

HOW SIGNIFICANT IS DURABILITY IN VERNACULAR HOUSE CONSTRUCTION?

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Abstract

For centuries, dynamic vernacular society has experienced repairing, or demolishing old houses, and constructing new houses. The time interval between those actions probably became more sparsely spread as modern and more durable technologies and materials offered wider range of options in the vernacular construction through globalization. The first objective of this paper was to compare the durability of distinctively old and new construction materials and technologies used in the vernacular houses in a context of northern Iran. The second objective was to search implicit values behind making decisions regarding durability. The 'old' construction technologies were 'Kali', Mud Houses, and *Lar deh ee*", and, while Load-bearing wall, Concrete, and Steel structure were the 'new' categories. A questionnaire-based survey was conducted among 167 residents of different vernacular houses and 18 of them were selected for interview. Besides, a number of 20 experts also participated in a mailing survey for validating the data. Perception of users on durability of structure was assessed and compared through 5 elements namely foundation, floor, wall, roof, and attachment through the structured-questionnaire, while the implicit values were revealed from data collected through the open-ended interview. Results showed that residents tend to rate the old houses higher, rather controversially. Commercialization might be gradually inclining users' choices towards new houses, but responses also showed that a house is likely to be redundant after only a couple of generations, even though it still has a long durable lifetime to spare, thus making the durability issue less significant.

Keywords: Vernacular Architecture, Durability, Globalization, Iran, Housing

Abstrak

Berabad dahulu, masyarakat vernakular yang dinamik telah mengalami pembaikan atau perobohan rumah-rumah lama, dan pembinaan rumah baru. Selang masa antara tindakan tersebut berkemungkinan menjadi lebih jauh apabila melalui globalisasi teknologi dan bahan binaan yang lebih moden dan tahan lama digunakan dalam pembinaan vernakular. Objektif pertama kajian ini adalah untuk membandingkan ketahanan bahan binaan serta teknologi lama dan baru yang digunakan dalam rumah vernakular di Iran Utara. Objektif kedua adalah untuk mencari nilai yang tersirat di sebalik keputusan yang dibuat berkenaan dengan aspek ketahanan. Teknologi binaan 'lama' terdiri daripada Kali, Mud, dan *Lar deh ee*, manakala keluli, konkrit dan dinding tanggungan beban merupakan kategori 'baru'. Kajian soal selidik telah dijalankan di kalangan 167 penduduk rumah vernakular yang berbeza dan 18 daripada mereka telah dipilih untuk di temuduga. Untuk pengesahan data, 20 pakar telah mengambil bahagian dalam kajian selidik melalui mel. Persepsi pengguna berkenaan ketahanan struktur dinilai dan dibandingkan melalui 5 elemen iaitu asas bangunan, lantai, dinding, bumbung, dan binaan tambahan melalui soal selidik secara berstruktur, manakala nilai yang tersirat diperolehi dari data yang dikumpul melalui temuduga secara terbuka. Hasil kajian menunjukkan bahawa kadar kecenderungan untuk struktur lama lebih tinggi. Kemungkinan pengkomersialan secara beransur, mengalihkan kecenderungan pengguna terhadap yang baru, tetapi keputusan tersirat menunjukkan bahawa sesebuah rumah mungkin tidak diperlukan lagi selepas hanya beberapa generasi, walaupun ia masih mempunyai jangka hayat yang panjang dari segi ketahanan, menjadikan isu daripada segi ketahanan kurang ketara.

Kata kunci: Seni Bina Vernakular, Ketahanan, Globalisasi, Iran, Perumahan

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1.0 INTRODUCTION

Vernacular architecture as its nature has many beneficial experiences that gained through centuries of trial and error process [1], [2], [3]. Over time, people have been using indigenous knowledge of material and technology to meet their needs confronting environmental conditions [4], [5]. New material and technologies offered wider range of options, and changed the traditional construction systems to newer ones often not so fitting with the context in all aspects, at least certainly not at the beginning [6], [7].

However, material and technology are not the only factor behind a vernacular house. Vernacular houses in greater sphere are intertwined with countrymen's life. Life starts from the parent's house. As kids grow up, they can impose additions, extensions or modifications to the parent's house. They can also become the neighbor of the parents when they start their own families in own their individual house. Countrymen are likely to live in their houses until their death, and then they can be succeeded by the children who still lived with them until then. The impact of these demographic changes continues through time as long as spaces remain available and habitable.

