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Analysis of the Problems and Prospects in the Use of Local Building Materials: Review of Literature

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Abstract

One of the strong considerations for the use of Local Building Material (LBMs) in housing delivery is that it could reduce cost and enhance foreign exchange earnings. This paper examines the type of LBMs, problems envisaged in the use of LBMs, its prospects among other issues. This paper is essentially a review of literature from which inferences are drawn. Recommendations towards the use and acceptability of the LBMs include; (i) that various government agencies should engage in the use of LBMs rather than mere campaigning to developers (ii) that every state should establish cottage building industries to improve the supply, and that more researches should be engaged on for more discovery of LBMs.

1.0 Introduction:

The term 'local building material' has generated many arguments in housing study and in the construction industries. The major bone of contention is the word 'local'. For instance, when does a material become local? Is it where it is produced, is it the technology involved in the use or arrangement of it, is it its methods of production or is it when it crosses an international or refuses to cross an international boundary? Would one be right to refer to building materials coming from Ghana, Togo, Benin Republic and other surrounding African Countries as local or non-local building materials? When for instance, a firm in Nigeria buys a brick making machine from Italy and uses the machine for the production of exactly the same stuff of brick they produce in Italy or Iran, is such product still local?

In some areas clay bricks are generally considered as local material while sand crate block is not but when one considers the fact that sand crate block produced at just about every street corner with sand dug up from just about every river bank, it is hard therefore to see how much more local a material can be. These are the worries of experts in housing and building industries and these issues need further classifications (Omole, 2001; Okunsaya, 1987)

A large number of housing experts believe that the local building materials serve as good alternative in housing construction and that the use of them will go along way in ameliorating the shortage of housing in developing countries thereby reducing importation and cut down the overall cost. However, there have not been intensive empirical cost comparisons between the locally made and the so-called imported building material to ascertain the real cost difference. Another similar argument is that the so-called local materials compare favorably well with the imported building materials (HPC, 1993; Olusanya, 1991)

There is no concuss on the definition of the term 'local building materials' the reason being that some scholars argue along the line that all materials available and produced within the country can be referred to as local building materials, while other argue differently. With this in mind, there are endless list of them what can be called local building materials (Omole, 2001). For the purpose of this study however, one can consider the list below and those in the appendix as such.

The term "Local" when used with building materials is a relative term. For instance, goods/building materials produce in America, Britain, France etc are local products at home, but become imported to other countries that import them. The same thing goes for goods produced in Nigeria, Ghana, Togo and the rest of the world. They are local building materials to the countries of their origin and become foreign or imported to the outside world. Along this line, Omole (2001) has once defined the term local building materials as those materials used in building construction, got around us, with less stress and with less or no further processing. With this type of definition in mind, the following building materials drop in ones mind and agree with the arguments above. They include the following:

- Literate
- Sand Crete

- Stabilized Earth
- Burnt Clay
- Clay Brick
- Bamboo
- Raffia leaves
- Planks
- Palm-Kernel Shell
- Crushed Coconut Shell (for floor and terrazzo material)
- Dung

This list includes those in the appendix and other not mentioned here.

Whatever the argument, the consensus of these arguments is that when every country gets involved in the production of one building material or the other, based on comparative advantages, there is no doubt that countries of the world will have large markets to buy from and this will be better of for the housing development globally (Onibokun 1982; Godman 1973)

2.0 Envisaged Problems in the Use of Local Building Material

There have been many criticisms against the use of local building materials. Here are some of the criticisms leveled against the use of local building materials

(1) Legal Acceptability
(2) Social Acceptability
(3) Durability as doubtful
(4) Technology to handle the setting
(5) Uncertainty of the cost
(6) Double standard on the part of the government
(7) Lack of standards and specification
(8) Lack of organizational/institutional framework
(9) Problem of mass production
(10) Uncertainty about the demand
(11) Uncertainty about the strength of material when compared with their imported counterparts

3.0 **Needs for the Use of Local Building Material**

One of the major factors militating against housing delivery system is the high cost of building materials. To this end, developers and experts in housing industries are now looking for alternative ways of solving these problems. Of such alternatives is the use of local building materials, thinking that this might reduce the overhead cost and at the same time make the materials readily available. The reasons for the use and the advantages of using local building materials are presented below.

(1) It cuts down or reduces price in a relative term
(2) The source can easily be visited and this makes it reliable
(3) Adaptation and the use of local building materials will make the imported ones relatively cheaper and makes them available thereby creating a large market (HPC 1993)
(4) Most of the local building materials require less or no further processing and thus make them very economical.
(5) Production of local building materials definitely creates employment for the labour market.
(6) The adaptation and the use of them led to the development of local technology and the development of indigenous firms and this invariably lead to technological advancement and makes such country self reliance (FGN 1981)
(7) It is a good measure of conserving foreign exchange
(8) To some extent, it fosters the custom and cultural heritage of the people.

