

## **SAFETY AND SECURITY CONSIDERATIONS IN SCHOOL PLANT CONSTRUCTION IN WEST AFRICA: IMPLICATIONS FOR RESEARCH AND DEVELOPMENT**

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### **ABSTRACT**

*The quality of school plant construction determines the quality and extent to which the school environment is conducive, safe and secured for effective teaching and learning. This paper examines the kind of safety and security considerations that should be paramount in the construction of school plant in West Africa. The paper underscores the need for continuous research on ways of improving the safety and security of school plant construction to meet up with the modern security challenges as well as provide a stable school environment for sustainable educational development. It considers inadequate finance and neglect of safety and security specifications as among the major challenges in construction of school plant in West Africa. The paper therefore suggests that adequate financing and strict compliance to security specifications should be viewed as strategies for ensuring safety and security in school plant construction in West Africa.*

**Keywords:** Safety, Security, School Plant, Construction, Development

### **INTRODUCTION**

Security considerations have always been given pre-eminence when it comes to construction of Palaces, Castles, Villas and Lodges for Kings, Emperors, Presidents, Governors and Royalties. Likewise the rich and the powerful have never compromised security considerations no matter the cost, when they are constructing their mansions. There is always the feeling of a sense of safety and security when an individual finds himself in a well-constructed and secured environment. In spite of this however, when it comes to construction of school buildings and infrastructure, safety and security considerations seem to be given very little consideration and are indeed, sometimes grossly neglected particularly in West African schools. This anomaly has given rise to a situation where the quality of school plant construction is so poor that within a few years some school buildings begin to crack and collapse sometime with heavy casualties in terms of human lives and property.

The safety and security of staff and students in various schools is not negotiable. This is because no effective teaching and learning can take place in a state of insecurity. The need for school construction to pay more attention towards infusing the highest possible standards of security has become imperative. This is more so because school buildings and infrastructures have become targets of bombings, arson and other forms of destruction by terrorists and criminals. It is against this background that this paper examines safety and security considerations that should be emphasized in the construction of school plant in West Africa.

School safety refers to measures that are put in place in the construction of school facilities so as to protect staff and students from sustaining unnecessary injuries as they interact with school facilities. School security on the other hand refers to measures that are embedded in the construction of school facilities aimed at preventing and protecting the school from harmful, aggressive and dangerous external influences. Although safety and security are closely interrelated, this paper views safety as an internal issue in schools, which in most cases involve protection from accidental injuries resulting from unfavourable environmental conditions. Safety issues include fire outbreak, flooding, spread of diseases, hurricanes which result in bodily injuries. Safety hazards occur either through negligence, careless or by accident. Security involve protection from deliberate, unfriendly and dangerous actions that are usually perpetrated by external sources and same times even internally within the school capable of causing harm or even loss of lives and property. Security issues that could affect schools include shootings, bomb threats, kidnappings, theft, vandalism, hostage taking, raping and arson, among others.

School plant construction is the process of designing and erecting buildings, making roads, bridges, drainages, landscaping and other structures in a school environment. Sani (2007) viewed school plant as embracing the school site, school buildings in terms of classrooms, laboratories, workshops, libraries, playgrounds, furniture, as well as infrastructures which include road network, electricity and water supply. Simply put in broad terms, school plant refers to physical facilities that have been put in place in a school in order to create and sustain an enabling environment for effective teaching and learning (Manga, 2013).

### **Safety and Security Considerations in School Plant Construction**

Safety and security are twin concepts that must be treated together as they are highly interrelated. It is difficult to draw rigid boundaries between the two as a safety matter could in other circumstances be viewed as a security issue. For example, an accidental fire outbreak in a school workshop could be viewed as a safety matter. But where terrorists deliberately set the school workshop ablaze, the fire outbreak could be viewed as a security breach. In school plant construction, safety and security from whatever perspective are viewed, should be uppermost in every facility that is to be constructed in a school environment. In doing so, the following critical aspects should be considered:

1. **School Location:** The first step in school plant construction is the selection of an appropriate school site. The school should be located in an area that is safe with special consideration to the following as identified by Manga (2014):
  - a. *Traffic Hazards:* A school should be located in a place that is safe from traffic accidents. It should preferably far from busy high ways or railway crossings to minimize the risk of students having frequent accidents in the process of crossing busy roads or railway lines on daily basis.
  - b. *Industrial Pollution:* A school should not be located in an industrial district that is prone to discharge of poisonous substances, dust, heavy smoke, and obnoxious gasses. Inhaling them could affect children's health.
  - c. *Topographical Hazards:* A school should not be located in rocky hills where students will be exposed to injuries from falling on sharp stones. They should not be located in a swampy or water logged area that is most likely to be a breeding ground for mosquitoes, flies and other insects that can be harmful to students' health.