Thus, the vernacular houses go through rebuilding and repairing. The former option can be chosen after certain generations, most probably when the original builder expires. It is often the best option for some practical reasons. For example, after the death of the original builder, the family of the newer generation may want to do some wholesale changes not only because of their altered lifestyles, but also because newer materials and technology could become available by that time. It can be argued that traditional building materials such as timber, clay etc. can only have a lifetime of 60-70 years. However, even with more durable material and techniques, a house can lose its appeal to the newer generations after that period, and may need rebuilding.

In between building and rebuilding, a number of repairs might occur. Until the need for rebuilding, repairing with newly available materials and technology is always considered as a more preferred option [8]. However, there might arise conflict regarding the extent of repairing or renovations, and if they occur, then how often. Sometimes, the tendency of high frequency or degree of repairing or renovations can simply be caused by the popularity of newly available materials or technologies rather than just from demographic changes. That requires unnecessary higher level of adaptation by the users to new lifestyles [9]. If it happen like that, then the evolution of vernacular architecture might become quicker than it happened in the past. Probably that phenomenon already started in various places in the world though some might argue that vernacular houses did not deserve that. At this point, two questions might be asked. The first one is that whether there is really a need

for evolution, and the second one is that if there is a need for evolution, then how fast it should be [10]. That can be addressed through different tangible or intangible criteria that form the vernacular atmosphere. This paper focused only on one of the tangible criteria, namely, durability of traditional materials and construction system to look for some answers to it.

2.0 CONTEXT OF STUDY

Vernacular area of northern Iran is as the context of this study which involves the area between Caspian Sea, and Alborz Mountain. It has a humid and mild climate; rice fields, forest and mountain; abundance of wood; habitat of farmers and ranchers from distant past.



Figure 1 Context of study, Provinces of Iran [37]

Different types of vernacular houses exist in this area considering the building material and techniques of construction. Among them, three are the most famous. They are *Kali*¹, *Mud*² houses, and *Lar deh ee*³. There exist a few of 'new' types as well, which are categorized as Brick, Concrete, and Steel structured houses.

¹ *Kali* houses are traditional vernacular houses constructed with logs horizontally installed one upon another as walls and the gaps are filled by mud.

² Mud houses are traditional vernacular houses constructed with thick mud walls.

³ *Lar deh ee* houses are traditional vernacular houses constructed with diagonal cut wood attached to the inside and the outside of a wooden frame as walls, and the gaps are filled by mud.

