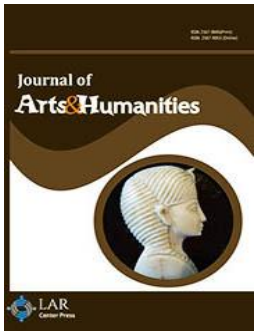

Journal of Arts & Humanities

Volume 08, Issue 07, 2019: 60-68
Article Received: 13-03-2019
Accepted: 03-04-2019
Available Online: 01-08-2019
ISSN: 2167-9045 (Print), 2167-9053 (Online)
DOI: http://dx.doi.org/10.18533/journal.v8i7.1609

Enhancing the Aesthetics and Transportability of Container-Kiosk in Ghana

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ABSTRACT

Over the years, container-kiosk have been used in Ghana as point of sale joints where various services are carried out. Although the initial intent of these temporary structures are purposely for sales, there has been a pressing need for owners of such structures to use them for both business and as an abode. This is as a result of the high cost of accommodation in our cities and over-crowding in these cities due to rural-urban migration. Aside defeating the primary use of these structures, they have not been designed and fabricated for easy transportability. These temporary structures both deface the environmental aesthetics of our cities and incur high financial burden on owners and the state when being transported or relocated. The objective of this research was to redesign container-kiosk with much emphasis on their beauty and demountability for easy transportability. The research employed the descriptive and studio based research design and used observation and interview to soliciting information from a sample size of 186, drawn from an accessible population size of 372. Explorations were made into the nature of materials used for fabricating these container-kiosks. It was found that mild steel rust faster than galvanize steel and also majority of these container-kiosk owe their rust to the concrete pedestal upon which they are mounted as well as unfavourable atmospheric conditions. Is was again found that much effort had not been made to improve the Aesthetics as well as the ease with which these temporary structure can be demounted, rather artisans copied the form in which ISO shipping containers have been formed. It is therefore recommended that design concepts and findings of this research be considered when constructing Demountable containers.

Keywords: Container-Kiosk, Demountable, Transportability, Aesthetics, Design.

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1. Introduction

Although container kiosk serve the purpose of being retail centre, it also provide a means of shelter for owners. However, the style of design, materials used and the means of transporting and mounting at site poses challenges to owners as well as conflicting with environmental aesthetic there by defacing the beauty of our cities; specifically Ghana. The National Analytical Report on the 2010 population and housing census released in 2013 indicates that Ghana's population increased by 30.7 percent between 2000 and 2010 (Ghana Statistical Service, 2013). As population increases, it is expected that facilities and social amenities will increase concurrently to take care of the needs of the populace. Contrary to this however, much attention has not been given to infrastructure in our country particularly villages and towns. This situation has led to rural-urban migration. Ghana Living Standard Survey Round 6, 2014 report indicates that 48.6% of the country's population migrated internally. Majority of these migrants according to the report are found in the city centres. Migrants, who hope in finding decent jobs, end up on the streets hawking for their daily up keep. This phenomenon does not only add up to the unemployment rate but also increases the housing deficit in our major cities. As population increases the use of land and space for residential and commercial purposes becomes scarce. Consequently city dwellers take advantage of any available space to put up 'containers' and other structures without the consent of city planners. 'Containers' are objects that are used for storage of goods or other items. In Ghana however the term is used to describe metallic structures made to the size of an average 'single' room that are used as kiosk for the display and sale of goods and services. A walk through major streets in our cities shows countless number of containers or kiosks littered everywhere including reserved areas such as waterways and road side. With time, these containers become sleeping quarters at night for owners who do not have the means to rent apartment in the city. Supposedly, containers are to be temporary stationed so as to be relocated in future to make room for permanent structures when the need be. In such times, most container owners lose their structures because of the way they were designed, fabricated and installed. Manufacturers of containers, fabricate containers wholly and transport them to site at the back of trucks. They are then mounted on already made concrete platforms and are held in place with concrete and tiled where necessary. Roofing and interior panelling are done to prevent excessive heat during the day. The main material used for fabrication is one millimetre (1mm) wrought iron steel or galvanized steel. Most manufacturers and clients prefer wrought steel because it is cheap compared to galvanized steel.

