



ISSN 2278 – 0211 (Online)

Impact of Construction Activities on the Built Environment of Ota, Ogun State, Nigeria

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Abstract:

Construction activities are the major contributor to economic growth and national development. Job opportunities, urbanization and infrastructural development are achieved through the execution of construction projects. This study assesses the impact of construction activities on the built environment of Ota, Ogun State, Nigeria. Qualitative research approach using non-participant observation was utilized. New building and road construction projects were observed in Ota, Ogun State. Findings revealed that construction activities have both positive and negative impacts on the built environment. The positive impacts are very significant such beautification of the streetscape. Air pollution especially raised dust, and noise pollution are the most significant negative impact of construction activities. The study recommends that sustainable construction methods should be implemented to significantly reduce the negative impacts of construction.

Keywords: Construction, economic growth, built-environment, sustainable

1. Introduction

Construction activities are inevitably agents of economic growth and national development and add value to the built environment by creating job opportunities, social facilities, and public amenities for human consumption among others. Construction can be described as a process that consists of building or assembly of a structure". On the other hand, a construction project includes all material and work necessary for the construction of a finished structure for occupancy by an end user. This includes site preparation, foundations, mechanical and electrical work, and any other work necessary to complete the project." There are different types of construction projects (Muhwezi, Kiberu, Kyakula, & Batambuze, 2012). Majority of human existence has been spent on manipulation of the natural environment to better suit its needs. These actions affect the natural environment both positively and negatively. Construction activities in Ota, Ogun State have been driven by both public and private projects which include construction of roads, schools, commercial and residential properties. The environment is threatened severely by so many problems, some of which are caused by the activities of construction projects (Ijigah, Jimoh, & Ade, 2013). Shen, Lu, Yao, & Wu, (2005) claimed that construction is a main source of environmental pollution, compared with other industries. Qi, Shen, Zeng, & Jorge, (2010) corroborated and maintained that any typical construction process involves using various construction equipment and natural resources that generates many pollutants.

Built environment is characterized by physical surroundings and conditions, especially as affecting people's lives; conditions or circumstances of living; and external conditions affecting the growth of plants and animal. It can be described as surroundings, atmosphere, climate, habitat, territory, biosphere, ecosystem, and nature. The term also refers to cities, towns and villages, culture in all its manifestations, history, lifestyle, and quality of life (Muhwezi, Kiberu, Kyakula, & Batambuze, 2012). Building and civil construction enhances growth and development by providing housing and housing environment for citizen toward achieving human comfort. However, the processes of the building construction result in various environmental impacts. Many of the environmental issues are caused by the dust and noise generated, raw materials used, and energy consumed during the construction process. Construction, maintenance and use of these structures and buildings have direct and indirect impacts on the built environment which can be classified into energy impact, ecological impact, visual impact, and material impact, resources use, energy impact, space condition and lighting impact and land use and ecological impact (Howard, 2000). Nevertheless, Buildings can improve the architecture of an

environment, thereby creating a serene environment. On the other hand, it can be a visual disaster if it was not properly conceived and constructed.

2. The Study Area

Ota is a town in Ogun State, Nigeria, with an estimated 733,400 population based on 2006 population projection. It is characterized by large concentrations of industries, tertiary institutions, residential buildings, and commercial developments. The construction industry plays a crucial role in the economy of Ogun State and Nigeria at large, by creating job opportunities and generating substantial annual revenue. However, it has been observed that construction activities in Ota impact on the environment through the process of construction and life cycle of development. This impact starts from the initial work on site, through the actual construction, to operational or usage period and demolition or re-use situation. The construction industry is responsible for the use of high volumes of natural resources and the generation of great amount of pollution. This is as a result of energy consumption during extraction, preparation, transportation, and usage of raw materials.

3. Methods

The study was carried out using the qualitative method. Data on types of construction in Ota and their impact on the environment were gathered first through in-depth literature review which guided the non-participant observation that was carried out. Documentation and content analysis were carried out to analyse the data gathered. Instruments employed were the internet and library to gather data from existing research/literature. Other tools were observation schedule, and a digital camera.

4. Types of Construction Activities in Ota, Ogun State

Construction activities within Ota are building construction, heavy and light civil engineering construction, and specialized industrial construction projects. Building construction projects in Ota, Ogun State include residential housing, institutions (e.g., hospitals, colleges, universities, churches, etc.), and commercial buildings (e.g., shopping malls and retail chain stores, warehouses, offices, and hotels).



Figure 1: Ijoko Bridge under Construction

Road construction and maintenance works are continuing projects which are executed in Ota these include construction of bridges, highway, streets drainages, gas power plant and communication systems. They are important initiatives that have a significant impact on the quality of life and living standards of Ota city. These construction projects are typically financed by federal, e.g., Federal Road Management Agency (FERMA), Ado-Odo Local Government Community Development Association, or private organisations/individuals e.g., Living Faith Church Worldwide (LFCW), Bells University of Technology (BELLSTECH).

Large-scale projects with a high degree of technical sophistication are specialized industrial construction projects in Ota. These gas power plants are in Canaanl and, Ota, Ogun State, chemical manufacturing plants, and steel rolling mills in the Ota industrial layout.