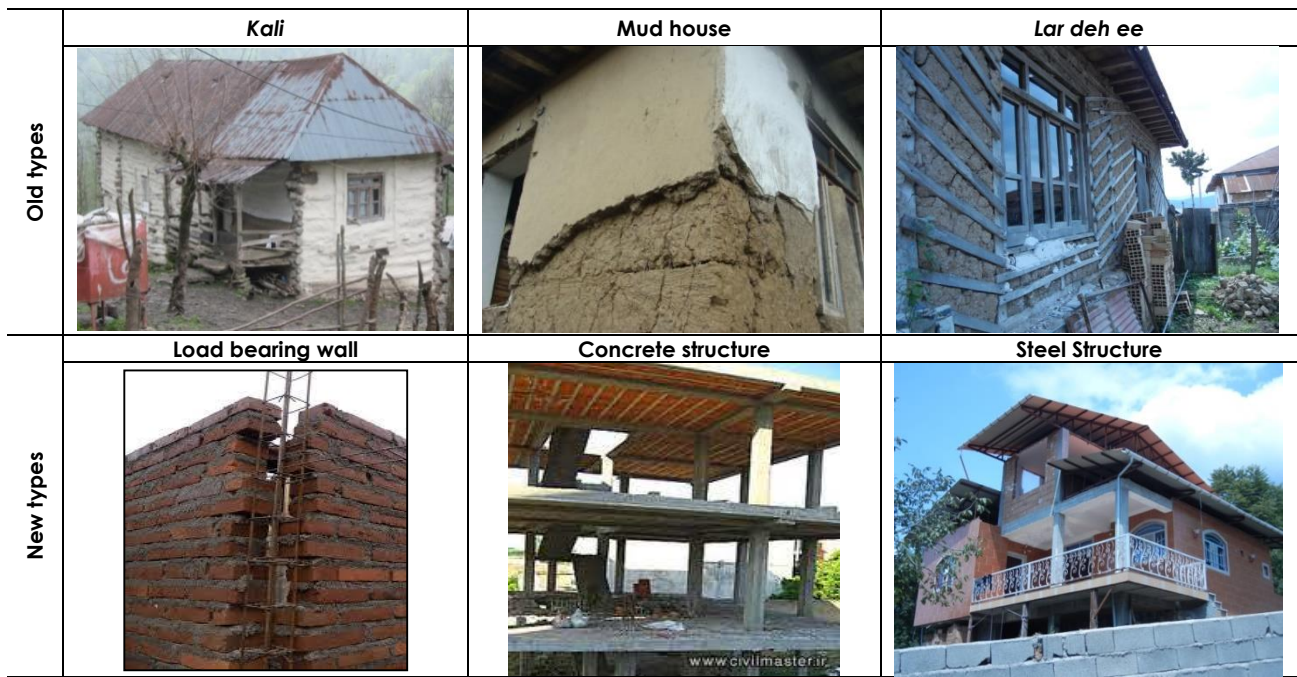


Figure 2 Old and new types of construction (source: authors)

Table 1 Brief descriptions of types of construction under 5 components (source: authors)

	Elements		Foundation	Floor	Wall	Roof	Attachment	
	Types							
Old types of construction	Kali	4 wooden pads Two-three big stones	Reinforced strip foundation	Wooden trunks and a mesh of woods which makes the floor	Wooden trunks as the horizontal elements make the wall	Two-pitch tin covered gable roof with raw wooden structure underneath	Artifact doors and windows, Outdoor WC and bath	
	Mud	Short thick wall constructed with sand and mortar of mud			Filled by hardcore stone and finishing by compacted mud	Thick mud wall		Four-pitch tin covered gable roof with cut wood structure underneath
	Lar deh ee	Sandy short thick wall			Mesh of cut wood filled by mud			
New types of construction	Load bearing wall	Reinforced strip foundation	Reinforced concrete	Filled by hardcore stone and finishing by concrete	Load bearing (35 cm thick) brick wall confined with reinforced concrete	Galvanized four-pitch gable roof with the steel profile underneath the structure	Prefabricated doors and windows Indoor WC and bath Modern sanitary	
	Concrete structure construction				Reinforced concrete column and (20 cm thick) brick wall with cement mortar	Waffle roof isolated by insulation		
	Steel structure construction				Steel column and (20 cm thick) brick wall with cement mortar	Galvanized four pitch gable roof with steel profile structure underneath		

Table 1 briefly describes the characteristics of five basic elements of vernacular houses of the context.

3.0 DURABILITY OF CONSTRUCTION

Durability is the focus of this study. Durability refers to staying strong and in good condition over a long period of time. However, the time until when a material or a component should last so that it can be considered durable cannot be clearly defined. This period will definitely vary depending on the purpose of the building, thus is defined as the Service Life.

The definition of durability can be modified to 'The ability of a building or any of its components to perform its required functions over the intended period of time'. Durability is not an inherent property of a building material or of a building component. It relates to the particular use of a material in a particular environment. A material that is durable in a particular environment may not be durable in a different one, or for a different use in the same environment.

Durability is one of the most important aspects of construction, which must be considered at every stage of a project, from planning to maintenance. There are varieties of durability requirements as there are varieties of buildings [11]. During Industrial Revolution in East Yorkshire from mid eighteenth century to early nineteenth century, many earlier buildings were replaced by uniform designs in brick [12]. Some questions may arise here such as, why this demolition happened? How many houses have been demolished? Alternatively, how many of them were still in their service life?

The medium life span of the buildings was defined as 30 years and the normal life span as 60 years. Some components of building were categorized as replaceable, some others as maintainable, and the fundamental and main structural components must last until the full life of building [13]. It means that it is not necessary to demolish the whole building if one or a few of the expired components can be replaced.

