

ABUJA-BASED HOTELS AND NEED FOR FIRE SAFETY MANAGEMENT

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Abstract

Evidence has shown that fire occurrence in hotels indeed disrupt the 'going concern' in the tourism business sector. There are hardly a day without an incidence of fire outbreak, with its attendance destruction and devastating impacts on both human and infrastructural development. Therefore, the need for a mechanism for fire safety management in hotel business, towards limiting the potential and impacts of fire occurrence. The study adopts a pragmatic approach by sourcing data through a mixed method to explore this construct. The scope of the research is between 3 to 5 stars rated hotels in Abuja. The total population in the study area is 221 hotels, while the sample size is 142 in number. Data were sought using structured questionnaire and interviewer guide. Stratified random sampling technique was used for the selection of hotels while simple random technique was employed for the selection of respondents for questionnaire administration. The preliminary data are analysed with both descriptive and inferential statistics. The preliminary data suggest five main variables; structural fire protection, detection and warning, fire equipment, escape route, and training and education are critical to meeting fire safety requirement in hotels. This is followed by the Multi-Criteria Decision Analysis (MCDA). It is used to establish the mechanism for fire safety management in hotels. The findings indicate that at least 0.83 (83%) improvement is required for Structural fire protection, 0.79 (79%) is required for fire fighting equipment and 0.78 (78%) status for fire detection and warning is required for adequate fire safety provision. It can be deduced that structural fire protection, can be improved in the design and construction of hotel facility and is very important in limiting fire incident among other factors in the proposed mechanism. It is, therefore, recommended that knowledge based decision making is required in the design and selection of fire retarding materials for the construction of hotel facilities, as well as proper adherence to the design codes.

Keywords: Abuja, Fire safety, Hotel facility, Mechanism.

Introduction

The scope of facility management more often goes beyond creating an environment for effective performance of procured facilities, in meeting the core objectives of any organisation in an efficient manner, but doing so in a safe and secured environment (Opaluwah, 2005). Businesses only strived in a safe environment, therefore, a holistic assessment of potential risks that can leads to clear understanding and adequate preparedness for mitigation in the working

space is of utmost importance to any organisation management. Most common associated facility risks in the built – environment, which needs to be continually evaluated for minimal impacts are; accidents, components down-time, maintenance related issues and fire propensity (Opaluwah, 2005; Balamurugan and Senthamilkumar, 2014).

The main purpose of making a building fire-resistant is the protection of life, goods and activities within the building. Most building materials in use have affinity for fire, which practically limits the ability to eliminate completely fire occurrence in a building facilities. Occurrence of fire outbreak in the United States of America (USA) is estimated to occur as frequently as every 37 seconds each day, in a nation fully advanced in technology of building construction (Balamurugan and Senthamilkumar, 2014). In developing countries such as Nigeria, possible causes of fire outbreak could be as a result of several factors to include frequent power outages, power surge, electrical sparks, illegal connection of electricity fittings, substandard materials, defective or indoor use of generators, and negligence of household leaving minors at home without supervision, storing up adulterated fuel at home, arson and ignorance (Paul, 2014).

This fire incidents overtime have resulted into a loss of both human and materials assets in large magnitude that has crippled a lot of business endeavours. The news of a mere occurrence alone, with or without, major destruction can send a very strange signal to the stakeholders in an industry. Tourism sector is highly averse to negative comments - people out to spend their hard earn money on vacation in serene and safe atmosphere among alternate destinations; will definitely reacts adversely to issues of fire safety. Consequently, a hotel facility that is procured mainly for the provision of high quality accommodation for tourists cannot be susceptible to fire risk. Fire safety management of hotel buildings is a very interesting and challenging work. In 2005, between 4 and 6 fires occurred daily in hotels kitchens, lounges and rooms, with annual losses of millions of Euros (Pizam, 2010). Bharwani and Matthews (2012) posited that to survive in a competitive business, the hotel management needs to move from being proactive to identify, analyse, and assess the risk, and consider the risk as a part of their business strategies. The hotel owners/managers of hotels have a legal responsibility to take reasonable measures to prevent the occurrence of fire and to protect the lives and safety of guests/patrons and staff in the event of fire occurring in their premises. A fire safety management will be effective only if it is implemented in total, and it monitored on a day to day basis (Ortmeier, et al, 2005; Pizam, 2010).

Generally, the fire safety objectives may include life safety, protection of property and structure, continuity of business operation, heritage and environmental protection. However, the fire safety objectives of a building may vary with the activity, occupancy, structure and height of the building. The severity of fire is the main factor that determines the safety of a building and its occupants. It is, therefore, important to understand mainly the mechanism which controls the potential fire risk by studying; the ways in which buildings can be designed to minimise fire damages, possible fire safety issues that could arise in the move toward energy efficiency, environmental protection and sustainable design and construction (Krause, et al, 2012). This study focused on the mechanism for fire safety risk management in hotel facilities in the Abuja, in

order to attain an efficient fire safety measures. The subsequent parts will be structured along the following sub-sections; literature review, research methodology, results and discussion, and conclusion.