5. Impact of Construction Projects

Observed impact of construction projects on the built environment in Ota are both positive and negative. The negative impacts are pollution (noise and air) and damage of infrastructure especially road while the positive impacts include beautification of streetscape, infrastructural development, and urbanisation.

5.1. Noise Pollution

Noise is unwanted sound. Environmental noise consists of all the unwanted sounds in our communities. Noise produces direct and cumulative adverse effects that impair health and degrades the residential, social, and working environment with corresponding economic, and intangible (well-being) losses (Jariwala, Syed, Pandya, & Gajera, 2017). Noise pollution features different characteristics that make it different from every other "classic" pollutant. It can impair the ability to enjoy one's property and leisure time and increases the frequency of antisocial behaviour. Noise is invisible; it does not smell; it disappears when the source is turned off and leaves no traces in the environment. In addition, when

people perceive something wrong about their hearing capacity, it is often a long time after the beginning of noise exposure. (González, 2014). It is one of the major problems in construction sites in Ota environment. The main sources of noise in Ota construction sites are pneumatic hammers, compressors, concrete mixers, operating machinery, several types of horns and acoustic signals, communication among workers, etc.

Environmental noise pollution is a threat to health and well-being. Due to continuous construction activities, noise pollution will continue to increase in magnitude and severity. The potential health effects of noise pollution are significant. Noise generated from construction activities adversely affects development close or adjacent to the construction site by degrading residential, social, and learning environments through vibration from machineries. Noise could be reduced on construction sites by the use of improved means of communication among workers, minimize their operating time of noisy construction operations, replacing noisy construction operations, duplicating noisy equipment if there is enough space on site, avoiding use of horns unless for safety reasons, avoiding the use of machinery at full power where possible (Teixeira, 2003).

5.2. Air Pollution

Air pollution comes about through production of dust clouds and air emissions. All construction sites generate high levels of dust (typically from concrete, cement, wood, stone, silica) and this can carry for large distances over a long period of time. Earth movements, demolition and other similar construction activities often gives rise to the production of billowing clouds of dust. Those have with pernicious effects on the increasing number of those suffering from respiratory diseases, and unpleasant effects on deposition surfaces. (José M. Cardoso Teixeira, 2003). Examples of dust production operations include road construction, refurbishment activities and cleaning of façades.

Air emissions are generated from vehicular exhaust, and machineries on site dust during construction (Kaur & Arora, 2012). This emission includes CO_2 , NO_2 , and SO_2 (Kaur & Arora, 2012) (Qi, Shen, Zeng, & Jorge, 2010). Construction activities that contribute to air pollution in Ota environ include site clearing, operation of diesel engines, construction vehicles and trucks, demolition, burning of waste materials, and working with toxic materials.

Construction dust is classified as PM10 - particulate matter less than 10 microns in diameter, which is invisible to the naked eye. Research has shown that PM10 penetrate deeply into the lungs and cause a wide range of health problems including respiratory illness, asthma, bronchitis and so on. Construction sites are responsible for 14.5% of PM2.5 (particle matter that is 2.5 micrometres in diameter) and 8% of PM10 emissions. Another major source of PM10 on construction sites comes from the diesel engine exhausts of vehicles and heavy equipment. This is known as diesel particulate matter (DPM) and consists of soot, sulphates, and silicates, all of which readily combine with other toxins in the atmosphere, increasing the health risks of particle inhalation. Diesel is also responsible for emissions of carbon monoxide, hydrocarbons, nitrogen oxides and carbon dioxide. Noxious vapours from oils, glues, thinners, paints, treated woods, plastics, cleaners and other hazardous chemicals that are widely used on construction sites, also contribute to air pollution. The installation of dust-preventing facilities should be enforced in these cases, this requiring careful evaluation and selection of adequate preventive measures.

5.3. Infrastructural Development

This is a positive impact of construction on the environ of Ota. This can be seen in the increasing completion and enhancement of road and drainage networks.

5.4. Urbanisation

Construction activities centred around the provision of academic institutions, religious buildings, and factories in Ota has led to positive urban growth. More residential buildings and supporting facilities have been constructed and are still coming up leading to urbanisation of the city.

5.5. Urban Aesthetics

Increasing urbanisation as a result of construction activities has led to a change in the streetscape. More modern buildings are coming up thus improving aesthetics of the city (see figure 2)



Figure 2: Modern Shopping Mall Along Idiroko Road, Ota

6. Conclusion and Recommendations

Findings revealed that construction activities have played a significant role in the transformation of the streetscape of Ota, mainly due to building construction, and road construction. However, these activities also have deteriorating impacts on the built environment like noise and air pollution. The paper therefore recommends that government with the support of stakeholders in the construction industry should come up with special legislations, codes or standards relating to sustainable construction practices to ensure its proper and effective implementation. The study recommends that certain measures should be made to mitigate construction impacts on the built environment includes constructing projects that are environmentally friendly (sustainable), building with energy efficient construction materials, setting goals to reduce emissions, and pollution emissions should be kept to a minimum.

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