Using different materials and technology, different house types have different life spans. However, standard life span of a house can be calculated from the average age of the same house type. Regarding traditional vernacular material and technology, repairing and maintenance of historical buildings require having knowledge about traditional materials and their characteristics. In different researches, the compatibility and sustainability of those were being tested. For example, lime mortar technology has been studied quite intensively [14]. Wood construction is also assessed by other researches [15].

Some questions are there that are related to the issue of durability. How long is the normal life span of every house type? Which factors are influencing the durability of houses? How much is the maximum usability life span of house? [16] Starting to assess durability of a house, there are usually no initial data available as the first step in hand [17].

On the other hand, expected service life is not exactly mentioned anywhere and no model have been found. The first step, therefore, was to collect data of operation, maintenance and renovation, or

repairing; consequently analyzing the data in modeling durability [17].

3.1 Durability Assessment

Durability of housing materials can be tested by physical and chemical tests such as resistance to sodium chloride accelerated aging test [14]. In the manuscript of Compliance Document for New Zealand Building Code, it is stated that the evaluation of durability must be done through one of these methods: in service history, laboratory testing and similar material [18]. It is also commented that evaluation would be acceptable when conditions of use has been taken to account, clearly identified and evaluated. Testing the durability of building materials and components could be done in four approaches. Bench mark test approach, which is related to the historical data of the material as bench-mark followed by comparison; reference material approach that compares the knowledge of material, climate and in service performance of a component; environmental and stress testing approach, where simulation of weathering in the lab tests the durability; and finally, site testing approach, which tests the material in real environmental condition [19]. It can be concluded that durability testing of materials and components is a very costly and time-consuming exercise [19].

On the other hand, there is much estimation about the life expectancies of materials. For example InterNACHI's Estimated Life Expectancy tables includes materials with their life prediction [20].

Durability of materials has been tested by scientists and by industrial factories. For example, the basic durability of wood, sand, brick, concrete, steel and so on, are shown in various catalogues and brochures. A little tolerance does exist in the life span of a material, which is influenced by quality of raw material, class of material and class of factory.

Nevertheless, for the construction elements it depends on the component's quality of mixture and fixture. Indeed the environment and the climatic condition affect directly on the lifespan of material and components. Referring to the literature, there are many approaches to establish a rule for durability of material and components. For example in a research, the elements of a building were placed in 5 groups and essential durability of each group has been mentioned. In the beginning, two categories with the title of difficult and moderately difficult to access or replace elements are required to have 50 and 15 years durability [18]. According to this, four elements, namely, foundation, floor, wall and roof must be durable for at least 50 years. For the attachments, structural units must be durable for at least 50 years and other parts can be less durable due to the possibility of replacement.

As it is a high cost and time consuming process to scientifically calculate the durability of material and component of the buildings, inevitably the related organizations adopted the prediction or estimation of material and component's durability. However, the

question is that to what extent the estimation is reliable and which factors affect durability of buildings more?

3.2 Factors Affecting Durability

Looking for durability of buildings in the literature, many factors were found that could affect durability. For example:

- a. Design, materials selection and quality of material [15], [21], [17].
- b. Installation, quality of product, placement and assembling of components [22], [21], [17].
- c. Weather and climatic condition, both at micro and macro level [15], [22], [21].
- d. Intensity of use and level of maintenance [22], [17].
- e. Neighborhood, facilities, land value, and political variables [23].
- f. Age of the building and upgrading of facilities [24], [25].
- g. Usefulness reduction over time and out of fashion or out of date [24].
- h. Socio economic factors [26], [25].
- i. Increasing the expenditure of keeping building operating, while decreasing efficiency [24].
- j. Population movements [24].

The ever-changing economic and social needs and issues related to sustainability lead people to have their houses changed, adapted or demolished. For the cities, it seems to be true since the houses built more than two decades ago in the cities rarely are sustainable, and changes may support sustainability. For the vernacular area that is different [26]. Traditional vernacular houses are intrinsically sustainable and inconsiderate changes may lead to unsustainability.

