Mosaic Tiles and Interlocking Blocks as Alternatives to Tropical Weather Effects on Painted Wall Surfaces of Public Buildings in Akure, South-West, Nigeria.

Kashim Isah Bolaji, Gabriel Fadairo & Adedeji Yomi Michael D.

Kashim, I. B. (Educator, Administrator),
Department of Industrial Design, School of Environmental Technology,
Federal University of Technology,
P.M.B. 704, Akure, Ondo State, Nigeria.
E-mail: ibykash@gmail.com
Mobile Phone: +2438033517742

Gabriel, F. (Educator, Architect),
Department of Architecture, University of Technology,
P.M.B. 704, Akure, Ondo State, Nigeria.
E-mail: gablegroup2010@yahoo.com
Mobile Phone: +2348033560305 /+2347027020034

Adedeji, Y.M.D. (Educator, Architect),
Department of Architecture, University of Technology,
P.M.B. 704, Akure, Ondo State, Nigeria.
E-mail: yomi_adedejiy2k@yahoo.com
Mobile Phone: +2348064681423

Abstract
Yoruba traditional architecture are made of Brazilian structure in mud and decorated with low relief created for the need of an integrated and settled society where social, political and religious life are marked with great unity of feelings. Man has come a long way along the path of technological creativity and innovations which has influenced Yoruba architecture of the past when compared with contemporary buildings edifice being erected since early 1960s. Houses are constructed putting in place elaborate use of foreign building materials such as concretes, glasses, exploitation of western technology and styles which are sometimes perceived to be off African cultural living styles. It has also been observed over time that Nigeria as a nation have exhibited laissez-faire attitude toward development of technological creativity in building renovations and promotion of maintenance culture. This paper is therefore keen in its attempt to look critically at an alternative medium to public building material utilizations for surface embellishment such as ceramic mosaic and interlocking tiles in place of the conventional use of shades of emulsion paints in the treatment of public buildings. The advantages are consequential on cost effectiveness in the long run, maintaining aesthetics and lifespan of the building surfaces since mosaics are materials that could last longer than human generations if they are carefully selected.

Keywords: Housing aesthetics, tropical weather, deterioration, tesserae and surface finishing.
Introduction

According to Salau (1990) housing is a tropical weather, critical basic need of man which is the second basic human need after food. This view was further buttressed by the National Policy of Housing (FRN) (1997) and Adeniyi (2008). It also affords man such benefits as protection, privacy, security and assets within an environment thereby improving productivity and economic well being of an individual.

Having looked at some definitions of housing and the significance of shelter to human existence, the thrust of this paper critically examined weather effect on the surface treatment of some public buildings in Akure township over a period of time, especially the problem of fading on public building, architectural style of construction, maintenance cost of building structures, exploitation of mosaic and ceramic tiles as alternative medium to surface rendition.

The earliest form of tiles historically dates back to pre-historic time when the use of clay as a building material was developed independently in several cultures. The first tiles was crude but even some 600 years ago people were decorating them by adding pigment for colour and carving low relief designs in to their surfaces.

Surface Treatment of Buildings in Akure Township

The Study Area

The study area is Akure, which was made the capital of Ondo State in 1976. Akure is located in relation to all big town in Ondo State, viz, Ondo town to the South, Owo to the East, Itaogbolu to the North. The rapid urban growth and physical expansion of the city have been accompanied by unplanned urban sprawl, deficiency in modern basic facilities such as water, electricity, hospital, sewage, municipal and community facilities. All of these facilities contributes to urban aesthetics but for this paper, the scope is limited to assessment of performance of emulsion coloured paints and probable adoption of mosaic tiles. Mosaic is considered for this study because it has the advantage to stand the test of time against long weather impact which invariably assists at preserving building surfaces in the face of contrasting tropical weather that is usually accompanied by heavy rainfall and dry seasons.

Akure municipal is fast growing and expanding directly translation on the economic life of the people especially in the areas of into housing provision. Olotuah (2000) states that adequacy of housing enhances individuals’ health, welfare, productivity and consequently the wealth of the nation. If this wealth must be maintain and sustained, then people’s attitude on issue’s broadening on maintenance of housing structure and surface treatment require to be reviewed for better performance.

