

# Investigation of architecture and structural deterioration of historical Akseki houses (Buttoned houses)

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Geliş Tarihi (Received Date): 07.05.2015

Kabul Tarihi (Accepted Date): 03.02.2016

## Abstract

*Whilom, relationship between human being and nature was oriented towards housing modes which intends to protection. Later on, because of human being's ceaseless efforts which give shape nature according to their needs, today nature is convicted to city architecture and housing modes which are necessary to protect the nature from detrimental effects of people. In the past, there was a structuring which includes slight human contribution on meeting social, cultural and emotional needs. On the contrary, there are examples of traditional domestic architecture, which are at peace with nature and which are harmony factor of a life that is equipped with prized acquirements in terms of social fabric. Present study will try to remind of vernacular architecture's factors in terms of material, construction practice and system by dwelling on examples of "Buttoned Houses" in Akseki-İbradı region in Antalya.*

**Keywords:** Buttoned houses, structural deterioration, protection.

## Tarihi Akseki evleri (Düğmeli evler) mimarisinin ve yapısal bozulma etkenlerinin incelenmesi

## Özet

*Başlangıçta insanoğlunun doğa ile olan ilişkisi, korunmayı amaç edinen barınma biçimlerine yönelik iken, sonradan insanoğlunun durdurak bilmeyen doğal çevreyi*

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*İhtiyaçlarına göre şekillendirme uğraşları, günümüzde doğayı insanın zararlı etkilerinden korumanın elzem hale geldiği barınma biçimlerine ve şehir mimarilerine mahkum etmiştir. İnsanın bu zaman diliminin sosyal, kültürel ve duygusal ihtiyaçlarının giderilmesinde payı yok denecek kadar az olan yapılaşmasının aksine, doğa ile barışık ve sosyal açıdan değerli kazanımlar ile bezenmiş bir yaşantının ahenk unsuru olan geleneksel konut mimarimizin örnekleri bulunmaktadır. Bu çalışmada, Antalya şehrinin Akseki-İbradı bölgesindeki “Düğmeli Evler” örnekleri üzerinde durularak, malzeme, yapım tekniği, plan özellikleri açısından geleneksel mimarimizin bu bölgedeki unsurlarının hatırlatılmasına çalışılacaktır.*

**Anahtar Kelimeler:** Düğmeli evler, yapısal bozulma, koruma.

## 1. Introduction

The house is an architectural work including generations. The entire communities have created a cultural accumulation and they are continuing to create it. The place leaves an impression on our social and cultural memory. It does not only create a history but also gives a shape to our perspective of the future. The houses in Akseki, one of the oldest residential areas in Antalya, have organized with an architectural skill which has a humanistic standard of judgement. The houses were built with stones and wooden materials.

Besides, they were built in accordance with the plan of classic house reflecting a radical architecture of trade. The houses in the highlands are called “Buttoned House” because of the used construction practice, and they play the role of indigenous identification. In recent years, although it has been partly achieved success on restoration projects of “Buttoned Houses”, coming events will be able to leave a mark on social memory about these place where generates our cultural wealth. That helps to bring these houses, which are examples of human-nature harmony to the future. Because protection of our traditional architecture means protection of local architecture, it can be shown to the next generation that there are examples in our tradition which include being respectful to the environmental values, and there is an understanding of architecture and planning which protect and maintains the local culture.

The main purpose of protecting of the architectural legacy is to transfer the cultural asset’s integrity and distinctive properties. To archive this, it requires collecting and evaluating information in terms of architectural structure systems, construction materials, architectural figurations etc. Thanks to this type of the evaluations, it can be presented to the next generation with written and visual data about facing extinction cultural assets [15, 18].

Social and cultural wealth of the society are integrated with structures to be built and so it is provided to the formation of the architectural work. With respect to this, architectural works are the most important witness to the history of mankind. One of the main factors affecting the formation of the architectural works is material, the other one is the construction technology within the facilities provided by the material [16].