The problem however is that wrought steel is corrosive. To solve the problem of rust or corrosion containers are coated with anti-rust and other oil based paint. When containers are allowed to be stationed at particular location for a long period of time without proper routine maintenance, concrete product react through chloride ions and carbonation exposure with the steel which triggers corrosion at the base (Poursaee, 2016). Consequently, the base of containers is chopped off by rust leaving the structure hanging on the interior panelling. In such cases it becomes nearly impossible for such containers to be demounted and transported without damage. In Ghana, decongesting exercises are carried out from time to time especially when there are natural disasters and road expansions. In such exercises persons whose structures are temporary sited in affected areas lose their structures and livelihood. A report by Timothy Ngnenbe of Graphiconline.com on February 2015 indicated that hundreds of structures were razed down by the Accra Metropolitan Assembly during a demolition to decongest Old Fadama popularly referred to as Sodom and Gomorrah. Prior to the demolition exercises notices were served to afford the affected persons ample time to relocate but to no avail. This was because not only did they not have places to relocate them to, but any attempt to relocate will cause serious damage to the structures, therefore they left it to be demolished. Decongesting exercise does not come at a cost only to container owners but to government who spend huge sums of money on the exercise which includes the payment of compensation and sometimes resettlement of affected persons. The Business Dictionary defines assembled products as component or item comprising a number of parts or subassemblies put together to perform a specific function and capable of disassembly without destruction. In today's world where trade and globalization is the order of the day, goods are shipped to different parts of the world on daily basis in intermodal containers. Goods such as furniture, electronic and other house hold appliances are made in parts and are assembled when they reach their destinations. The advantage is that such items can be taken apart and transported easily

and reassembled without difficulty. Demountable building is a building designed and built to be movable rather than permanently located (Kronenburg, 2002). The idea of demountable structures could be adapted and applied to the designing and fabrication of local containers to make it easier for transporting thereby saving cost. This research is geared toward the study of the nature of locally made containers and designs a container that is not only pleasing to the eye but is demountable for easy relocation. The results of the study will add to the body of literature on demountable structures which can be used as resource for container manufacturers, students, researchers, and artisans in Ghana and Africa in general.

1.1 Demountable structures in Ghana and around the world

Temporality has become the order of the day in today's world. Our world has moved from the age of agriculture through industrialism to supper industrialism. An era of fast moving society based on transience. The days of permanence has given way to adaptability, materials such as aluminium, plywood, asphalt, plastics are all not new to the system but are improved tremendously to serve the purpose of today (Marsh, 1944). To think that the world we live in and things surrounding us is permanent is more or less an illusion, in reality everything changes as part of life cycle (Shvidkovsky, et al 1997). Temporary architecture constitutes structures that are created to serve a specific purpose and lose its existence and significance once the purpose is fulfilled. For instance exhibition booths and tents, political campaign and entertainment show stages, military base and mounted research centres where various activities are carried out are among the commonly seen temporary architecture. Temporary or ephemeral architecture goes beyond single structures or buildings but extend to communities. In 1990, the Budumburam camp was opened in Ghana to refugees from Liberia when they fled a civil war in their country (Kpatinde, 2006). Within the period of its existence the camp hosted more than 30,000 refugees. When the camp was finally closed down in 2009 the land was given back to its rightful owners. Another example is the Hajj village in Tamale and Accra airports. The Hajj village at Kotoka International Airport, Accra was opened to pilgrims in September 2012 (http://ghananewsagency.org/social). This temporary village was set up to host pilgrims who converge at the Kotoka International Airport, Accra to embark on a journey to Mecca to fulfil their religious obligations. The development of temporary architecture is on ascendency in response to the increased speed of the world in terms of technology and people's desire for immediate gratification (Armada, 2012). Items and structures that seem fashionable today may be outmoded the following year. As technology advances and industries develop new ways of doing things, the old ones automatically fade away. Consequently, many countries are focusing on ephemeral architecture rather than permanent ones. In Tokyo the average expected lifetime of a building is less than 20 years – buildings are no longer forever. It must also be noted that structures that are thought of as permanent in years passed are being pulled down to make room for modern architectural designs. This goes to confirm the observation made by Shvidkovsky et al (1997), that nothing is ever permanent. In Ghana the term temporary structures are synonymous to containers used as kiosk for the display and sale of goods and services. Such kiosks are supposed to be temporarily mounted at vantage areas in our major cities but assume permanency by respective owners.