Paint application on building surfaces is the most popular aesthetic expression in Nigeria as expressed by (Fawehimi and Adeosun 2001). They explained that paints are manufactured in shade of colours, quality and make. They are used in the surface treatment of both interiors and exterior walls of residential and public buildings. Onibokun and Agboola (1991) reports that about 60% of the total cost of the housing expenditure goes into building materials, in which the surface treatment of a building is represented by approximately 5% of the initial cost of construction.

A noticeable trend in the last decade in Nigeria, with a particular reference to Akure is that painted houses are getting fewer, and many of the painted houses are not re-painted. More of the upcoming new buildings are not painted at all. This may not have been unconnected with the downturn in the nation’s economy over a period of time spanning over two decades now. It is a manifestation that increasing number of people are living below the poverty line while the prices of building materials astronomically are on the corresponding rise.
Cost Reduction Strategy

One of the strategies employed by contractors handling public projects is to use paint for surface finishes that would sustain for upward of five years. Unfortunately the constant revisit of the surface dressing of these buildings gulp more money than when some other lasting materials like mosaic, tiles and laterite’s blocks are used. Other paints that are used in most cases are those that are fairly cheap to make the overall contract profit robust. Be that as it may, the tropical weather that Africa is endowed with do not help matters. The long months of rainfall and severe sunshine usually impact negatively on the paints and make them to fade as soon as they are painted. Evidences of some of tropicalized weather effect on buildings in Akure actually justified the fact that it is better to spend initial money on more durable and enduring materials rather than using paints that are easily liable to fading. Within Akure metropolis there are evidences of the use of mosaic, tiles and Laterite’s wall on the following buildings:

1. Morim Plaza opposite Police “A” Division Oke-Eda Akure.
2. Big lecture theatre at Federal University of Technology, Akure.
3. Tisco Building Akure opposite Akure Fire Service Station, Alagbaka.
4. Electronic Testing Centre, Federal University of Technology, Akure.

Looking at some of the structures mentioned above, it is clear that over the last 13 years they have not been painted and their surface outlook has not been stressed from public view. It can therefore be rightly put that the use of mosaic, ceramic tiles and Interlocking laterite’s blocks would readily be an option in place of paint. Figure 1 below expresses the impressions of a faded academic building painted less than three years ago at the Federal University of Technology, Akure, Nigeria, while Figure 2 shows public building of a restaurant in Akure with a surface finish in ceramic mosaic and tiles.

The Ondo State liason office in Abuja, the Capital Territory of The Federal Republic of Nigeria which was constructed by Bonifade Construction Company Limited, Akure, shows a skillful use of mosaic tiles, that may be expected to last as long as possible with minimal level of renovations since its construction.

Tiles as a building material (usually as glazed wares in variety of colours and textures) are traditionally and extensively used from time immemorial in Nigeria for the embellishment of kitchens, and toilets (shower and toilets) to produce smooth, impervious and durable water run way surfaces. According to Creative Homeowners (2006) ceramics tiles and mosaic have always been used in homes for decorations and they still are today. They are available in an almost endless variety of shapes and colours to suit any house style and taste. They offer qualities that are not found in other building materials. They are extremely durable, don’t rot, or burn or provide a nesting space or food source for insects. If tiles are properly installed, it is one of the few materials that should last long as the structure without a major update or replacement. It provide hundreds of design options and resist wear better than most interiors exterior materials.

They are sparingly used as external surface treatment in Nigeria public buildings because of the initial cost implication when compared to plastic – surfaced materials and application of paints. But in recent time this attitude have started to change and most banks and co-operate organizations have attached a lot of value to how attractive their business premises and building outlook should be showcased to be able to withstand the competition inherent of the tight Nigerian business climate. In Akure, buildings with tile surfaces and mosaic can be seen in dots of places compared to what it used to be in the past. Tile and ceramic mosaic are fast been realized by the populace as providing an attractive finishing to building walls and floor surfaces. Apart from being a material with high resistance for tear and wear, with such durability resulting from its initial high temperature treatment above 1000°C in the furnace and eventually on the long time it is cost – effectiveness when compared with constant wall renovations using paints.
Development of Local Materials Initiative

Major building materials used in Nigeria (Cement, Bricks, Glass, Paints) are produced in exotic multimillion dollar plants. Due to huge overheads cost and significant importation dependent inputs in the operations and maintenance, the plants run at only a fraction of installed capacity which makes them wasteful and inefficient. The result is high production cost which are passed on to the consumers in high prices of building materials compounded into spiralling cost at the market due to shortfall between demand and supply. A research that has to do with Materials Preference Options for Sustainable Low-Income Housing In Selected Cities In Nigeria by Adedeji (2007), highlights strategies that promotes the use of low capital, labour intensive plants and machinery in the production of building materials such as stabilised clay cement which seems far more efficient in the production of the nation’s requirement for sustainable housing.

