

Traditional Cultural Elements in Built Environment Design in Botswana

Interior Design; Exterior Design; Built Techniques and Technologies
Decorations

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Abstract: Indigenous (traditional, local) knowledge is present all around the world as an accumulated experience of thousands generations. Its presence is very visible in all areas of life, including design and construction of the built environment (especially residential houses, but also working spaces, community areas, etc). Modern materials and building techniques are prevailing and putting that old but nevertheless valuable knowledge aside. Africa was fortunate because modernism in design, including built environment design, was introduced lately and did not have such a strong effect and was not accepted as it was in the other parts of the world. Traditional materials, decorations and building techniques are still in use in majority of the African countries, especially in countryside. In many cases, indigenous knowledge appears to be more appropriate and adequate than modern one, regarding harsh climate conditions in Africa. Imposing modernism, even when we have a more suitable solution, is not only wrong, but also unprofessional. The paper presents research regarding indigenous knowledge in built environment in Botswana, and its possibilities of application in contemporary build design. The main research question is not what indigenous knowledge is, or is it valuable. The main question is not even can it be applied in modern built environment. Answers on all those questions are well known. The question is how it could be applied on the best way. The paper addresses our intentions, research hypothesis, basic principles, methodology and results for the project and the conclusion.

Key words: Built Environment Design; Indigenous knowledge; Architecture; Tradition; Culture; Cultural background

1. Introduction

For centuries, indigenous (traditional, local) materials and techniques have been presented in every region around world. Accumulated knowledge and experience have overcome modern technologies for quite a time, but today they begin to lose the battle. Modernism is prevailing in such extent that indigenous knowledge is in serious jeopardy of the vanishing. The battle between traditionalism and modernism is not just a heritage problem. Several engineering disciplines could use this vast knowledge and experience in an everyday practice. Adopting indigenous knowledge and adapting it to contemporary challenges could be a step forward that could entail various benefits.

This could contribute to the country's economy by reducing import and even creating new opportunities for export. Also, it could be an opportunity for developing regions of the country to increase local business and employment. All of this would increase the quality of life for the whole nation. A combination of modern

engineering and technologies with indigenous knowledge could bring a new development. It may appear that indigenous materials and techniques do not have a scientific background, but their multi-century experience bear witness to their validity to be accepted upon serious researches.

National heritage has also to be accentuated. UNICEF, through ICOMOS, highlighted that “The built vernacular heritage is important; it is the fundamental expression of the culture of a community, of its relationship with its territory and, at the same time, the expression of the world’s cultural diversity” [Mexico Charter, 1999; Charter on the Built Vernacular Heritage].



Figure 1. Traditional house at Serowe, Botswana



Figure 2. Partly finished house with visible construction system, Dipuduhudu, Botswana

2. Knowledge of Indigenous (Traditional, Local) Materials and Techniques in the Past and Present Days

During the past centuries, indigenous materials and techniques were been used solely. International (so called modern and sometimes scientific) building materials and techniques in design and construction have been introduced only recently, during last part of the XIX and during XX century. Even today, a traditional style in design and construction is widely present. As per Census 1991, sdistribution of the traditional houses and their proportion in quantity to modern buildings vary from place to place. The larger place – the higher percentage of the modern buildings. In Gaborone (capital of the Botswana) there are 94 % of buildings made of the modern materials (bricks, blocks, concrete and similar), and only 2 % bult on the traditional way (sun dried mud bricks). In the countryside the situation is different. Mahalapye and Palapye have 64 % and 62 % of modern buildings and 32% and 34% of traditional ones, respectively. On the other hand, small and distance places show a different proportion. At Rakops there are only 17% of modern and 83 % of buildings made of traditional materials; Mathatane has only 19 % of modern and 79 % of traditionally made buildings; even a dweveloped places such as Letlhakane has only 25 % of modern and 70 % of traditionally built houses.

