

# **Analysis of construction system and damage assessment of traditional Turkish house – Case study of timber framed Kula houses**

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**Abstract** It is said that traditional Turkish house, with its tiled roof, extended timber projections, all surmounting a heavy stone bearing wall base, has become an icon known worldwide. Most of these constructions are at risk of disappearing, as the evidences of their cultural significance representing their spatial organization, its period's art concept, traditional design and construction technology, emphasizing how important they are. In this context, this study aims to put forward the general construction typology and deterioration reasons of the timber framed Turkish Houses dating back to 18th-19th centuries located specially in Kula Settlement which are one of the parts of this important Cultural Heritage

**Keywords** timber structures, traditional Turkish houses

The Turkish House we know today has begun to be formed during the settlement of the nomadic Turks from the Middle East to Anatolia. This type of housing has spread through the Southern Anatolia to the Balkans forming a large area of social and cultural typology. The principles of construction for the houses mostly are the same but the cultural details completely vary. A ground floor closed to the street with a stone or adobe wall and a upper floor which sits on either load bearing stone walls or wooden studs characterizes the house type generally seen within the geographical boundaries where the Turkish house is to be found. The upper floors have a timber frame construction. The middle floor, if there is one, has a low ceiling and is either a mezzanine floor or a whole floor. The top floor has, through time, become ever livelier with several projections and with multitude of windows which are of a standard size. The standards size of the window creates a sense of unity with its recurrent rhythm, not only in each house but also throughout the town. The roof always slopes on all four sides. This is one of the main discriminating characteristics of the Traditional Turkish House. (Günay, 2007). The two striking aspects of the Ottoman House were the courtyard and the hayat-sofa (hall).

Kula is a traditional settlement, located in the middle of the Aegean Zone of Turkey, in Western Anatolia and has very important architectural heritage of timber structures dating to 200-300 hundreds of years. The construction system of Kula houses is a mixed type as common in other regions. First floors are built as masonry made of stone with mud mortar, which are supported by horizontal timbers embedded into wall. The upper floors are built most commonly by Hıms technique, but in some cases both Bagdadi and. Hıms techniques are used in the structure system of the upper floors. In this case Hıms is used in the body of the building while the eaves and the projections are built by Bagdadi. The

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type of wood used in the timber framework is yellow pine (the local flora of the region), kufeki stone (is the local stone type found in the region) is used as the infilling material of the walls (Tosun, 1969). When Kula is examined in deterioration reasons framework, the most important factor of the deterioration seen in this settlement is the abandonment. Abandonment can be accepted as the starting point of the other deterioration factors. The owners of these big timber structures moved to the new developing part of the town, to reinforced concrete multi-storey apartment buildings, rented their houses to people with lower-income, or left them to their elders whom cannot take care of the repair expenses of the buildings, or left them as they are. The new owners of the houses prefer to live in the courtyards of the buildings where they built new one storied concrete houses, or if they prefer to live in the old structures, they modify them with defective workmanship, incorrect attempts at restoration, incorrect methods of construction, changing the sizes of windows, closing the sofas with aluminum joinery. The emptied timber structures are exposed to long-term outer affects especially rain and wind, which causes fungi attacks, and insect invasion.

As stated in the declaration of “principles for the preservation of historic timber structures” by Icomos (Principles for the preservation of Historic Timber Structures, 1999), diversity of historic timber structures, the various species and qualities of wood used to built them, vulnerability of the structures to external effects (humidity, insect attacks, fire, etc.), the increasing scarcity due to its vulnerability, misuse, and the loss of skills and knowledge of traditional design and construction technology must be taken into account when dealing with a timber structure, and makes the structures, items that should be analyzed, and documented. By taking the “Icomos-1999” doctrine into account, this study analyzed the general construction typology of the timber houses dating back to 18th-19th centuries located specially in Kula Settlement, but this analysis can be evaluated as a pilot-sample work, and a typological study among the whole region due to the similarities of the constructions. Most of these constructions are at risk of disappearing because of lack of care and restoration, as the evidences of the timber structures and their cultural significance representing their spatial organization, its period’s art concept, traditional design and construction technology, emphasizing how important they are. When the damage assessments have been discussed and the reasons for their deterioration have been analyzed, it is seen that **Wood** being the basic construction material of this type of houses because of its vulnerability cannot be protected against exterior factors. Due to the rapid deterioration of this material, today one can encounter limited number of these constructions. This makes the case even more important status. When maintenance and repair of these constructions come into question, one should apply the principles of Venice Charter, the Burra Charter, and other related UNESCO and ICOMOS doctrines when protecting and preserving a historical timber structure. Decisions of repair and maintenance should be taken in accordance with each structure and the features of its structural details. In cases with no possibility of maintenance, details pertaining to the original structure should be kept as records in the structures. Making some strategic assessment on ancient timber structures one should take these into account and consideration: the historical value of the fabric, the overall condition of the structure and hence, the scale of repairs, the options for the future uses. As Tampone (Tampone & Messeri, 2006) declares; to obtain this aim, at least *four levels of interventions, hierarchically should be settled according to the building process that of members (ties, beams, struts), connections, structural units and structural system with supplementary elements*. The general aims of the principles of preservation of old structures are to conserve the **authenticity** of the structure and its **original function** in a condition of sufficient safety.

## REFERENCES

- Günay, R. (2007). Geleneksel ahşap yapılar sorunları ve çözüm yolları. İstanbul: Birsen Yayınevi.
- Tampone, G., & Messeri, B. (2006). Compliance of the practice of strengthening ancient timber structure in seismic areas with official documents on conservation. Proceedings of the 15th International Symposium of IWC-Why Save Historical Timber Structures. İstanbul.
- Tosun, Y. (1969). *Milli Mimarimizde Kula Evleri*. İzmir: Ege Üniversitesi