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Perception of the Use of Glass in Housing: A Case Study of Ado-Ekiti, Nigeria

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Abstract
The development and use of glass in recent times, particularly in the architectural sector, is a growing phenomenon across developed and under-developed economies. Public acceptability and adoption of any developed materials in Nigeria is one issue that is shrouded in uncertainty. This paper investigated the level of perception of the use of glass in housing among Ekiti people using Ado-Ekiti as a case study. It provided the background profile of glass in terms of the production, properties and peculiar uses as a housing material. It employed structured questionnaires randomly administered to residents of five selected districts of Ado-Ekiti to elicit relevant information. The information provided by respondents of different socio-economic background was subjected to factor analysis using statistical package for social sciences (SPSS). The results reflected different levels of perception in the use of glass as a building construction, furniture and kitchen utensil material in housing and the built environment in general.
Key words: Perception, glass, housing materials, furniture, kitchen utensil.

1.0 Introduction

Glass is becoming an increasingly popular building material in the world and part of the reason for the increasing popularity is its transparency. In the aesthetic front, glass has always scored high in terms of embellishment to the beauty of any architectural facility. In the areas of building construction, furniture and kitchen utensils glass is contemporarily emerging as frontline contending material in the built environment. The glass sub-sector is not left out of the drive to contribute to the achievement of the millennium development goals. Development in glass occupies a strategic place in the life of man and has continued to march along the path of progress defined and influenced by the growth of the nation (Eric, 2010).

Architects and engineers enjoy using glass because of its potentials in design, aesthetic value, extreme versatility, clarity, thermal properties and limitless applications. In homes and offices it is favoured for its transparency, protection, elegancy, ease of cleaning and durability. Glass and its variety of forms are almost ubiquitous, yet its uses are often times unrecognized. Its application ranges from the comparatively unsophisticated drinking vessels and containers used thousands of years ago to the high technology of optoelectronics, telecommunications, and magnetic disc recording and in biological implants. Glass is today no longer considered fragile like it was a couple of decades ago. This is because through usage of the right processed glass (like tempered glass or laminated glass) one can make glass which is stronger, safer and more secure. The processing technology for architectural glass is widely available in Indian glass processing industry.

Despite the use of glass in various aspects of human life, it is possible for people of different socio-economic background to have different levels of perception of the use of glass in the area of building construction, furniture and kitchen utensils.

This paper, therefore, set out to investigate the level of perception of glass as a building construction, furniture and kitchen utensil material in buildings.

2.0 Literature Review

Housing is universally acknowledged as one of the most basic human needs for life and it is a residential structure where man lives and grows (Aluko, 2004). The National Housing Policy for Nigeria (1992) identified it as the essential human need after food. It has profound impact on the lifestyle, health, happiness and integrity as well as productivity of individuals. Onibokun (1985) argued that it reflects the cultural, socio-economic values of a society and it is an index of civilization (development) of a people. Thus, the development is a pursuit of topmost priority by every responsible individual and government (Akingbohungbe, 2002). The value of it is, in part, a function of its neighbourhood and component materials of construction. Adaptation of such materials is, however, subject to societal acceptance or otherwise based on public perception of each of them (Solanke, 1977 and Akingbohungbe, 2003).

2.1 The Concept of Glass:

Glass is an amorphous (Non-Crystalline) solid material. It is typically brittle and optically transparent. Glass has being in use for centuries in windows and drinking vessels. Its chemical, physical and in particular optical properties make it suitable for applications in the building industries (Eric, 2010).

2.2 Production of Glass

Glass because of its unique and versatile properties is made from naturally occurring and locally sourced materials mainly limestone and sand. Molten glass is gotten by heating a mixture of materials such as soda ash, dolomite and small amount alumina in a furnace with limestone and sand and heated to a temperature of 1700^0 C. At this stage of production, colour can be added in terms of pigment.

2.3 Glass and Glazing

Scholze(1994)identified three major types of glazing used in buildings generally.

The first one is Single glazing: This is glazing out single pane of flat glass. The second one Double glazing: Double glazing is an insulating glass unit comprising a combination of two glass panes in a factory-Sealed unit) and the third one is the Low E Double glass: This is a glass that allows the sun's heat and light to pass through the glass into the building whilst blocking heat from leaving it. (Scholze, 1994).