This initiative can imperatively result into a network of small scale industrial establishment for sustainable development. In Nigeria, the Nigerian Building and Road Research Institute has developed locally available laterite to make solid interlocking blocks, which is similar to that of Hydraform blocks used extensive in South Africa which proved to be environmentally friendly and cost efficient. Other materials are agro-waste composite-panels products from strands, particles or fibres wood mixed together with cement and manufactured into panels, bricks, tiles and other products used in the construction industry. In Cost-effective composite building panels for walls and ceilings in Nigeria Adedeji and Ajayi (2008) informs that the excellent properties of cement-bonded made them useful for ceiling, walling, roofing, flooring, claddings, partitioning and shuttering.

The development of interlocking blocks (Solid interlocking laterite blocks) shows some overriding merits over the conventional types (as shown in Fig. 4). These include, substantial cost savings, accelerates construction, thereby reducing workmanship and cost, it is environmentally friendly, it has simplicity of operation just as its accompanied with excellent thermal capacity characteristics. Hydra form blocks are three times as efficient as concrete and almost twice as efficient as fired clay bricks in terms of the thermal insulation they offer, attractive external face block finishes (in a variety of natural colours derived from the soil found at individual sites) is also possible, while interior walls may be plastered, painted or sealed.

Designs Used for Surface Embellishments in Akure

On most cases, the designs that are used on walls are usually thematic. Some themes are derived from cultural activities from the environment. A typical example is the painting of lion on the wall of the “Deji of Akure palace, “that is, the traditional palace of the king of Akure. The strength of the lion has historical significance to the town. Except for the sculptural statues in lion, the one that are painted are usually weather beaten after extensive exposure to rainfall and sunshine. The two agents of weather might to some extent look extreme but it influences significantly the serenity of the environment in terms of improving the green area in rainy season and golden roof impression from dusts in dry season.

At the Federal University of Technology Akure, Professor Bankole Ojo supervised some Industrial Design students’ project on a wall mural made on the wall of building that accommodates Schools of Environmental and Engineering Technology during the 2005/2006 academic session. The mural design was an aesthetic thrust of the environment some seven years ago but presently, the weather has affected it so significantly that the fading level has almost allowed it to lose the essence of its theme which is “technology for self reliance”-the motto of the university.

On the contrary, there was an indoor mosaic in tesserae that was jointly executed in 1993 by Prof. J.B. Akolo, Prof. S.R. Ogunduyile and Prof. T.L. Akinbogun at the lobby of the Federal University of Technology, Akure senate building (Fig. 3). The theme is on technology while the composition depicts the university activities. Since the time of its execution till date, the surface quality of the mosiac has not
changed despite the fact that the surrounding surfaces of the building had been refurbished several times with paint. The essence of this is justified by Akinbogun (2000) position on the effect of tropical weather on fading of paints on walls and going by advantages inherent in the current application of tiles on the surface wall of Morims restaurant in Akure (as shown in Fig. 2). It only revealed an interplay of different colours differentiated by the areas that recede in the building while in some other part of the buildings one colour is used without reference to interplay of thematic concept or interplay of design either at floral or geometric levels. It is believed that since murals executed with high quality paints are fading and artisan have started to think of tiles as an alternative to combating the tropical weather effect on emulsion colours, the artists in academics are challenged to make a difference and encourage the artisan that lay these tiles to consult designers so that they can be properly guided to make a difference by introducing design concepts even if it is at a level of geometric rendition of the shapes.

Fadamiro (2010) in his inaugural lecture at Federal University of Technology, Akure expressed the dynamics of city development to landscape architecture in which he emphasized physical and mental health benefit of landscaping. He lauded the contribution of soft landscape materials such as vegetation which is been assisted with constant rainfall but played down on aesthetic materials that are used for the surface embellishment of building. Since tiles happen to be structural or constructional materials that are man-made, tile for surfacing cannot be under emphasized as one of the elements recognized and well used today in Akure as urban design features with high sense of aesthetics and functionality. Akure is a typical African setting that is currently experiencing a rapid and profound re-orientation in its social and economic live and transformation in its urban renewal efforts.