It is obviously true that some building materials have a lower life span than the building itself [27]. One of the problems that have influence on the life span of wood is fungal decay. Also, bacteria affect different types of wood under a variety of environmental conditions [15]. Additionally, while concrete and steel can have protection measures employed for such harsh conditions, they will still only have a limited service life governed by the protection levels employed to give the designed service life. Within its stated limits, timber on the other hand, will last much longer in harsh conditions, without the need for additional protection. In most cases, the design life is almost indefinite [28]. In contrast, it must be taken to account during the selection of material that after the lifespan of the building expires, and decision is made to demolish it, what should be done to the waste [23].

The number of normative documents on compressed earth block (CEB) is many. Some of them are as follows: The norm IS 1725 from India, norms NBR from Brazil, norms ARS from African Regions, norms NT from Tunisia, norms from New Zealand, norm KS 02-1070 from Kenya, norm XP P13-901 from France, norm NTC 5324 from Colombia, norm UNE 41410 from Spain, norm ASTM E2392M-10 from the American Society for Testing and Materials, and lastly, norm NMAC 147.4 from New Mexico. In addition to these, normative documents of

great international prestige are EBAA 2001, HB 195 and Bulletin 5 [29].

Moreover, many factors influence on construction element's life span such as changes in consumer needs, dissatisfaction and failure [30]. Failure depends on degradation of building elements related to use condition; dissatisfaction is mostly related with the changes of styles and fashion trends. The needs of occupants due to their family size changing i.e. demographic changes through time may also have impact [31].

3.3 How Significant Is Durability For Vernacular House Structure?

A research conducted on North America on demolished houses showed that the main reasons that lead to the demolition of a house is related to changing land values, lack of suitability of the building for current needs, and lack of maintenance of various non-structural components, rather than the relationship between structural system and actual useful life. Indeed, the theoretical maximum lifespan of most buildings are probably far longer than their service life and for the houses, it is more obvious. Finally, it suggested that instead of durability, it must be shifted to the flexibility of design, de-constructability and more accurate lifespan prediction [32].

In the same research in China, it is found that the average age of the demolishing a building is much shorter than predicted lifespan [23]. The idea that durability of construction is one of the basic pillars for sustainability is unsupported in the lack of life cycle assessment and accurate lifespan predictions [32].

There are some problems to achieve the durability of construction. First, it involves high cost and long time consuming. Secondly, it depends on many factors that must be considered. On the other hand, some people argue that buildings are always demolished before the end their service life. Nevertheless, architects must know about durability of material and components during the design process. Indeed, they must also know their society and trends to understand maximum effective lifespan and service lifespan of the building. With this knowledge, they would be able to design and select the material and components that are adequate to required lifespan [21]. In this approach, three basic pillars of sustainability; economic, social and environmental should be taken into account.

4.0 METHODOLOGY

For the study, a total number of 167 houses comprising all six types of vernacular houses in the region were selected. The criteria of durability is one of the strongest indicators of measuring building performance regarding material and construction technique, and that is why it was selected for this study [33]. As discussed in the literature review, perception was used to measure durability rather than scientific technics. A questionnaire survey that included both structured

questions, and unstructured interview, was conducted. The questions were arranged to cover five basic elements of construction that are most related [34]. These are foundation, floor, wall, roof and attachment.

The initial question was about their perception of durability of their own house type; the second one was about their perception on the durability of their house type. Concurrently in the unstructured interview, there comparative views on their house type and other house types were asked in order to get a complete picture of perception. Descriptive, process, holistic and hypothesis coding were used in first cycle coding generated from the interview responses. Embedded theme emerged from the patterns found in second cycle coding [35]. The explicit objective of the study was to find out what method is the most durable, while the implicit objective was to understand how much durability is actually expected. A deep semi-structured informal interview was conducted with selected residents on each type in order to obtain qualitative data.

The results were validated by a mailing questionnaire sent to 20-selected number of local construction experts who are familiar with the vernacular and modern architecture of the context. They were asked to rank the types of construction against the criteria of durability in a five-point Likert scale. The average from their answers represented the priority of each construction type under the criteria of durability. This was later used to validate explicit findings gathered from the responses of the residents before searching deeper for the implicit findings.

Literature, catalogues, brochures and other similar resources were used as secondary data in order to triangulate the findings.