This reveals a fact that indigenous knowledge of design and construction is still highly present in Botswana. This present a treasure, which we, as engineers, architects, designers and other building professionals, can and must evaluate proprely and give it a chance to be integrated in modern building industry.

3. Traditional Design and Construction (Interior, Exterior, Structure) in Botswana

3.1 Introduction to the present situation

We cannot ignore the fact that some of materials and techniques, which we consider as unique for our environment, are widely spread all over the world. Very similar traditional architecture is present in eastern and other parts of Southern Africa. And even more, some material, techniques and elements (e.g. thatch roof) are not indigenous and reserved for Africa only. Traditionally, vast area along the Danube river (South Germany, Austria, Hungary, Northern Croatia and Northern Serbia) have been using thatch roof for centuries. However, these techniques and materials have been present in Botswana for so long that we accept them as our indigenous.



Figure 3. Traditional house with thatch roof, Novi Sad, Serbia

3.2 Techniques

In Botswana, traditionally, a constructive structural system is a skeleton. Wooden pillars are fixed into soil at the bottom. At the top, the pillars are connected with wooden beams, which support rafters. All connections are made by bast rope. A wall is made of sun-dried mud bricks and its role is only to divide internal from external areas. Usually, a wall does not touch the roof and that that iopen area (not more then 100-200 mm) provides natural ventilation for the interior space. Houses do not have windows. The roof is thatched, fixed to twigs with bast rope.

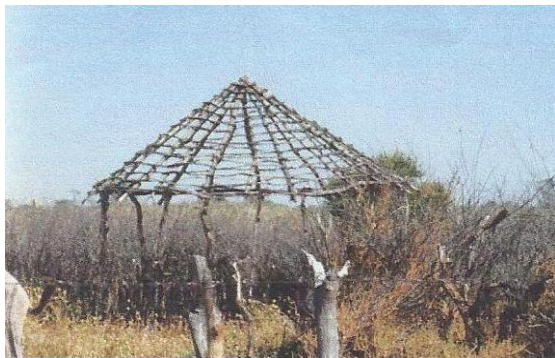


Figure 4. Semi-finished traditional house at Dipuduhudu, near Molepolole, Botswana



Figure 5. Finished traditional house at Dipuduhudu, near Molepolole, Botswana

3.3 Structure

A wooden structure provides a full skeleton system with pin joints. It might be suitable for seismic areas, but in regions as Kalahari/Karoo plateau it is not of such importance. Due to high mobility and the assumed short life span, houses usually do not have a strong foundation.



Figure 6. Construction system – Skeleton with pinpoints, Dipuduhudu, Botswana



Figure 7. Traditional house – Details of the construction system

3.4 Materials

Wooden elements are naturally branched, which could be found in the nature, without any final finishing (including natural shape and imperfections).

Mud for bricks is a mixture of soil, water and cow dung. Selection of ingredients and their proportion is very important. Only the soil from the bush (with dry leaves in traces) and fresh cow dung are used. Cow dung provides fat, acid and fibers that are the main elements that keep mud together and give it a long life span. Mortar for plastering is made the same way, with the addition of coloured soil for artistic purposes (decoration of the external walls). The role of animal fat and organic acid in the mortar has not yet been fully studied. However, it is very likely that natural fat makes mortar more coherent and works as a binding ingredient. Mortar with a higher percentage of cow dung could be metal floated and show a shining finish (highly polished).



Figure 8. Soil samples, different colours (used for decoration)

3.5 Insulation

In Africa, insulation is one of the biggest problems in building industry. In a climate where it is extremely hot for 9-10 months, and people have to heat their houses other 2-3 months, a good insulation is an imperative.

In area of insulation, traditional materials could help us significantly. Mud bricks are 3-4 times better insulators than stock/concrete bricks. A metal sheet roof without additional insulation (which is standard roof

coverage for low and mid-class buildings in rural areas of Botswana) is not comparable with a thatch roof. Even if we add 50 mm of the fiberglass or similar insulator, the thatch roof still has better insulation performances.