Literature Review

The Fire Concept

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light and various reaction products (Charles, 2000). Fire starts when flammable and/or a combustible material, in combination of sufficient quantity of an oxidiser such as oxygen-rich compound is exposed to a source of heat or ambient temperature above the flash point for the fuel and is able to sustain a rate of rapid oxidation that produces a chain reaction (Olaghade, 2012). Fire requires an ignition source and a combination of oxygen and fuel to sustain the fire (Henderson and Mackay, 2009). This is commonly called the fire triad in which fire cannot exist without the three elements in place and in the right proportions (Figure 1).

Fuel

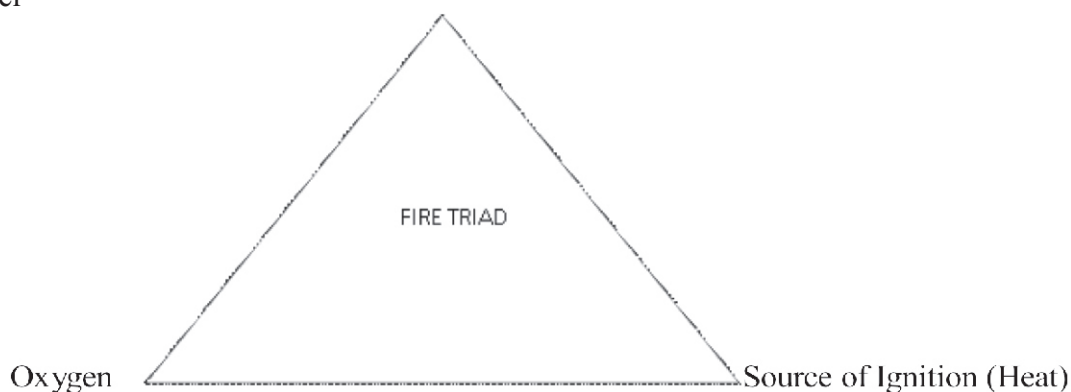


Figure 1: Fire triad.

Generally, fires are initiated with a single fuel object. The smoke produced from the burning object is transported by a smoke plume and collects the upper portion of the space as a layer. The smoke plume also transports the heat produced by the fire into the smoke layer causing the smoke layer to increase in depth and also temperature (Charles, 2000). This smoke layer radiates energy back to unburned fuels in the space, causing them to increase in temperature. Fire spreads to other objects either by radiation from flames attached to the originally burning items or from the smoke layer. As other objects ignite, the temperature of the smoke layer increase further, radiating more heat to other objects (Charles, 2000). The fuel in this case is anything flammable or combustible store or kept in a building or in an open space including furniture, curtains, clothing, beddings, paper and inflammable liquid. The more combustible these materials are, the more severe the resulting fire hazards (Ohemeng, 2010).

Hotel Facility and its Classification

The hotel is an accommodation provided for visitors away from natural place of resident on commercial interest. The facility is meant to provide home away from home to millions of travellers and tourists. Accommodations were booked for varying purposes, so as the need and expectation of services rendered by the hotel facilities. The qualities of the services provided are normally used as the rating criteria (Stars ratings) for the classification of the hotels. Hotels can also be considered and classified based on their core mandates. According to Kumar and Narayan (2008) and Raju (2009), most hotels can also be classified as follows: *residential hotels*, normally an apartment houses that provide hotel services to guests on a long term basis; *transit hotels*, normally located close to airports and motorways on a shorter period; *resort hotels*, usually close to scenic beauty such as lakes, mountains, seas and beaches normally incorporating recreational amenities such as golf course, and swimming pool among others; *heritage hotels*, usually historical properties of aristocratic nature for special experience to tourists; and *commercial hotels*, mostly focuses on the busy commercial centre incorporating services such as business centre facilities and parking lots.

Common Fire Hazards in Hotels

The hotels industry became fragile and highly susceptible to challenges relating to fire risk. It is a daunting task for the facility/safety manager to navigate between fire code (protection and prevention) and guests' safety amidst potential fire triad in trying to meet the hotels main objectives. Some of the main causes of fire in hotels include kitchen fire from unattended cooking grease fires/chip pan fires, electrical systems that are overloaded, poorly maintained or defective, combustible storage areas with insufficient protection, combustibles near equipment that generates heat, flame, or sparks candles and other open flames, smoking (cigarettes, cigars, pipes, and lighters), equipment that generates heat and utilises combustible materials, flammable liquids and aerosols, Fireplace chimneys not properly or regularly clean, cooking appliances-stoves, ovens, electrical wiring in poor condition, personal ignition sources-matches lighters and exterior cooking equipment-barbecue (NFPA, 2013; Jacobs, 2014).