- d. *Security Post:* The school should preferably be located in a place where there is police presence or any other law enforcement agencies that can respond rapidly to assist the school in times of urgent security needs
  - e. *Criminal Areas:* schools should not be located in some parts of urban centers that are known to be notorious in harboring criminals who might trespass into a school to commit atrocities.
2. **School Fence:** When an appropriate site is selected, it may be more appropriate to start the construction of school plant by erecting a formidable fence around the perimeter of the school. This will help to establish school boundaries from the start and as well as forestall future incursions into school land by members of the community. This will also help to avoid future boundary clashes between the school and the community with all the possible security implications (Chiaha & Mbanefo, 2013). Providing a strong school fence with only one entry and exit point located at the main gate will help to deter trespassers who would otherwise be passing through the school compound from different routes. A high solid wall with security spikes or barbed wiring or other sharp objects at the top will discourage those who might wish to jump or climb the school fence. Electrical fences with warning signs may also be considered.
  3. **School Gate:** A school gate should be boldly and solidly constructed to withstand forceful entry. It should have a separate entry point and an exit point so that people can be checked when they are going in when they are coming out of school without obstructing traffic as in a one way channel. The entry and exit gates should have strong bars with stop signs attached to force vehicles to stop for security checks. The gate should be well lit at night see all people coming in and going out of the school. A **Security Room** should be attached to the main gate to provide shelter to security staff at the gate even when it is raining. The security room should also serve as a store to keep weapons and other gadgets that may be required for security duties.
  4. **Security Office:** Provision should be made to construct a security office in the school. The security office should have a reception space, offices, a detention room, toilets, bathrooms, a changing room and a store. It should house the close circuit television (CCTV) monitors and other security apparatus. In addition it may have an extension where security dogs are kept.
  5. **School Buildings:** School buildings are structures that have been constructed to provide shelter. In a schools setting, school buildings include: classrooms, libraries, laboratories, workshops, offices, administrative block, kitchens, dining halls, lecture theatres, student hostels, staff quarters, toilets, bathrooms, stores, common rooms, mosques, prayer chapels, sports complex, school clinic, and other structures. All buildings in general, regardless of the purpose for which they are constructed should have the following safety and security considerations.
    - a. *Ventilation:* School buildings must be well ventilated to allow for adequate circulation of fresh air. Windows should be large and aligned for cross ventilation. In addition functional fans and air conditioners should be adequately provided to moderate adverse

temperatures in school buildings. Ventilation of school buildings should be seen as safety measure intended to protect children from inhaling injuries carbon dioxide and other substances from stagnant expired air (Lugg and Batty 1999). Jeffrey and Lackney found that poor ventilation of school buildings is a health hazard as stuffy and buildings are associated with respiratory illnesses, sensory irritation, skin rashes and mental fatigue. Proper ventilation of school buildings enhances air circulation, filtration and minimizes pollutants.

- b. *Lighting*: Provision of adequate lighting is a safety factor that should be taken into cognizance when designing and constructing school buildings. Gorof and Brophy (1995) found that students could experience fatigue, eye strain, blurry vision and headaches due to poor lighting in classroom, laboratories or libraries and workshops. They also found that students reacted more passively to classrooms that have large windows that allow for plenty of natural sunlight to flood the classroom. As a security measure, providing adequate security light both inside and outside the classrooms will enable staff and students to see and be seen in the dark. It encourages and exposes criminals from hiding under the cover of darkness to commit evil.
- c. *Colour*: The colour of school buildings should be carefully chosen for security enhancement during the construction of school plant. Light colours keep school building cooler during the day than dark colours. Earthman and Lemaster (1995) stated that cooler buildings are more comfortable especially in West African tropical climate. In terms of security, light colors reflect more brilliantly at night under security lights than dark colours. Bright colours makes it easy to see criminal activity around school buildings at night than if the buildings are painted in dark colours.
- d. *Acoustics*: School building design and construction should incorporate measures that minimize the effect of noise distraction as a crucial safety consideration. Prolonged exposure to high intensity noise in a school setting is often harmful to the health and behavior of large segments of exposed population. Evans and Maxwell (1997) found that a significant increase in blood pressure was associated with schools constructed near noisy urban streets. Noise could also emanate from within a school building.
- e. *Doors and Windows*: The strength of doors and windows is a critical security consideration in the construction of school buildings. Doors and *Window Frames* as well as their *Hinges* should be such that they are not easily damaged by intruders. Windows should have strong *Security Locks* from the inside only, while doors should have security locks from both the inside and outside. *Burglar Proofs* could be installed on each window to prevent or delay access in case window frame is broken. Doors could equally be reinforced with iron bars from the outside. In addition, *Mosquito Netting* could be attached to windows in student hostels, staff quarters and other residential buildings where people sleep at night as a protection against mosquitoes. Doors should have peeping devices where the person inside the building can look and see who is at the door before answering the door.
- f. *Corridors*: Provision should be made for safe corridors in the construction of school buildings. The layout of school buildings should be designed in such a way that corridors