5.0 DATA COLLECTION AND RESULTS

5.1 Results

In this section, three sets of data are showed. The first set (Figure 3) was about durability of each element of every house type in the vernacular context of Northern Iran. These data were the average of standard lifespan of the elements that were collected from resident's responses. To be comparable, the mean of durability of all elements from residents' responses were also calculated and is showed in Figure 4.

The second set (Figure 5) show the mean lifespan of every construction type derived from experts' responses. These data were collected in five point Likert scale. However it was converted as percentage value.

The third set of data was about the qualitative part. First and second cycle coding have been done on the responses of interviews and are showed in Table 2.

Residents have been asked about the age of the house, their estimation of the life span of the house, and the standard life span of these types of houses. On the other hand, the experts were asked to rank every type of houses in a five point Likert scale.

Moreover, in the qualitative part, the residents were asked to compare the durability of their houses, the

durability of their house types, and the durability of other house types, in order to get some insight about the significance of durability as whole.

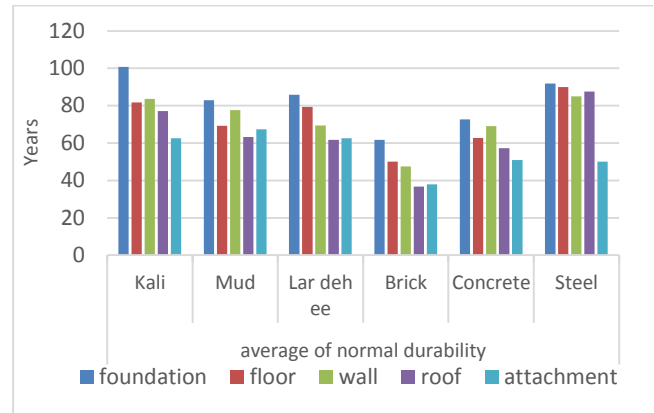


Figure 3 Resident's response about durability of elements

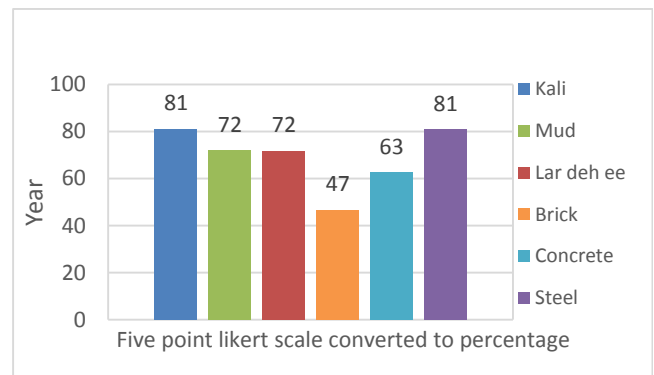


Figure 4 Mean of total elements' durability

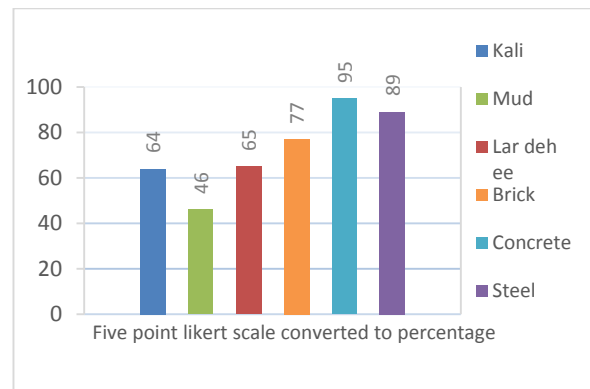


Figure 5 Experts' durability assessment

Table 2 First and second cycle coding yielded from interview

	Foundation	Floor	Wall	Roof	Attachment	Building as whole	
	First cycle coding					Discussion	Second cycle coding
Kali	Local material Good material Well kept Less depth Simplicity	Material Maintenance Moisture Simplicity	Material Maintenance Simplicity	Material Maintenance Simplicity	Material	Less depth of foundation helps the building to absorb seismic waves like a joist	Repair and Maintenance Simplicity
Mud	Local material Quality construction Simplicity	Local material Quality construction Simplicity	Local material Quality construction, Well kept Repair and maintenance Simplicity	Local material, Quality construction, Well kept, Repair and maintenance simplicity	Material not high quality	The people argue that new material such as tin sheets increase the durability	Repair and Maintenance Simplicity
Lar deh ee	Natural material, Correct construction process, Composite material Simplicity	Material, Repair and Maintenance Well kept Simplicity	Material, Thickness as weakness, Repair and Maintenance Simplicity	Second hand material, Joinery, Quality of material, Repair and Maintenance	Material not high quality	Natural material as the place of conflict. Some people regard the long durability of their building due to using the natural material while other think using the natural material decreased the durability.	More detail Simplicity
Load bearing brick wall	Natural material, New material,	New material	New material	New material	Material not high quality	Depending on mason (whether skilled or not) the quality of building and consequently durability is different	Semi-experienced
Concrete structure	New material, Durable material, Reinforced concrete	New material, Durable material, Reinforced concrete	New material, Durable material	New material, Durable material	Material not high quality	Quality of construction depends on engineers, specific workers and material	Induced information
Steel structure	New material	New material	New material	New material	-	No knowledge and experience about the new material leaves people with no idea	Inexperienced

5.2 Evaluation

5.2.1 Kali

In this type, difference between experts' (Figure 5) and residents' answers (Figure 4) is not significant. Looking into the details of residents' responses (Figure 3), the strongest element of *Kali* construction type is its foundation, which seems to be more durable than other elements.