If we look at the construction methods of the traditional Turkish houses, the main material used is wood and the process is noggin technique means that spaces of wooden

nexus is filled with adobe. In the use of this method besides the continuation of a tradition, local material resources resulting from Anatolia and Rumelia woodland vegetation and its earthquake risk have an important role. Because types of masonry structures require less wood material than wooden nexus structures, there is widespread use field where wood is insufficient. From the XVII. century, examples of Turkish Houses showed the effect in a wide geography where it reaches the borders of the Ottoman Empire. However, although Turkish Houses which began to decline in terms of style has continued to build character in Anatolia's small towns and villages for a while, they have lost its significance because of new developments and changing life styles. Again, due to the various reasons such as rapid urbanization and fires, our important legacy is disappearing every passing day [17].

## **2. The history of Akseki**

Akseki, its old name is Marla, has been established on Taurus Mountains in 1286-1288. There is no record about Akseki before these years. Contrary to popular belief that Marla is an Arabic word, it is a Turkish word mentioned in *Divan-ı Lügatit Turk* and it means "High-Ulemas Land". Despite all this, its name has changed as Akseki by officious administrators who were not even aware of Turkishness and Turkish. Fortunately, Akseki name is an arm of the Teke Nomands as can be seen, Akseki name contrary to popular belief that comes from geographic feature, comes from Nomad Turkman tribe. Considering the history of Antalya, it can be said that Akseki was the preferred location for residential in Anatolia starting from the first era to Hellenistic period and then to Hittite period by looking at the fossils called "Homo sapiens neandertalensis" found in the Karain Cave. Later, Akseki in the Roman Empire since its foundation had taken control by Seljuk and Ottoman rule. Akseki, separated from Alanya in 1872, has been an independent state in Antalya Konya province in 1901. In the meantime, Akseki district boundaries collapsed and some villages were left to Seydisehir district. İbradı originally was a town, Then later it was separated from Akseki in 1991 [1].

Although the organization İbradı date is unknown, it can be said that the history of İbradı could extend to the first era by acting in the presence of the ruins of the Ancient City of the Hellenistic period in İbradı and it's around.

## **3. Buttoned houses**

### **3.1. Architecture**

The mountains terrain and climate conditions, has affected the Akseki's livelihoods, social structure and people's life style and also it affected Akseki houses. Along centuries, house masters who build earthquake resistant houses by using stones all round and materials, have generally produced two storey, wooden backed, stone walled buildings. The houses with simple and plain facade enriched with bay window and pergolas. As well as wood is used as beams in stone walls, it is often used in the inner part of the house. The roof of the house is usually pitched roof and it is covered with squatting and Spanish type tile [2].



Figure 1. Butted house [10].

### 3.2. Building material

Building materials are mainly stone and wood. Despite the used stone\*, it was obtained from the local region, as wood, samphire or juniper tree from the Cupressaceae family, turpentine tree or taros cedar and spruces from Pinaceae family was preferred.

Stone especially used in wall construction. As shown at Figure 1 and 2, All walls of the house were built with mortar dry wall technique which compressed by wooden beams and peşduvans\*\* taken between the rubble. Wood was used in the form of intervals and peşduvans. The ends of the beams in the exterior have been flushed out of the wall to an amount. They are called "button" in this region. Because of these applications in masonry, the houses called "butted house" (3).

\* In Akseki region Quaternary sediments (Qal) are found on carbonated limestone. Generally old carbonated stones are found in Akseki territory (Anamas-Akseki Autochthonous) [19].

\*\*Peşduvan or Pişduvan: In the wall corner, wooden beams are pair and perpendicular to each other.



Figure 2. Butted house [10].

Wood is also used in parts such as pergola, place for ablution and rest room. Besides, it is seen that there are the round beams made of spruce in sofa cover. Again, houses' roof tree, terrace, door and window profiles are fully made of wood. Tar denominated trees were preferred for the interior architecture such as ceiling, closet, hood fume, door, room, shelf systems and terraces [3].



Figure 3. Buttoned house [10].