**Recommendations**

Fadaigo (2010) supported the fact that the architecture of public buildings should be comfortable and in general, be a disperse of configuration forming natural ventilation. The exposure of the external walls and floors to direct winds and sun rays at the same time requires effective protection against solar radiation with utilisation of such materials like stabilised interlocking clay bricks, ceramics mosaic and tiles that could absorb all the odds of the tropical weather.

Establishment of tiles making industries with increase awareness of their cost effectiveness which should be well demonstrated by Government and Estate developers in the state will promote the aesthetic of the environment and increase the revenue generation of the state. This will also increase the demand from the industries exploiting the solid mineral explorations in the state apart from the job opportunities such exploration would create to young unemployed.

**Conclusion**

The creation of old Ondo State from the Western Region on 3rd of February, 1976 to the period of the present Ondo State after Ekiti State was carved out of it, October 1996, the use of mosaic as surface finishes for public building has not been very prominent compared to the use of colour paints. Paints are used but it is not employed on a substantial scale as would have been expected. But in the new millennium, new material and methods with a predominance of parapet wall are employed as a result of devastating action of wind during rainfall on buildings that are high rise. The parapet wall exposes the external walls to severe weathers attack which eventually distort the aesthetic value of the painted surfaces. To address this occurrences and safe cost of frequent maintenance, there is need to reawaken the attention of government and corporate organizations why durable materials such as laterite’s blocks, tiles and mosaic should either replace or be used as alternatives to paint on the exterior of buildings. This can be done through advertisements, seminars and exhibitions of building materials in the State at intervals.
With the current political dispensation in Ondo State, the call for foreign investor’s participation in the development of the State’s economic potentials cannot be better than now. It is pertinent to consider reactivation of the tile-producing Ceramic Industry at Ifon in Ose Local Government Area of the state as earning from the sale of the tiles could generate additional revenue for the state. The exhibition of exhibitors among the brick and tiles industries at Deubau in Essen and Bautic in Berlin emphasizes the place of surface finishing and model improvements. This is through the use of engobes, and special glazes of different red and brown tones And importantly, it was established that Germany clay roofing tile industry has a turnover plus in 2003 with 5000 employees as expressed in a conference in Munich, producing tiles valued at 685.5million Euro. Ceramic mosaic is expected to enable the viewing public to be psychologically uplifted and heartened with lots of happiness as it give room for visual narratives with clear aesthetic creation in Akure as a New Millennium Development City.

REFERENCES
APPENDIX

Fig. 1. A Faculty of Engineering building at the Federal University of Technology Akure, Nigeria showing a weather-beaten painted wall surface after several renovations, 2010. (Photo © Bolaji Kashim)

Fig. 2. A restaurant building situated at Adegbemile, Akure, Nigeria showing a brilliant wall surfaced with mosaic tiles several years ago, 2010. (Photo © Bolaji Kashim)

Fig 3. Wall Mosaic Titled “Technology” situated at the lobby of the University senate building at Federal University of Technology, Akure, Nigeria, 2009 (Photo © Adelabu Oluwafemi)
Fig 4. Solid Interlocking blocks used as Exterior Walls and Finish in one of the selected sites in Akure, 2007 (Photo <c> Adedeji Y.)

**Author's biography**

**KASHIM, I. B.** (Ph.D. Industrial Design) is an Associate Professor at the Federal University of Technology Akure, Ondo State, Nigeria. He is a member of Society of Nigerian Artists (SNA), Association of African Industrial Designers (NAID), Craft Potters Association of Nigeria (CPAN) and Ceramics Association of Nigeria (CeRAN).

**GABRIEL, Fadairo** (N.D. Arch., B. Arch., M. Arch, PhD Architecture in Urban Housing Studies and Flood Expert) He is a Senior Lecturer in The Department of Architecture, Federal University of Technology, Akure. Member of Association of Architectural Educators, and an Associate Member of Nigerian Institutes of Architects.

**ADEDEJI, Yomi Michael D.** (PhD) Architecture with specialisation on Materials and Technology). A Senior Lecturer in Department of Architecture, Federal University of Technology, Akure; Full Membership - Association of Architectural Educators in Nigeria (AARCHES); Nigerian Environmental Society (NES); Nigerian Institutes of Architects (NIA) and Architects Registration Council of Nigeria (ARCON).