1.1.1 Kiosks

The term kiosk originated from a Persian word "koschk" meaning an open pavilion in an oriental style (Reuveni, 2002). The term has been used to describe small, freestanding structures with one or more sides open for easy interactions with outside surroundings. During the rule of the Ottomans in the Bosphorus region, much attention was given to gardens and landscaping where wooden kiosks were placed in vantage places for the relaxation and meditation of the sultans. Hither to, the structures found in these gardens were pavilions made of stones. The switch might have been due to the cumbersome nature of working with rocks as compared to wood. Kiosks have contributed immensely to the socio-economic development of many developed countries. Before the surge of supermarkets, malls and online stores, goods and services were retailed in kiosks. Most developed countries rode on the simplicity and affordability of kiosks to develop their economy and improve the life of its people. The use of kiosks for economic activities became wide spread at the onset of industrialisation particularly at the introduction of the print media. With the introduction of mass

produced goods, retailing as a business got underway as industry players sought ways to market and sell their products. Newspapers were delivered to the doorsteps of prospective clients and were sold at corners of streets and railway stations. Stile a publishing house in Berlin in the 1900s after obtaining necessary permissions from city authority set up the Deutsche Kiosks and Berliner Trinkhallegesellschaft in and outside Berlin as sales point for the distribution and sales of newspapers and journals (Reuveni, 2002). According to Reuveni (2002), the idea of setting up kiosks was an attempt by authority to regulate and prevent the sale of newspapers on the streets which they describe as unhygienic and to bring orderliness in the use of space in the city. For individuals, kiosks have been used as life starters. At the aftermath of the Second World War in 1945, most surviving Eastern European Jews adopt a culture "Dan Diner describe as a 'provisional way of life': an attitude that minimized commitments to the surrounding German world and always left open the possibility of leaving"(Holian 2017). Hence most of the economic activities of the Jews were centred on petty trading in temporary structures. Most of the structures where these Jews engaged their economic activities were simple kiosks made of wooden frame with wooden panels. The sitting of temporary structures was partly due to the fact that spaces where they occupied were not allocated for permanent use. It was also because the Jews never intended to stay for long (Holian, 2017). The surge of kiosks in St. Petersburg and Moscow after the disintegration of the Soviet Union in December 1991 was due to the fact that shops and stores were state owned. Most of these stores were located at city centers distant from prospective shoppers. According to Axenov et al (1997), before 1991, residents of St. Petersburg spent on average 3-4 hours in transit to get to pubic stores. Shoppers therefore resorted to kiosks and other types of low cost mobile commercial establishment to meet their needs. In recent times the term kiosks has been used to describe automated machines that are used at public places for various purposes. For instance the automated teller machine is a form of kiosks which dispenses money to clients of respective banks. There are others like water dispensers, automated toll booth and many other automated machines that serve the public interest. Unlike most countries and cities that have employed the use of kiosks as means of ordering the use of space and activities of retailers and petty traders to prevent haphazard sitting, Ghana has thrown caution to the wind by allowing unauthorized sitting of kiosks popularly referred to as containers in our major cities. This situation has dire consequences on the state and individuals.

1.1.2 Intermodal containers

The introduction of intermodal containers has brought a lot of ease to importers and exporters who can now transport goods in large quantities. Hither to, goods to be transported overseas were packed into crates small enough for stevedores to handle individually. Intermodal containers are standardised shipping containers that are designed and built for intermodal freight transport, meaning they can be transported across different mode of transport: from ship to rail to truck without unloading and reloading their cargo. Containers as they are simply called comes in different sizes, the most commonly used is the 40feet long, 8feet wide and 8.6 feet high as accepted by International Organization for Standardization, (ISO) standards (Heins 2013). Shipping containers are designed and manufactured using Corten. Corten is carbon enriched steel with higher strength and corrosion resistance. The average thickness of sheet for containers is 3mm; depending on its usage a particular thickness size is selected.

Figure 1. Images of container kiosks sizes

(http:/www.csiu.co/resources-and-link/container-cost-breakdown). Aside the corner beams that provide the main support, the sheet is manufactured in regular corrugations that help to reinforce the side to be strong enough to withstand loads and pressure that may occur during the transportation

processes. Shipping containers are robust and resilient to handle the pressure of moving from one port to the other around the world without deformation. A typical container when well-maintained will last for more than two decades.