5.2.2 Mud Houses

In the 'old' category of construction types, mud houses are at the lowest level with regard to durability. The

reason is embedded with the climate condition of the region. High level of humidity affects the durability of mud houses because the water seepage from ground. Although 'walls' of the houses in this type could be covered with waterproof material, the penetrating moisture from the ground during the years makes the foundation and floor vulnerable.

5.2.3 Lar Deh Ee

Comparing *Kali* and *Lar deh ee*, a slight difference between experts' rank (Figure 5) and residents' response (Figure 4) arises with respect to the average age of these two types in the context. It shows that durability of *Kali* is higher than that of *Lar deh ee*.

Referring to Figure 3, the strongest element after foundation is the floor of the house, which is usually made of sand.

5.2.4 Load Bearing Wall

In the experts' point of view, durability of the load bearing wall houses is more than that of all past technologies (Figure 5), but residents' response showed it had the lowest level of durability among all types (Figure 4). Most important issue that affects the durability of load bearing wall types is the construction by inexperienced and unskilled people. These people went to the city, worked as the junior worker in construction for a while, returned to the villages, and constructed the houses as contractors or subcontractors.

5.2.5 Concrete Structure

The concrete structure showed major difference in views between residents and experts. Experts ranked it as the highest durable (Figure 5), while residents put it as the lower than all 'old' types of construction methods (Figure 4). The reason can be rooted in the fact that concrete is new to the region, and people have less idea about its properties. People know about the past technologies (*Kali*, Mud houses or *Lar deh ee*) more, and depend on them. But their knowledge about the present technologies (Load bearing wall, Concrete, or Steel structure) is limited, and that comes only through the media. They are actually in the middle of a transitional period.

5.2.6 Steel Structure

Data showed that the durability of steel structure construction is considered highest among all construction types (Figure 4 and Figure 5). However, the fact is that these houses existed in this region for only a couple of years, and the durability of this type is perceived by the residents only from the advertisements. However their perception is correct as we see that experts support that as well.

6.0 DISCUSSION AND FINDINGS

Looking at section 5, one can directly find the answer to the explicit objective. It clearly showed that new technologies are obviously more durable. Even though sometimes residents differed with the experts, the fact was that the residents' perception was flawed because of some hidden facts. However, the search did not stop here. The implicit objective was to find how significant the factor of durability is in the particular context. Therefore, does a very durable material is an automatic choice, and can replace an old material immediately? Qualitative judgment emerging from the coding helped to generate the implicit themes that put extra value on the findings that were stated below.

6.1 People Have the Tendency to Choose New Technology without Measuring the Durability

People tend to choose the new technology because of its ease in case of maintenance, while they were uncertain about their consequences, whether they may be useable in future or not. For example one respondent said:

"...residents must look after their old houses and any damages must be repaired as soon as possible. They regularly repair their houses and paint it before every New Year. For the new technologies, it is different. On one hand the construction does not need to be repaired earlier than at least two decades and on the other hand the repair must be done by professionals..."