4.0 The National Housing Policy and the Place of the Local Building Materials

The National Housing Policy of February, 1991 has paid due recognition to building materials in its chapter six. The policy noted in its section 6.1 that building materials and components constitute between fifty and sixty percent (50-60%) of the total construction input and as such, emphasized that this sector “Building Material and Components” can not be left to develop haphazardly (FGN 1991).

Specific Sections of this Chapter 6 deal directly with issues on building materials with particular reference to local building material. For instance, quoting from sub-sections 6.4.12 thus:

(i) Determine on a continuous basis, the consumption pattern in the country of the basic building materials for housing and construction.
(ii) Consciously promote the establishment of cottage and small scale industries producing building materials and components from local sources such as clay, brick, concrete products, timber etc.
(iii) Encourage, though fiscal measures, the expansion of existing industries producing building materials and components from local sources.
(iv) Identify new local material available for manufacture of required building materials.
(v) Collaborate with other developing countries in the development of technical expertise for building material manufacture.
(vi) Encourage regional spread of building material industries in order to stabilize cost and widen distribution.

Sub-section 6.4.15 ensures that the construction units should use substantial percentage of local building materials and components. Also, sub-section (6.5(ii) echoes the reconstitution of the Nigeria Building Research and Road Institute. (NBRRI) into the Nigerian Building Research Institute (NBRI) to focus its attention mainly on building and housing mater, while another body shall be established to focus on road and transportation matters.

5.0 Policy guidelines and conclusion

The encouragement of the use of local building materials should be a collective responsibility of the government, individual and private organization. For instance, the following are measures that could be taken into consideration in encouraging the use and development of local building materials.

(1) Governments should ban or place restriction on some imported building materials. This will allow our local industries to grow and encourage people in using the available locally produced building materials.
(2) Encourage exportation of the locally produced building materials to find places in the world market to generate enough capital to enhance the development of home-based manufacturers.
(3) Both government and private bodies/organizations should be encouraged to establish industries that produce local building materials.
(4) Some planning authorities who hitherto restrict people from using local building materials in the cities should be made to relax their stringent standard thereby encouraging developers to commerce their development with the use of local building materials.
(5) Housing experts, particularly the civil engineers, the Architects, the draughts man and the rest should be made to incorporate the use of local building materials into their designs.
(6) More importantly, governments should demonstrate and give good examples by using some of these locally produced building materials in the construction of government quarters and other projects rather than the mere campaigning to the people.
(7) There should be adequate mapping of local building materials for the building industries in the country and conscious efforts made to exploit them.
(8) All building materials factories like those manufacturing cement; clay bricks and marble, saw mills and plywood factories previously closed down for political reasons or due to miss-management or lack of essential raw materials. Should be reopened as a matter of priority.
(9) Efforts should be intensify to promote afforestation throughout the country to increase wooden plank production. In addition, wooden structure, where suitable should be considered as substitutes for the conventional block and mortar type of structures. Research is needed on the use, seasoning, preservation and maintenance of woods.
(10) More studies and research institutes should be encouraged to do intensive and extensive work on the development and uses of local building materials.
    (i) Training schools should be established for this purpose.
    (ii) Intensive research work is necessary on low-cost masonry materials and components. For instance, research on how to improve on the commonly used materials such as concrete block, burnt-clay brick, and pre-cast concrete are needed.
    (iii) More discoveries are still needed on the use of stabilized earth using asphalt, rubber, petroleum residues, and cementations materials.

(iv) There is need to investigate the use in most developing countries of fibrous materials such as lignocelluloses, palm-kernel shells, crushed coconut shells, particle boards, sugarcane residue and bamboo.

(v) It has been suggested that bamboo is a good local reinforcement material if it is not split by nail or subjected to terminate and fungal attacks. This should be a good area for future research.

Improvement of local building materials, methods of using and assembling them to meet the present day demand for modern housing is necessary and highly recommended.

Conclusion

In conclusion, it is necessary for every nation to develop its endowed raw material resources, for the development and enhancement of housing delivery. To do this, intensive surveys and assessment of raw material resources in every country is necessary to exploit them in commercial quantities and to re-orient the mind of the people towards the use of these materials.

APPENDIX

Classification of Common Building Materials

A. Cement/Block Work

Cement per 50kg bag
Cement per tonne (20 bags)
Sandcrete block 9✠9✠18
Sandcrete block 9✠6✠18

B. Earthwork.

One tipper load 5cu yd or cu.m
Washed gravel per tipper load
Unwashed gravel per tipper load
Granite gravel per tipper load
Sharp sand per tipper load
Soft sand per tipper load
Filling (literate) per tipper load

C. Timberwork (Hardwood – Opepe)

2”✠6”✠12’ per length ------
2”✠4”✠12’ per length ------
1”✠12”✠12’ per length ------
2”✠4”✠12’ per length ------

D. Softwood - Afara

2”✠6”✠12’ per length ------
2””✠4”✠12’ per length ------
2”✠3”✠12’ per length ------
2”✠2”✠12’ per length ------
1”✠12”✠12’ per length ------