2. Methodology

Qualitative research methods were used to solicit data and conduct the research. Strauss and Corbin (1990), generally defines qualitative research as any kind of research whose findings are not obtained by means of statistical procedure or by any other means of quantification. This research employed the descriptive and studio based research approach of the qualitative research design. The population for the research were artisan (fabricators), container kiosk owners, government agency and container kiosks that are designed and manufactured by local fabricators located in Apowa and Beahu in the Ahanta West District of the Western Region of Ghana. In all, accessible population for the research investigation were 160 containers located in the catchment area of these fabricators and 50 artisans, 156 container kiosk owners and 6 persons from the Ahanta West District Assemble responsible for giving permit and sanitation. The purposive sampling technique was used in the selection and examination of container kiosk which were made specifically in the Ahanta West District that have been mounted in their current location for more than Five (5) years and have been marked for relocation from 80 sample size out of an accessible population of 160 container kiosk. This was purposely done to ascertain the credibility of the view that these materials suffer rust and also verify the difficulty if not impossibility of their relocation. Random sampling was also used to interview respondent from an accessible population of 212. Face to face interactions was employed and did not make use of questionnaire, this was because majority of the population being interviewed did not know how to read or write. However, question guide was used to help in asking the needed questions in other to obtain the required data. 106 out of the accessible population is adequate for the study because Cohen and Manion (1981), assert that , for quality research, 30% of the population for the study is a fair representation for an acceptable accuracy of result hence, the research used 50% of the accessible population for the study (Table 1).

Table 1.

Population size

POPULATION FOR THE STUDY	ACCESSIBLE POPULATION	SAMPLE SIZE 50%
CONTAINER KIOSK PRODUCED IN AHANTA WEST DISTRICT	160	80
ARTISAN (FABRICATORS)	50	25
CONTAINER KIOSK OWNERS	156	78
GOVERNMENT AGENCY	6	3
TOTAL	372	186

3. Concept and design

Shelter is one of the basic essential needs of man, without it, an individual becomes disorientated. As stated earlier, kiosks do not simply serve as a means of retailing goods and services, but also provide a means of shelter for owners. The concept for this study was inspired by a popular Akan adage which says; 'if buildings were boxes people would travelled with theirs'. The adage expresses the desire of people to travel with their house if it were possible. It defines the plight of a stranded individual who is in a situation where they are unable to find shelter especially outside their towns of residence. 3D modelling tool (Rhino) was used in designing the structure in 3-dimentional form and shape. Below are the 3-Dimensional designs of a collapsible kiosk;