It can be said that one of the tendencies of people to construct with new technology is the ease and comfort. While one does not need to maintain and repair the house regularly, why should it be resisted against the new construction technologies? [36] The time when people's livelihood depended on the house has passed. Now people work outside and just rest in the houses. They cannot have an eye on every corner of the house to find when first evidence of any damage will occur. Thus, their choice absolutely goes to the way of selecting new technology although they are not completely certain about the lifespan of it. Another respondent can be quoted here:

"... we are not aware of concrete construction's lifespan. We have heard about its durability. The structure seems to be strong enough to resist for a long time..."

When the first respondent was asked "if second generation would not accept to live in concrete construction what will happen to this house even if it is still strong enough?", his simple answer is, "I don't know. But it would be a very bad situation". Uncertainty about the future is one of the consequences of transition between old and new era and it could be aggravated by huge media invasion.

However, durability is a tangible criterion, and it is worth noting that now we can refer to the literature to predict the durability of steel structure, concrete structure and load bearing brick wall. Hence, it can be explicitly stated that new technologies could be a safer choice as far as durability is concerned. But what happens to cultures that were developed from the nature of durability of the old types? For example, repairing at New Year Eve was almost like a ritual in old days. It gave people inspiration of life, it enhanced social bonding. No one will be bothered to do the repairing once new types conquer the region. Gradually this culture might disappear. Or will they? One can argue that vernacular people will find their own way to celebrate, to bond. But the signs are negative so far. Therefore, though the increase in choosing new materials is imminent, there is a danger of sudden drop in social bonding.

6.2 Houses Are Discarded After Almost Every Two Generation

As evident, the average age of inhabited houses visited in the vernacular context of the region was not more than 76 years old. It means that vernacular service life of houses was approximately equivalent to two generations of usage, and after that, they had lost their attraction and acceptability. There was a search for the reason. Participant 2 said:

"...newly married couples usually do not accept to live in old houses. Constructing a new house is quite simple. Although the old house with some repair would be livable, starting a new life in new house is more tempting....."

Changes in lifestyles occurred slowly in older days. Less durable houses was not a big problem, as a new house could be constructed easily. Simplicity of the construction allowed them to have a new house instead of refreshing and repairing. But new materials have invaded the region very quickly. Industrial brick or cement block used as new elements occurred only 45 years ago. Around 15 years later, concrete, and very recently, steel has emerged as the basic structural material in the villages. So the durability of new technology and materials were not tested yet, as they did not even pass new generation. But studies on these materials predict they would have even more service life.

However, it is only the half of the story. The question still exists that refers to O'Connor's study which talked about the reasons of demolishing buildings [32]. New families would always like to taste a new house, if not a new type of house. Expanding horizon of media and advertisements can always encourage the people to change their lifestyles even they may not be even one generation old.

Though new materials can ensure longer durability of the house, it could be concluded that perhaps the people's choice is not 'maximum' durability. The new types may fulfill their 'need', but they may not be able to meet the 'wants' because of the temptations of the world prevails even more though today's age of globalization. The residents might replace their buildings with new ones ignoring the issue of durability, thus making the issue of durability less significant in a sense.

7.0 CONCLUSION

Through this paper, durability of all types of construction technology of vernacular houses in the context of Northern Iran was discussed and analyzed. Analysis showed that new materials are indeed more durable, and therefore they are the better choices. For the moment, people are accepting them almost blindly, through the influence of attractive advertisements. However, if only durability is concerned, it might not be a big issue. It is because, whether durable or not, houses are going to be discarded after a generation or two anyway. But durability is not the only criterion to affect the choice of material or technology. The fear is that if

the tendency of blind acceptance continues, which is sometimes correlated with globalized media invasion, then it might affect lifestyle abruptly. Even while studying durability, small scale effect on lifestyle was noticed, and that was also not a good sign. For example, people are choosing to use new technologies because they do not need any maintenance and repair at least during the first two decades of inhabitations. It certainly is eliminating some cultural traits such as New Year Eve activities, which is indeed a bit unfortunate. Therefore, there might be need for some guidance that can help these residents in a way that they can accept the newer materials and technologies more logically and passionately from within the society rather than become victims of induced external influences.

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