E. Plywood - White

$\frac{3}{4}$ ”✠4”✠8’ per piece
$\frac{1}{2}$ ”✠4”✠8’ per piece
$\frac{1}{4}$ ”✠8’ per piece
$\frac{1}{8}$ ”✠4”✠8’ per piece
Plywood – Veneer
$\frac{3}{4}$ ✠4”✠8’ per piece
$\frac{1}{4}$ ”✠4” ✠8’ per piece
Flush door (high quality)
Flush door (low quality)
Panel door (high quality)
Panel door (low quality, 1350)

F. Roofing

Corrugated iron roofing per bundle (20 pieces)
Light super sever asbestos $3^{1}/_{2}$”✠8’ per piece

$3^{1}/_{2}$"✠6' per piece
Ridge capping per paid
Ceiling board 4'✠4'✠Asbestos
Nails (3 inch) per bag (100 pieces)

G. Glass Work

Louver blades (plain)
3' length per piece
2'✠6" length per piece
2' length per piece
Louvers blades (plain)
3 lengths per piece
2✠6 length per piece
Louver blades (Obscured)
3' length per piece ---------
2'✠6" length per piece
2' length per piece

H. Sheet Glass

3mm thickness
24✠36 piece
36x36 piece
4 mm thickness
24x36 per piece
36x36 per piece
5 mm thickness
24✠36 per piece
36x38 per piece
36x36 per piece

Aluminum Louver Racks

Standard (six blades) per pair
HAC (six blades) per pair
Double Dove (six blades) per pair
HAC (eight blades) per pair
Double Dove (eight blades) per pair

I. Finishes

Ceramic Tiles

6x6 tiles per pack (72 pieces)
8x8 tiles per pack
12x12 tiles per pack

Adhesives

CPA Adhesive (Dunlop) per litre tin
Semestic (white colour) per litre tin
Shell butter colour per litre tin

J. Paints

Coloured Emulsion (high quality) 4-litre per tin
White Emulsion (high quality) 4-litre per tin
Coloured Emulsion (low quality) 4-litre per tin
Coloured Gloss oil (high quality) 4-litreper tin
White Gloss oil (high quality) 4 per tin
Coloured Gloss oil (low quality) 4 per tin
White Gloss (low quality) 4 litre per tin
Wood Finish (high quality) 4 per tin

K. Fittings

Water Closet System
Twofold complete set

Royal complete set
Abeokuta complete set
Shower tray complete set
Double standing shower tray
Single standing shower tray
Wash-hand basin (small) with one tap
Wash-hand basin (big) with two taps
Wash-hand basin (small) with two taps
Wash-hand basin (big) with two taps
Bathtub with one tap
Bathtub with telephone shower
Arson water heater

L. Reinforcement

Mild Steel Rods-per ton

$\frac{1}{4}$ ” Diameter (44 pieces) per ton
$^{3}/_{8}$” Diameter (180 pieces) per ton
$\frac{3}{4}$ ” Diameter (45 pieces) per ton
$\frac{1}{2}$ ” Diameter (112 pieces) per ton
$^{5}/_{8}$” Diameter (70 pieces) per ton
$^{7}/_{8}$” Diameter (36 pieces) per ton
1” Diameter (27 pieces) per ton

High Tensile Rods – per Ton

$\frac{3}{4}$ ” Diameter (33 pieces) per ton
$^{3}/_{8}$” Diameter (33 pieces) per ton.
$\frac{1}{2}$ ” Diameter (93 pieces) per ton
$^{5}/_{8}$” Diameter (52 pieces) per ton
$^{7}/_{8}$” Diameter (28 pieces) per ton
1” Diameter (21 pieces) per ton

M. Electrical Installation

Distribution Boards:
Single phase 4 ways – 3 amps per number
Single phase 6 ways – 60 amps per number
Single phase, 8 ways – 100 amps. per number
Single phase 10 ways – 130 amps, per number
Single phase,2 ways – 180 amps. per number

N. Surface Wiring Cables

Cable Copper Conductor with or without earthen
2-Core 1 mm^2 per 100m coils
2-Core 1.5 mm^2 per 100m coils
2-Core 4 mm^2 per 100m coils
2-Core 6 mm^2 per 100m coils
2-Core 100 mm^2 per 100m coils
2-Core 1 mm^2 per 100m coils
2-Core 1.5 mm^2 per 100m coils
2-Core 4 mm^2 per 100m coils
2-Core 6 mm^2 per 100m coils
2-Core 2.5 mm^2 per 100m coils
1-Core Earths 8 mm^2 per 100m coil.

O. Conduit Pipes and Accessories

25m diameter x 300 long per length
20m diameter x 300 long pipes per length
Stop-end circulation box per number
Two-way “U” per number
Three-way “Y” per number
Male bushing/female coupler number

P. Conduit Wiring Cables

Single core, all insulated with Solid Copper Conductor
1 mm per 100m coils
1.5 mm per 100 coils
4 mm per 100 coils
6 mm per 1000m coils
10 mm per 1000 coils
16 mm per 100m coils
25 mm per 100m coils

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