Figure 2. Left wall design

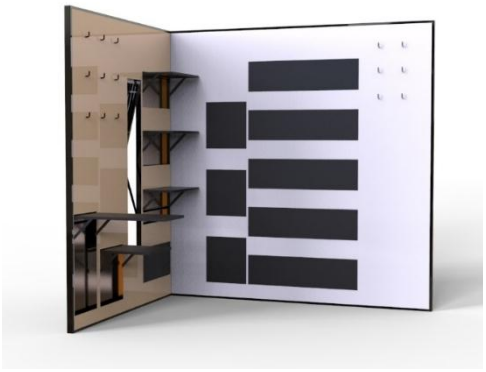


Figure 3. Left and rare wall designs

Figure 4. Left and right wall designs

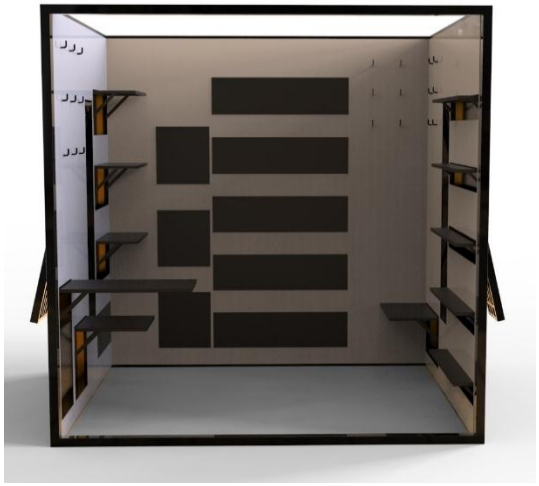


Figure 5. Construction of walls

Figure 6. Fully constructed kiosk

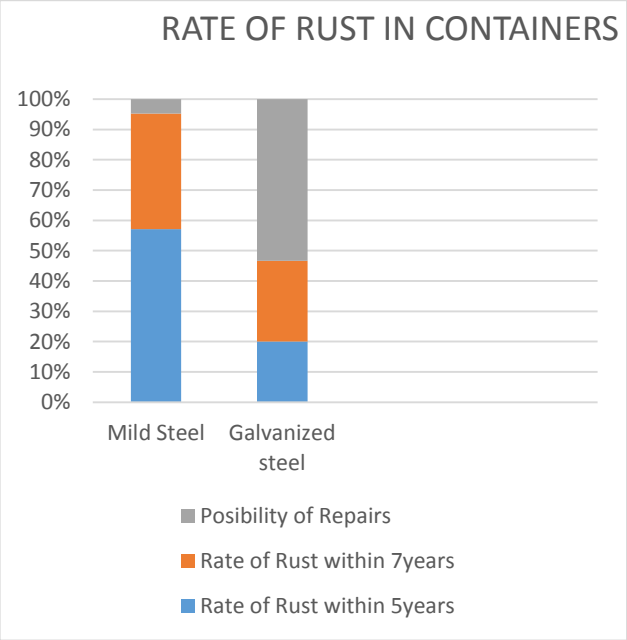
Figure 7. Practical rendering of the design

4. Materials and work procedure

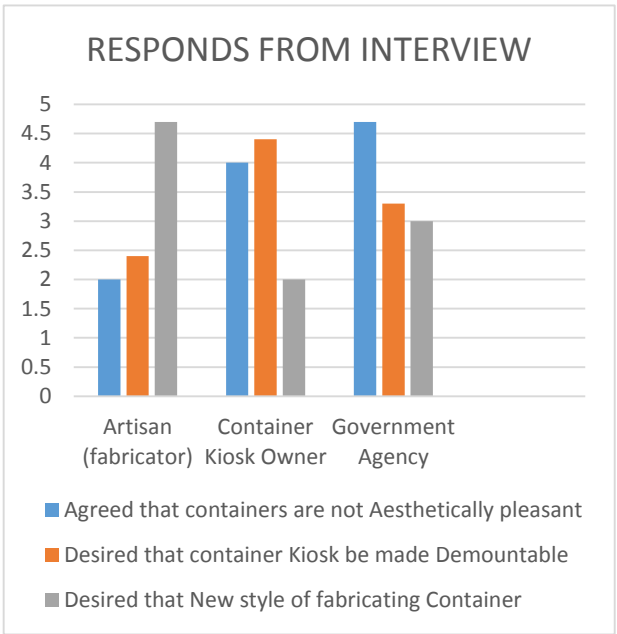
The researchers conducted series of experiment on various material that can be used as substituted for the locally made containers. Aside mild steel that has dominated the locally manufactured container industry, there are also other materials like galvanized steel and alocubond composite that can be considered in the production of containers which has the ability to resist rust.

However much consideration was given to material affordability in relation to production cost as well as long life span. Also another factor that was considered was the size of the container kiosk. The choice of size of a container kiosk depend on three main factors namely; the land allocated or available for use, the use to which the kiosks will be put and the financial state of the prospective container kiosk owner. It must be reiterated that majority of container kiosks are sited at temporary locations. Locations are either authorized that is given under the permit of city planners or sited illegally. The underlining factor however is that these containers are made to be relocated in future to make way for permanent structures. In view of these fact container kiosks are manufactured in smaller sizes. The average container kiosks size fall within eight to fourteen feet square and eight feet high (8 – 14feet x 8ft high). The size of the proposed demountable container kiosk shall not depart much from the size of average containers on the market hence, the six by eight by eight feet high (6 x 8 x 8feet) was opted (Radwan 2015, Heins 2013). The design concept of the demountable container kiosk as explained early on is based on the nature of the tortoise. It is designed to contain all the essential component of a container kiosk. This may include shelves, counter, and benches for receptionist and clients, and flower pot stand. It also has electricity outlet to allow easy connection to available power source. The demountable container is designed to be quick build and use. It has six parts namely;

1. The left side: this side contains four (4) shelves, a window with burglar proofing and plain Perspex, client's bench and flower stand.
2. The right side: this side contains the receptionist counter and bench, four shelves and a number of hooks to support hanging objects such as necklaces and bangles.
3. Back side: the back side has 8 shelves with decorative wood panel
4. Front side: it comprises the door to the container, it is made predominantly with plain Perspex with burglar proofing. It also has wooden exterior wooden panel for aesthetic purpose
5. Top: comprises roof and ceiling fused together
6. Pedestal: which is made of treated wood and has been partitioned or segmented in so to be able to dismantle easily or foldable. It also comprised of peg slot to receive the main frame of the kiosk to secure it in place.