of school buildings help in crime prevention encourage positive student behaviour and enhance overall safety and security of a school.

- g. *Security Devices*: Various security devices could be installed in the construction of school buildings. These in closed circuit television (CCTV), cameras, intruder signaling alarm systems that if triggered could produce sounding bells or sirens, intercom system, fire extinguishers and safes and telephones (Nation Association of School Psychologists 2013).
- h. *Land Scrapping*: Safety and security should be paramount in the construction of school landscape. *Trees* should be planted to protect school buildings from the hazards of strong winds and rainstorms. *Drainages* should be constructed to channel rain water and prevent flooding in the school. *Carpet Grass* should be planted on school grounds as a protection against soil erosion in school premises. *Parks and Gardens* should be designed in such a way that they do not serve as a hiding place for criminal activities. There should be provision for staff and visitors *Car Parks* with signs fixed on no parking areas to restrict access to visitors
- i. *Conveniences*: Adequate *Toilets, Urinals* and *Bathrooms*, as well as sewage and refuse disposal facilities should be provided. Poor *sewage* and *refuse* disposal facilities can constitute health hazards for staff and students. Facilities for safe drinking *water* and *food* administration should be put in place when constructing the school plant, as contaminated food and water can lead to health hazards. A *Powerhouse* should be constructed to house the schools generators to ensure stable electric power supply. Electricity is needed for security lighting and operation of electronic devices on security.

### **Implications for Research and Development**

School plant construction is an area that requires a lot of research as it involves Architects, Engineers, Contractors Estate Manager, Educationists, Quantity Surveyors, School Administrators, Health Officers among others. School building design and construction is a rapidly changing phenomenon all over the world. There is a need for West African schools to catch up with world standards in school plant construction so as to provide a conducive, safe and secure school environment. Emphasis on safety and security in school plant construction will provide a stable environment for rapid educational development, which in turn is a pre-requisite for overall national development in West African countries.

### **Challenges of School Plant Construction**

School plant construction in West Africa is faced with many challenges. One of the greatest challenges is that of inadequate finances to purchase high quality building materials that will ensure the strength and durability of school buildings. Thus there are several cases of building collapses which compromise the safety of school staff and students

In some cases there are no properly documented blueprints on security specifications to be adhered in school plant construction. Sometimes even where security standards are specified to guide school plant construction, they are often neglected out of error. There are cases where contractors deliberately connive with corrupt officers to cut down cost and end up providing poorly constructed school plant. In most cases no punitive sanctions are enforced to ensure compliance to security standards in school plant construction.

### **Suggestions**

Based on the challenges examined, the following suggestions are hereby given to ensure that safety and security considerations are uppermost in school plant construction in West African schools:

1. Adequate finances should be provided by government and school proprietors to ensure quality construction of school plant
2. There should be clearly spelt out security specifications to guide school plant construction. Through supervision must be done to ensure strict adherence or compliance to security specifications in school plant construction
3. There should be strict sanctions on anybody involved in deliberately refusing to adhere to expected security standards in school plant construction in West African Schools.

### **CONCLUSIONS**

The Problem of school safety and security has become an issue of global concern. In addition to other measures put in place to ensure safety and security of staff and students, proper school plant construction is considered as one of the topmost strategies of ensuring safety and security in schools. Poorly constructed school plant could constitute a safety hazard and or security risk that expose staff and students to all sorts of dangers. Research on ways of improving safety and security in school plant construction has become imperative in order to ensure high quality of education and national development in West African States.



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