropolis.

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