The Concept of Fire Safety Designs in Hotels

The nature of tourism business to any kind of risks makes hotels business highly fragile when susceptibility to fire hazard. In order to provide safety measures against fire, sufficient protection mechanism has to be incorporated from conception through design to construction stages of any standard facility. The design features in modern hotels are normally comprehensive to mitigate the high risk. These features include; structural fire protection, provision of escape routes, smoke control and ventilating systems, installation of automatic sprinkler system, fire detection system, installation of fire hydrant and hose reel systems, safe storage of dangerous goods and combustible materials among other (Chow and Kot, 1989; Siemens, 2014).

- ***Structural Fire Protection***

A structural member needs to be design for satisfactory performance in case of fire occurrence. The Hong Kong Building Regulations (HkBR, 1974) set out the minimum fire

resistance periods (FRP) for the construction of building elements. The value depends on the volume or floor area in any one storey. For compartments, it is recommended to install fire-resisting doors and select non-combustible materials for duct or pipe works. In addition, it must be ensured that the guest floors are well separated from the other areas of relatively higher fire risks.

- ***Provision of Escape Routes***

The building planning regulation specifies the provision of means of escape for emergency (Code of Practice, 1986). An emergency **staircase** in the floor of the uppermost storey if more than **17 m** or **6 storeys** above the ground level, with specifications for basements, garages, car parks, and refuge floors. Hotel staffs are also trained to ensure that problems such as the wedge-opening or locking of fire doors, the blockage of the means of escape among other are done seamlessly (Siemens, 2014).

- ***Smoke Control and Ventilating Systems***

The amount of smoke involved and smoke movement pattern are central to smoke control mechanism. The purpose is on limiting the fire load on one hand, and providing either physical barrier to confine smoke and providing natural or mechanical ventilation for extraction. The escape routes should also be protected by pressurisation systems in controlling smoke movement as specified in the new code of practice on minimum fire service installations and equipment. Heat and smoke may spread from one compartment to another through the ventilating ducts. Therefore, protecting by fire dampers or using fire resisting ducts is essential for quality pollution resistance in standard facility such as hotel (Building Ventilating Systems Regulation (BVSR), 1974; Hobson and Stewart, 1994; Siemens, 2014).

- ***Others Automatic Installations and Systems for Fire Safety Design in Hotels***

Other automatic installations and systems that was normally incorporated for improved fire safety design in hotel are; automatic sprinkler systems, fire detection system, fire hydrant and hose reel systems, handling of dangerous goods and combustible materials, and excavation procedures. All these are embedded in fire safety design systems for optimum fire risk reduction (Fire Offices Committee (FOC), 1986; Graham and Roberts, 2000; Siemens, 2014).

These components and equipment were recommended to be incorporated into hotel design as major part of fire safety strategies in; prevention, communication, escape, containment and extinguishment towards fire safety practices (Andrew and Anthony, 2017).

Research Methodology

This study is aimed at proposing a mechanism for fire safety management in hotel facility in Abuja. The study scope was restricted to between 3 and 5 stars hotels in Abuja, the Federal Capital Territory (FCT). Preliminary study have shown that the construct characteristics are well situated within this range of classifications, at minimum, a 3 stars hotel considered issues related

to fire safety among its design and management framework. The study area was also adopted on the fact that Abuja is one of the fastest growing cities in Nigeria and houses most hotels in the country. This pragmatic research adopted mixed method design approach. Quantitative and qualitative strands of inquiry was utilised towards achieving the aim of the study, in order to fully explore and corroborate facts for better understanding of the constraints within the boundaries of the study context (Creswell, 2012; Babbie, 2014). Data were sought concurrently, using structured questionnaire survey and interview guide.

Considering the unit of analysis, the population according to Hotel Owners Forum Abuja (HOFA, 2019), a total of two hundred and twenty one (221) hotels were registered as a 3, 4 and 5 stars hotels in Abuja. Stratified random sampling technique was used for the selection of hotels while simple random technique was employed for the selection of respondents for questionnaire administration (Dougherty et al, 2014). A total number of 142 hotels were sampled, based on the Yamane (1967) methods of sample survey (*see* Table 1).

Table 1: Distribution of Target Population and Sample Sizes by Categories

S/N	Category (Stars)	Number	Sample Size
1	5	30	13
2	4	76	51
3	3	115	78
Total		221	142

Source: HOFA, 2019.