2.4 Properties of Glass

Generally, glass can be molded into almost any shape when is in its molten state. Mechanically it is strong, hard and resistance to abrasion and scratches. Its chemical properties make it more resistant to corrosion and virtually inert. Due to its optical properties it can reflect, bend, absorb and transmit light. Tooley (1984) described glass as energy source with unlimited life. The following are some of the properties that make glass a peculiar materials as a building construction, furniture and kitchen utensil materials.

Appearance: Glass is generally colourless in nature and in most cases transparent. Some colorations can be imparted on transparent, translucent and opaque glasses. It can therefore be done by pot colour, Flashed glass, colour ceramics pigment fused on one side, painting and fire finished.

Density: The density of glass is about $2560kg/m^3$ and the weight of glass is about $2.5kg/m^2$.

Melting Point: The melting point of glass is about 1500^o.

Solar Heat Transmission: Ordinary glass transmits a high proportion of solar wave radiation object in building which are heated by short waves will radiate heat of a much longer wavelength to which glass is opaque. Solar heat control glasses act mainly either by reflection or absorption. Pilkington glass product reduces solar heat transmission with improved comfort for occupants and also reduces cost in terms of air conditioning.

Visible Light Transmission: Based on the function and the type of the glass, the percentage of light transmitted on one surface of a glass pane and that received on other side varies.

Ultraviolent Transmission: Ordinary glass transmits a very small proportion of the sun's ultraviolent rays and virtually none in the so called health band which is about 35% at 334monometers and less than 2% at 313 monometers.

Durability: Glass is extremely durable under normal condition.

Strength: Glass in building is required to resist various kinds of load e.g. Wind load impact by person and animals and sometime by thermal and other stresses. Glass is elastic up to its breaking point.

Sound insulation: This can be greatly enhanced by double glazing.

Behaviour in Fire: Although glass is generally none combustible, under the action of fire, ordinary, glass breaks and later melts. Glass is a good conductor of heat.

2.5 Types of glass.

Glass varies in their types and this is determined by the function they are expected to perform when in use. Generally, types of glass are classified into four broad groups.

Translucent Glass: This is a type of glass that allows light through it and doesn't allow for complete or total vision. e.g Rolled glass, Rough glass, Patterned glass, Wired rough cast glass and Wire pattern.

Transparent Glass: These are glasses whose primary operation is not just to allow light but also vision which may be partial or totally clear. The following are forms of transparent glass: Down sheet glass, Clear float, Wire Clear floats.

Special Glass: These are glass materials with a more specialized form of production by certain characteristics or attributes impacted to them. This gives a wide variety of glass types that could be used under various conditions or specifications. They include: Toughened glass, One way glass(venetian mirror, transparent mirror, tinted glass), Diffused reflection glass, Solar control glass, Spectra float glass, solar shield, Sun cool glass, Heat resisting glass, X-ray resisting glass and Antique glass.

Other Glass Products: These include: Laminated glass used for security purposes, Insulating glass, Glass block, corrugated glass.

2.6 Uses of glass

Theenvironmentaland social benefits of glass come from its use (Eric, 2010). Generally, glass has its application in various areas of human life. It has its application in laboratory, medical equipment, microscope, astronomy, telecommunications, electronics magnetic disc, clock faces, cars, biological implants, television/ computer screen, electric bubs and fittings. For the purpose of this study, its uses will be limited to building construction, furniture, kitchen utensil.

3.0 The Study Area

Ado Ekiti is a city in southwest Nigeria, situated in Ekiti-state and recognized as the capital of the state. The people of Ado Ekiti are mainly of the Yoruba ethnic group. Ado Ekiti City has a University, the University of Ado Ekiti, and a Polytechnic, the Federal Polytechnic, Ado Ekiti. Various commercial enterprises operate in Ado Ekiti such as Odua Textile and Odua Print. The city is the trade centre for a farming region where yams, cassava, grain, and tobacco are grown. Cotton is also grown for weaving.