4. Potential Benefits of the Usage of Indigenous Materials and Techniques

A mere knowledge of indigenous materials and techniques is not enough. We have to adapt them to practice nowadays. The first step is to fully understand them. Only after that, we could proceed with their industrial production and mass usage. Preserving the heritage is not just a duty. It makes us proud of what we are and of our origins. Only a self-conscious nation can make a progress. Knowing the past and the mode of life with all its aspects could help us find the way towards progress.

Economically, a return to the traditional building materials (modified to meet today's requirements) could contribute to the country's economy by reducing import and creating new opportunities for export. Local businesses could be increased and develop. Socially, it could create new employment and bring prosperity to remote regions of the country. And as for the benefit, perhaps the greatest one would be the improvement of the quality of life. With less expensive building materials and much higher insulation performances, people in the countryside would live a better life in better houses.

5. Role of the Education in Better Usage of the Indigenous Materials and Techniques

Education, implemented through official channels (primary, secondary and especially tertiary education) as well as alternative forms (museums, historical societies, engineering institutions, etc.) could improve our understanding of our materials and techniques. Only through better knowledge and understanding we could find a real and adequate place for the indigenous materials and techniques. Teachers at schools have to develop an interest and knowledge of traditionally built heritage among students. Not only that the lecturers at tertiary levels (Universities, etc.) have to develop this knowledge but also they have to attract students to study and research in this area. Independent researchers could also contribute, together with other Government and private institutions (national museum, local museums, research centres, etc.).

There is a lot of space to intervene at all levels of the education system. With minimum changes in the existing Curriculum, the involvement of heritage (in this case – a built heritage) could be greatly improved. At schools, the subjects as History, Social science, Design and technology, etc. could incorporate more tangible national heritage, including a built heritage.

6. Indigenous Materials and Techniques Today – New Challenges and a Potential Step Forward

Nowadays, we find traditional materials and techniques used in two ways. All around the world, and also in Botswana, there are numerous new, modern-designed buildings where traditional materials are used. In Botswana, majority of them are hotels and tourist centres outside the towns or within national parks. Furthermore the Government is trying to apply indigenous materials in some of their buildings, especially in the countryside and within national parks. The usage of the traditional materials could make a milieu and atmosphere by incorporating a building into a natural surrounding. It is much more due to marketing reasons though, but the benefit is multilateral – stone and mud are good thermal insulators, as it is a thatch-covered roof. Thick walls are well sound proof and reduce noise.



Figure 9. DWNP, Park Entrance Gate at Chobe National Park



Figure 10. Mokolodi Game Reserve Reception building

In the countryside people try to adopt modern materials and techniques and preserve some traditional elements at the same time. This could be a right step forward if engineers would recognize values and trends and give their contribution accordingly. Usually, the result is a square house with a thatch roof. The construction system is not merely a skeleton with a pin joints. The trend is to go with concrete or mud bricks with mud plaster, but without mixing it with cow dung. The roof is usually covered with thatch.



Figure 11. Contemporary square house with a thatch roof and a skeleton construction system, Serowe, Botswana



Figure 12. Contemporary round house with solid structural walls and a thatch roof, Gumare

7. Conclusions

Nowdays, the importance and value which indigenious knowledge provides has been accepted and fully recognized. Nevertheless, it has not found its full usage yet. This statement does not cover all areas and disciplines of indigenious knowledge only, but it is specifically valid in areas of engineering and technology.

This paper is not a call to return and live in traditional house, in the past. On the contrary. That sort of utopian ideas is only a step back in development of the human kind. This is just a call to continue evaluating indigenious knowledge and reawake its parts that could be used today. Thousand of years and hundreds of generations had come to some conclusions through their experience. Let's have it scientifically analyze And incorporate in modern life and engineering practice. That could be a step forward.

8. References

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9. Sources of the Photographs

All photographs (Figures 1 to Figures 12) are from the Author's private collection.