Middle to top managers were the respondents in the study since that segment forms the fulcrum for decision making and daily management practices in any organisation operations. Structured questionnaire surveys were self-administered to obtained data from the respondents. This process lasted for about 7 weeks to allow for considerable rate of return. While a semi – structured interview question was adopted for the face – to face interview that lasted for about 20 minutes per period (Creswell, 2012). The data were analysed using descriptive and inferential statistics such as; Mean Item Score (MIS), Relative Importance Index (RII), Cronbach's alpha (α) and Factor Analysis to arrive at the most preferred variables for mechanism development.

A Multi-criteria Decision Technique (MCDT) was used given consideration to variables, which are the fire safety risk measure in hotels (Behzadian et al, 2012). The variables under consideration are Structural fire protection (M_1), Fire detection and warning (M_2), Fire-fighting Equipment (M_3), Provision of escape route (M_4), Staff training and customers' education (M_5). These measures were operationalised against three predetermined outcomes, which are: Reduce incidence of fire (C_1); Reduce casualty of fire (C_2); and Safety probability (C_3) as the criteria basis. The overall analysis of the MCDT was conducted using R-programming. The value of criteria weight (*see*, Figure 2).

Table 2: Decision Criteria on each Indicators and Performance Ranking

<i>Criteria</i>	<i>Normalised Ideal Best</i>	<i>Normalised Ideal Worst</i>	<i>Normalised Performance</i>	<i>Rank</i>
Structural fire protection	0.089	0.072	0.83	1 st
fire detection and warning	0.110	0.037	0.78	3 rd
Firefighting Equipment	0.06	0.11	0.79	2 nd
Provision of Escape Route	0.041	0.078	0.72	4 th
Staff Training and Customers education on fire safety management	0.074	0.045	0.71	5 th

Sources: Fieldwork 2019.

The mechanism suggests that at least 83% improvement in structural fire protection is demanded for it to be considered adequate. 79% for firefighting equipment, followed by 78% status for fire detection and warning is required for adequate fire safety. Provision of escape Route takes the 4th ranking with 72.0% performance requirement, and lastly staff training and customers education on fire safety management ranked 5th with 71% demand.

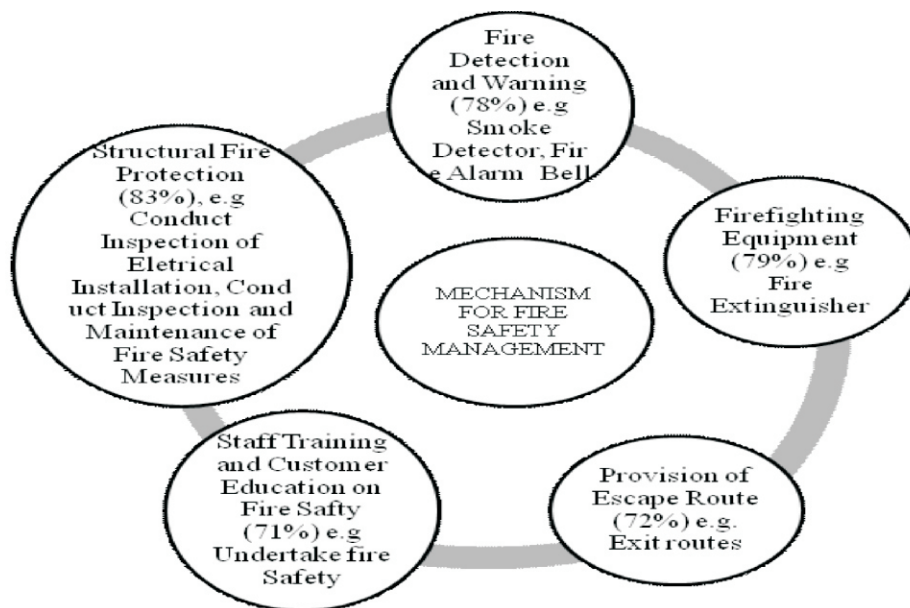


Figure 2: Proposed Mechanism for Fire Safety Risk Management in Hotels.

Conclusion and Recommendations

The purpose of the research work is towards proposing a mechanism for fire safety risk management in hotel facility. This was achieved with mixed design methodology. The preliminary data and analysis suggest five main variables; structural fire protection, detection and warning, fire equipment, escape route, and training and education are critical to meeting fire safety requirement in hotels. This was followed by the Multi-Criteria Decision Analysis (MCDA). It can be deduced that structural fire protection, as can be improved in the design and construction of hotel facility is very important in limiting fire incident among other factors in the proposed mechanism. It is, therefore, recommended that knowledge based decision making is required in the design and selection of fire retarding materials for the construction of hotel facilities, as well as proper adherence to the design codes.

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