Ado-Ekiti grew in size and in population. Some fifty years ago, the city began to grow/expand beyond its peripheries and ancient gates. In 1963, the city was the largest urban centre in the present Ondo and Ekiti States and its population of 158,000 in the census of that year represented it as the most populous urban centre in Eastern Yoruba land. The creation of Ekiti State in October 1996 and the establishment of state capital at Ado-Ekiti further enhanced the city's physical development. Among the most conspicuous of the great changes in the town is the expansion of Christianity and Islam. Christian missions especially of the CMS, Roman Catholic, Baptist, African Church and Methodist, later the Cherubum and Seraphim and Apostolic Church took root and expanded during the 20th century. Each of these Christian communities established numerous churches such that by 1970, the CMS (Anglican) and the Roman Catholic had grown so fast that they had become dioceses with their headquarters and seats of bishops in Ado-Ekiti. The two missions had three grammar schools, the number increased to five in 1990. The growth of Christian communities was very rapid between 1970 and 2000; new missions and denominations Pentecostal, Charismatic, Evangelical and Episcopal arose, swelling up existing communions. Altogether over one hundred churches were recorded in the city in the year 2000. The Muslim community did not lag behind in the faith spread. The central mosque was built about 1930 and thereafter, a number of mosques were built in Idemo, Umayo, Isato (Irona), Ogbonado, Okesa, Oke-Ila etc. The Ansar-Ud-Deen emerged in the early 1940s. The number of mosques increased substantially with the growing number of well-to-do Muslims who build mosques as annexes to their private homes.

4.0 Methodology

A preliminary work by the authors identified and delineated four core residential districts in Ado Ekiti namely: Adebayo, Ajilosun, Irona and Ijigbo areas. The district areas were adopted for this study. Structured questionnaires were prepared and administered randomly to the people in the four districts. Information provided by respondents of different socio-economic background was subject to factor analysis using statistical package for social sciences (SPSS).

5.0 Findings and Discussions

Findings show that more than half of the respondents, about 56%, are male respondents and about 43.7% are female respondents. Also 50.7% of the respondents are within age 21-25, while those within 15-20 years are 38% and of those 26-30years, are 9.9% also with 1.4% are above 30years of age. Based on the religion of the respondents, Findings show that a greater percentage of students (94.4%) practice Christianity while 4.2% practice Islam and 1.4% are Traditional worshipers. Distribution by ethnicity shows that 87.3 % which is the majority of the respondents, are Yoruba, while 8.5% are Igbo, 2.8% are Hausa and other tribes are specified are 1.4%.Almost half of the respondents are middle income earners 49.3% while 23.9% are low income earners and 26.8% of the respondents are high income earners.

Table 1: Socio-Economic Characteristics of Respondents

Socio-Economic Characteristics of Respondents		Frequency No	Percentage %	Valid Percent	Cumulative Percent
Sex	Male	40	56.3	56.3	56.3
	Female	31	43.7	43.7	100.0
	Total	71	100.0	100.0	
Age	15-20	27	38.0	38.0	38.0
	21-25	36	50.7	50.7	88.7
	26-30	7	9.9	9.9	98.6
	above 30	1	1.4	1.4	100.0
	Total	71	100.0	100.0	
Religion	Christianity	67	94.4	94.4	94.4
	Islam	3	4.2	4.2	98.6
	Traditional	1	1.4	1.4	100.0
	Total	71	100.0	100.0	
Ethnicity	Yoruba	62	87.3	87.3	87.3
	Igbo	6	8.5	8.5	95.8
	Hausa	2	2.8	2.8	98.6
	Other Specify	1	1.4	1.4	100.0
	Total	71	100.0	100.0	
	Low Income	17	23.9	23.9	23.9
	Middle Income	35	49.3	49.3	73.2
	High Court	19	26.8	26.8	100.0
Income Rate	Total	71	100.0	100.0	

Source: Field survey, 2012

Table 2: Perception of Glass as Building Construction Materials.

Building Construction Materials.		Frequency No	Percentage %	Valid Percent	Cumulative Percent
Consideration of Glass as Building Construction Materials	Yes	66	93.0	93.0	93.0
	No	5	7.0	7.0	100.0
	Total	71	100.0	100.0	
Rating of Glass as Building Construction Material	Excel	28	39.4	39.4	39.4
	Good	27	38.0	38.0	77.5
	Average	9	12.7	12.7	90.1
	Fairly	7	9.9	9.9	100.0
	Total	71	100.0	100.0	
Rating of Glass as Window Material	Excel	38	53.5	53.5	53.5
	Good	26	36.6	36.6	90.1
	Average	4	5.6	5.6	95.8
	Poor	3	4.2	4.2	100.0
	Total	71	100.0	100.0	
Rating of Glass as Door Material	Excel	18	25.4	25.4	25.4
	Good	32	45.1	45.1	70.4
	Average	18	25.4	25.4	95.8
	Poor	3	4.2	4.2	100.0
	Total	71	100.0	100.0	
Consideration of Glass as Walling/Partition Material in Buildings	Yes	29	40.8	40.8	40.8
	No	42	59.2	59.2	100.0
	Total	71	100.0	100.0	
Use of Glass for other Building Components.	Floor	15	21.1	21.1	21.1
	Furniture	37	52.1	52.1	73.2
	Roof	9	12.7	12.7	85.9
	Stair	10	14.1	14.1	100.0
	Total	71	100.0	100.0	
Why Would You Consider Glass As Building Construction Materials	Aesthetics	22	31.0	31.0	31.0
	Vision	21	29.6	29.6	60.6
	Security	5	7.0	7.0	67.6
	Translucent	13	18.3	18.3	85.9
	Thermal Control	5	7.0	7.0	93.0
	Sound Control	4	5.6	5.6	98.6
	Others	1	1.4	1.4	100.0
	Total	71	100.0	100.0	