As shown at Figure 3 and 4, Houses' windows can be carved wooden cage, pinwheel\* design shutter wood carving samples can be used as decorating. There is extensively the use of wood for decoration in the rooms and ceiling sofas [9].

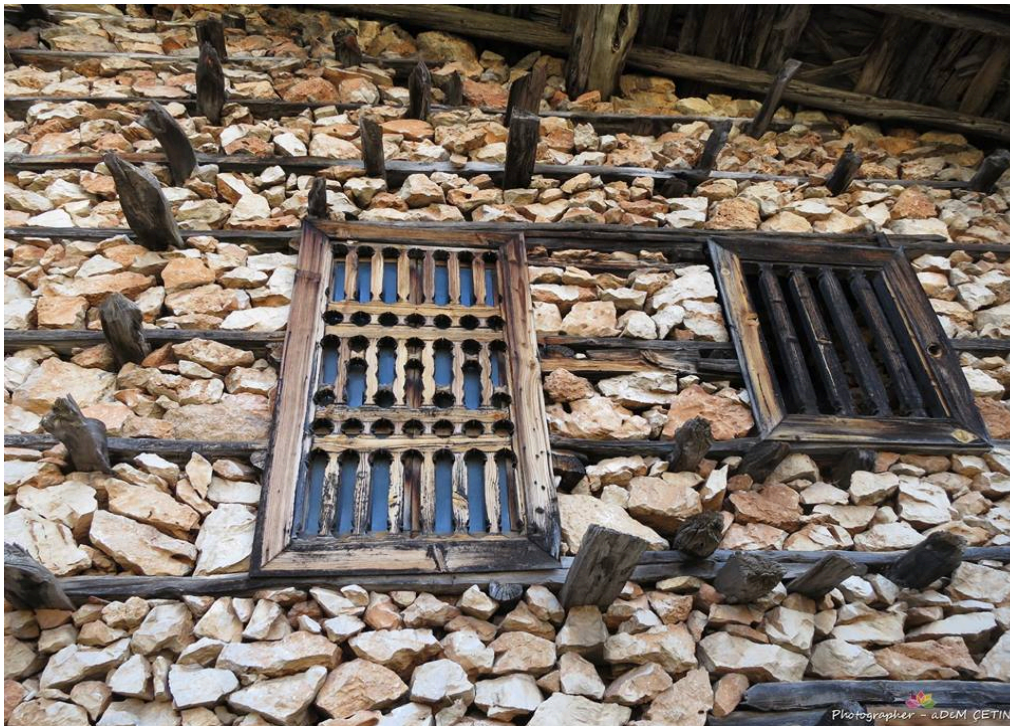


Figure 4. Buttoned house [10].

The uses of metallic materials in the houses are not very common. However, lock and hinge assemblies are made of metal. Plaster is one of the unseen materials in the houses. The plaster can be very rarely seen in the same of the houses' stove veils\*\* and lamp stand [3].

Generally, there is no door handle on wooden door. Instead, there is "traka" which is the indigenous lock system. Traka has carved a hole located on the side of the drop-down door frame. As a result of movement of the spring part formed at the back of the hole, the door leaf becomes free and it opens automatically.

\*Pinwheel design: Ornamental motifs like Swastika are used as padding of pinwheel design. Especially, in the Seljuk and Ottoman Period, it was used in carpet and rug motifs, decoration pictures. It was used as patterns and motifs in Islamic arcs' decoration pictures (in figure5,6 and 7).

\*\*Veil: It is the shelf above the stove and side eyes.



Figure 5. Durmus Yazici's buttoned house, ceiling view [9].



Figure 6. Durmus Yazici's buttoned house, southeast room ceiling view [9].



Figure 7. Durmus Yazici's buttoned house, southeast room ceiling detail [9].

### 3.3. Construction practice

In stone-build houses with wooden buttons, although the 60-70cm wide stone wall seems like main carrier, the main carrier is wooden skeleton. Wood frame system and the mixed system consisting of stone masonry wall are unique for Akseki and there is no similarity in conventional tissue in Anatolia [14].