Chat 1: Rate of rust in container kiosk



Chat 2: Interview Responds

The design also took into account the pedestal on which the demountable container kiosk will be fixed. Wooden material was considered which is also designed to be foldable. Because it is believed that other inserts can destroy them, appropriate wood treatments will be given to the wood before use. The design also took into consideration the aesthetic aspect of the container. As a developing country, unemployment rate is quite high therefore many people are engaged in petty trading. Consequently kiosks being it wood or metal are inevitable. It is therefore important that we design containers kiosks that are aesthetically appealing to enhance the beauty of streets where they are

located. The design therefore incorporate metal sheets and tubes, Perspex, wood and other related materials.

5. Conclusion

In Ghana, container kiosks are predominant. About 20% of container kiosk are made from ISO Shipping Containers; the majority of container kiosks are locally made. The difference is as a result of the cost involved in the acquisition of ISO Shipping Containers. Manufacturers of locally made containers use corrugated 1mm steel plates and 40mm angle iron for the fabrication of containers. The container is then coated with anti-rust paint to prevent corrosion. Galvanized steel accounts for just a very small number, majority of container kiosk are made of mild steel/ wrought iron sheet. Mostly, the challenge of accommodation and employment in our major cities is as a result of over population. This is partly due to rural – urban migration. Consequently, citizens develop innovative ways to earn a living. Masses of the people are engaged in petty trading and street hawking in our major cities. Those who can afford to set up containers and use them as kiosks for the sale of goods and services are granted permission to temporary site their containers for business purposes (Fig 1). The challenge however is when it is time for relocation to make room for permanent structures; it becomes difficult or nearly impossible. This is due to the way containers are fabricated and installed. The results of the study can be used as manual or guide to container manufacturers in their fabrication processes. Demountable containers are quick and easy to mount and demount thereby making it easy to be transported to other location for immediate use. With demountable containers governments will not need to spend resources on demolition exercise especially when it comes to temporal structures because container owners can demount and transport their containers to other locations when the need arises. As stated earlier, locally made containers are designed and fabricated using mainly the arc welding technique of joining. Containers are wholly welded as one unit and are carried on the back of trucks and transported to the final destination to be installed. After this roofing is done, the interior walls paneled with either wood or Plastic Tongue and Groove popularly referred to as 'Plastic T and G'. Other works that goes into the finishing of the container is electric wiring, construction of shelves and painting. At this stage the container kiosk is ready to be stuffed and used.

Also with regard to the design and cost of the improved container, the locking mechanism used is such that it can be easily loosen up without much stress. The container was design to be grouped in segments with the inbuilt shelves to easy its folding and transportation. The pedestal is made with treated wood within which appropriate securing joints have been designed to be hold in place the main frames of the container and the pedestal has also been partitioned so as to also be folded. Mild steel or Galvanized steel can all be used throughout the fabrication process from the roofing to the fishing stage. This container will be less expensive than the already existing container fabricated in Ghana because the new metal containers will not extra roofing which requires carpentry work because the new container is built with its own roofing system already in place. Also during moving to location sites and relocating the containers will not result in loosing valuable assert as well as will not require large vehicles to transport them.

Policy implementation section

According to David Adjaye the Ghana Building Code which turn to replace the National Building Regulation, is a modified adoption of the International Building Code. This was created by the Ghana Standards Authority for the Ministry of Works and Housing. It was launched in the later months of 2018. Although distribution has been made to all district and municipal assembles, Part 5, Section 5.3 under Design Requirement which states that "All permanent and temporary structural members, including formwork and false work of a building, shall be protected against load exceeding the design loads during the construction period except when, as verified by analysis or test, temporary overloading of a structural member would result in no impairment of that member or any other member. In addition, precaution shall be taken during all stages of construction to ensure that building in not damaged due to loads applied during construction". In analyzing this part of the regulation, the spirit behind the understanding of this code shows that the loads vary in various aspects but much emphasis for the purpose of the study was on the construction period. Most of the Kiosk we have in Ghana fall short of

this code in that transporting these kiosk to their places where they will be mounted posse huge challenge. The building code does not strictly specify how container-kiosk or similar temporary structures need to be design or constructed. This paper tries to design a model or ideal container-kiosk specifying the methods for constructing and materials required as well as taking into account the aesthetic appeal of the building. Most of these container-Kiosk end up distorted if not destroyed and will require huge sums of money to repair them before they could be mounted on their cement pedestals before use. The least spoken of the rust caused by the cement pedestal to the metal Kiosk the better. This research creates an alternative means to curb theses defects. Transportability to the sites they will be mounted is very convenient since all the parts can easily dismantled and assembled without stress as well as the pedestal is not made of cement rather from materials that can be transported with ease and not cause rust as well.

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