Source: Authors Field Work (2011).

Analysis of responses in the table above shows that 93% of the respondents consider glass as building construction material while just 7% of the respondents do not consider glass as building construction material. 39.4% of the respondents rate glass as an excellent material for building construction while 38.0% said glass is good as a building construction material, 12.7% said glass is averagely alright as a building construction materials while just 9.9% of the respondents rate the use of glass as fair. The table also shows that over half of the respondents rate glass as an excellent materials when use as window materials 53.5% while 36.6% said glass is good as a window materials .Also 5.6% said glass is averagely alright as a window materials while just 4.2% of the respondents rate glass as been poorly use as a window materials. Also 25.4% of the respondents rate glass as an excellent materials when use as a door materials while 45.1% said glass is good as a door materials. Also 25.4% said glass is averagely alright as a door materials while just 4.2% of the respondents rate glass as been poorly use as a window materials. The distribution table shows that 40.8% of the respondents prefer glass as a walling/partition materials in any building while over half 59.2% of the respondents do not prefer glass as a walling/partition materials in any building. The table also reveals the various uses of glass as construction materials: it shows that 21.1% of the respondents specify that glass is also use in floor construction apart from wall, door and window while over half

of the respondents 52.1% said glass can be use as furniture materials. Also 12.7% respondents said glass are use as roofing materials and 14.1% of the respondents specified glass as been use in stairs.31.1% of the respondents consider glass as building construction materials because of its aesthetics value while 29.6% of the respondents said glass is use as building construction materials because of its vision. Also 7.0% of the respondents said glass is use as building construction materials because of its security and 18.3% of the respondents consider it as building construction materials because of its translucent properties while 7.0% of the respondents said glass is use as building construction materials because of its thermal control. 5.6% of the respondents consider glass as building construction materials because of its sound control properties. While1.4% of the respondents specifies other properties like strength, transparent, specific gravity. This Analysis as specifically shown that glass is used in the building industries because of its Aesthetics value.

Table 2: Perception of Glass as Furniture

Perception of Glass as Furniture Material		Frequency No	Percentage %	Valid Percent	Cumulative Percent
For Shelf	Excel	33	46.5	46.5	46.5
	Good	23	32.4	32.4	78.9
	Average	9	12.7	12.7	91.5
	Fair	5	7.0	7.0	98.6
	Poor	1	1.4	1.4	100.0
	Total	71	100.0	100.0	
For Centre Table	Yes	69	97.2	97.2	97.2
	No	2	2.8	2.8	100.0
	Total	71	100.0	100.0	
For Dining Table	Yes	60	84.5	84.5	84.5
	No	11	15.5	15.5	100.0
	Total	71	100.0	100.0	
For Wardrobe	Yes	40	56.3	56.3	56.3
	No	31	43.6	43.6	100.0
	Total	71	100.0	100.0	
Reason for choice of Glass	Aesthetics	26	36.6	36.6	36.6
	Vision	13	18.3	18.3	54.9
	Security	2	2.8	2.8	57.7
	Density	3	4.2	4.2	62.0
	Transparency	21	29.6	29.6	91.5
	Sound Control	6	8.5	8.5	100.0
	Total	71	100.0	100.0	

Source: Authors Field Work (2011).

The table above shows that 46.5% of the respondents rate glass as an excellent materials when use as a shelf materials while 32.4% said glass is good as shelf materials. Also 12.7% said glass is averagely alright as shelf materials and 7.0% said glass is fair when use as shelf materials while just 1.4% of the respondents rate glass as been poorly use as shelf materials for television, video and radio set. It should be noted that, over three quarter of the respondents 97.2% like their centre table to be made of glass when use with other materials while just 2.8% of the respondents are not interested in using glass as centre table when use with other materials.