Firstly, hard ground is excavated 30-40cm deep and dry walls built to create basic with unique flat stones. As shown at Figure 8, short wood thrown 50-60cm apart to the stone walls of the vertical and their ends are excluded as 20-25cm. Over this short places, by interlocking wooden beams are placed along the inner and outer side of the wall. Dry stone wall formed with irregular row is 50-60cm. rising after, the same system is repeated. Wall rises; it is used as a step short of wood protruding from the wall above the level and no need for scaffolding [14].



Figure 8. A Preliminary sketch from building process (drawing by Kemal Reha Kavas) [7].

Between two wooden beams is called "destur" and vertical short pieces thrown stone wall is called "button". Wooden frame connected by a horizontal is interconnected with wooden columns in the vertical. According to the window and door pillars, approximately 2m apart placed on wooden parts are connected to the switch until the

roof and they are connected to the rafter on the roof. Therefore, the stability of the wooden frame is ensured. Pine or tar is preferred for beams and wooden posts, and samphire tree is used for buttons [14].

Wooden beams and stone walls framed with wooden flooring in the system is laid on wooden beams with 40-45cm intervals. On the wooden beams inserted into 20-25cm. stone wall again wooden beams are nailed along its entire length [14].

When it comes to the bride corner chamfer and wall corners, wooden beams are laid in pairs and orthogonal. This is called "pişduvan" among the people. Beams on the doors and windows are called "dökkü" [14]. Before tile's use in roofing and now wood chip boards are used. Chip boards are arranged on the sloping roof rafters staggered and parallel to the slope. However, mostly tiles are used instead for the repair or need to be replaced [14].

Gutters are also made of wood in traditional production system. 10-12cm wide, carved woods in the middle of 2-3m in length are superimposed on each other and identified with a metal ring, then they are attached to the ends of the rafters along the eaves end [14].

### 3.4. Plan features

Like the houses in the other region in Anatolia, the active life style types of plans were applied to Akseki Buttoned Houses and as shown at Figure 9 plan types contain inner hall, central hall and external hall. The houses, which have an important requirement of social life in the sedentary, were built with tried before with varying types of plans [9].

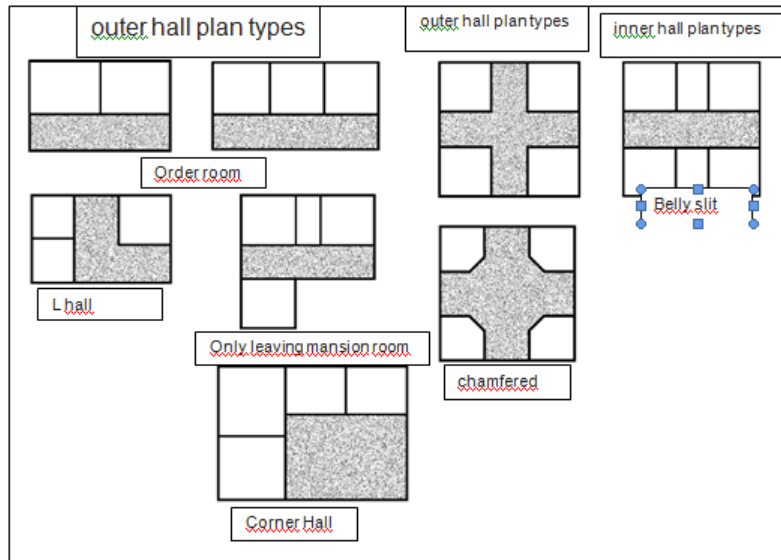


Figure 9. Akseki button house plan types; [9].

### 4. Structural deterioration factors

Although there are various structural causes of deterioration, it is mainly Physical, Biological, Chemical and Anthropogenic deterioration [4].



As shown at Figure 10, If a wood is open to climatic effects such as rain, snow, temperature changes, UV-rays, wind, appearance of the wood varies, joints are open; like splitting, cracking, torsion happens. The first effects of UV-rays are seen material's color. Material's color becomes lighter or darker because of the radiations [5].