The table also shows that over three quarter of the respondents 84.5% like their dining table to be made of glass when use with other materials while 15.5% of the respondents are not interested in using glass as their dining table when use with other materials. Over half of the respondents 56.3% prefer wardrobe to be made of glass when use with other materials while 43.6% of the respondents are not interested in using glass as their wardrobe when use with other materials.36.6% of the respondents consider glass as furniture materials because of its aesthetics value while 18.3% of the respondents said glass is use as furniture materials because of its vision. Also 2.8% of the respondents said glass is use as furniture materials because of its security and 4.2% of the respondents consider it as furniture materials because of its density properties while 29.6% of the respondents said glass is use as furniture materials because of its transparent. 8.5% of the respondents consider glass as furniture materials because of its sound control properties.

Table 3: Perception of Glass as Kitchen Utensil Materials.

Kitchen Utensil Materials.		Frequency No	Percentage %	Valid Percent	Cumulative Percent
Rating of Glass as Drinking Vessel	Excellent	27	38.0	38.0	38.0
	Good	34	47.9	47.9	85.9
	Average	8	11.3	11.3	97.2
	Fair	1	1.4	1.4	98.6
	Poor	1	1.4	1.4	100.0
	Total	71	100.0	100.0	
Rating of Glass as Dishes.	Excellent	17	23.9	23.9	23.9
	Good	36	50.7	50.7	74.6
	Average	12	16.9	16.9	91.5
	Fair	5	7.0	7.0	98.6
	Poor	1	1.4	1.4	100.0
	Total	71	100.0	100.0	
Rating of Glass as Kitchen Utensil Materials.	Excellent	13	18.3	18.3	18.3
	Good	11	15.5	15.5	33.8
	Average	21	29.6	29.6	63.4
	Fair	13	18.3	18.3	81.7
	Poor	13	18.3	18.3	100.0
	Total	71	100.0	100.0	

Source: Authors Field Work (2011).

The distribution table above shows that 38.0% of the respondents rate glass as an excellent materials when use as drinking vessel while 47.9% said glass is good as drinking vessel. Also 11.3% said glass is averagely alright as drinking vessel materials while just 1.4% said glass is fair and poor respectively when use as drinking vessel. The distribution table also shows that 23.9% of the respondents rate glass as an excellent materials when use as dish to which food is eating , while over half of the respondents 50.7% said glass is good when use as dish to which food is eating. Also 16.9% said glass is averagely alright as dish to which food is eating and 7.0% said glass is fair when use as dish to which food is eating, while just 1.4% of the respondents rate glass as been poorly use as when use as dish to which food is eating.18.3% of the respondents rate glass as an excellent materials when use as kitchen utensil materials, while 15.5% of the respondents said glass is good when use as kitchen utensil materials. Also 29.6% said glass is averagely alright as kitchen utensil materials and 18.3% said glass is fair as kitchen utensil materials while 18.3% of the respondents rate glass as been poorly use as kitchen utensil materials.

6.0 Conclusion and Recommendations

The results reflect different perception level towards the use of glass as a building construction, furniture and kitchen utensil materials in buildings and the findings has shown the important and significant of glass to our society and the built environment in general.

7.0 Conclusion

Going through the data collected and analyzed, the results reflect different perception levels towards the use of glass as a building construction, furniture and kitchen utensil materials in buildings and the findings has shown the important and significant of glass to our society and the built environment in general. During the course of study, glass as come to stay as materials and its use in the designs of buildings, furniture and kitchen utensil materials cannot be over emphasized. It is materials that room for flexibility and has great aesthetics value. Table 17 and Table 12 of this study have shown that, glass is used as building construction material and furniture because of its aesthetics value. As a result of this study the following recommendations are hereby suggested.

- Government should encourage the use of glass as building construction materials by establishing more Nigeria based glass companies.
- Because of the high cost of glass materials, most low-income earners are less privileged to the use of glass as a building construction, furniture and kitchen utensil material. Therefore the cost of glass materials must be reduce as to enable most low-income earners who have interest in the use of glass to use it as materials.

- Government should create more departments of glass and ceramics in most Nigeria higher institution of leaning as this will enable those who will like to study how glass is been produce to have the professional knowledge.
- Government should set up a monitoring task to mandate the use of cutting walls/glass in public buildings such as civic centre, skyscrapers, event centres, and hotel. e.t.c. Glass because of its aesthetics value will help to improve the aesthetics condition in the case of urban renewal in the developing cities.

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