When users moved another venue, if they don't do the necessary simple repairs, structural elements are directly exposed to atmospheric conditions and damages. Generally, due to the damage to the cover tiles, rain water reaches the element in the structure, moisture balance is disrupted and it is seemed that colors are changed and the decay effect starts. Increasing the amount of moisture is caused to suberication on the wooden materials [4].

The biological factors that cause deterioration of wood are bacteria, mushrooms, insects, marine creatures, birds and mammals. Besides, algae, moss and lichen are also harm [5]. The effects of the mushrooms and insects are the most observed biological effects. Bacteria and fungal effect causes discoloration and decay [4].

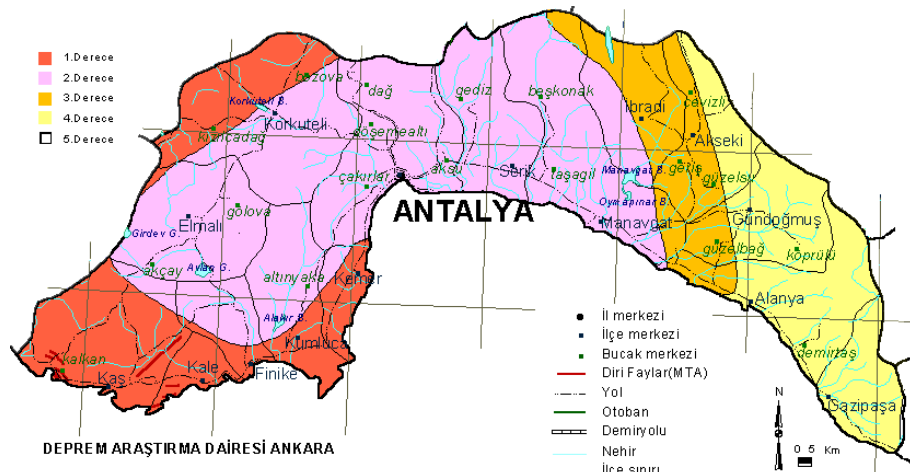


Figure 10. Earthquake map for Antalya.

As a result of investigations, the deterioration occurring in conventional housing was seen in the most abandoned sample. Because like the migration to the big cities or because the death of family elders, people leave their houses and so wooden elements of the house are exposed to atmospheric effects over time. If the wooden damaged by atmospheric conditions, it becomes open to the effects of the biological factor [4].

As shown at Figure 10, 46% of the surface area of the Antalya is located in the 1. and 2. Degree earthquake zone(11). Earthquakes have been recorded throughout history in Antalya and the oldest ones are B.C. 227, A.D. 68 and A.D.365 years [12]. The structures of wooden beams used to support masonry walls have an important effect [8]. In the light of the current scientific studies, examples of "Buttoned Houses" in Akseki-İbradı region are all earthquake resistant.

## 5. Suggestions

Around the houses of Anatolia have similar and different functions, decoration and construction elements. This similarities and differences can occur in the same region

because of their difference of the economy, culture, political and religious. Akseki houses are a living example that has survived from the history because it has an architecture showing compliance with environmental, and despite the limitations of natural resources, it covers many aspects of the local culture [2].

The historical Buttoned Houses should be maintained in the long term, and it needs to be evaluated and the degradation factors after transferring to the future as cultural heritage. Generally, abandoned and accelerated deterioration due to neglect and other factors are also taken into consideration degradation and it should be included in the permanent restoration program. Antalya's tourist attractions are a well known truth and the efforts in the conservation on cultural heritage will help to the economic development.

The residential area of Anatolia's historical, scientific, art, social and economic values should be investigated, protected, developed and transmitted to the future generations. Therefore, it should be given importance to our traditional houses. Nowadays, there are houses abandoned to its fate because of reasons such as migration, and these houses have an important part of our cultural memory. Therefore, they should be transferred to the new generation by maintaining the unique features. Because Hafez-e Sirazi said word for mankind "Human life is such a composition, if you played after him that people truly live". These words apply to the civilizations and works.

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