

## **THE WINDOWS OF HISTORICAL BUILDINGS IN KIRKLARELİ/TURKEY: CHARACTERISTICS AND PRESENT CONDITIONS**

İ. Yüksek<sup>a</sup>, N. Erdoğan<sup>b</sup>

<sup>a</sup>İzzet Yüksek, Trakya University, Faculty of Technical Education, P. Box 14 39100 Kırklareli, Turkey - izzetyukse@trakya.edu.tr

<sup>b</sup>Nevnihal Erdoğan (Prof.Dr.), Trakya University, Department of Architecture, 22030 Edirne, Turkey - nevtrakya@hotmail.com

**KEY WORDS: Windows, Traditional Houses, Degration**

### **ABSTRACT**

The windows of historical buildings in Kırklareli/Turkey exhibit architectural features that warrant special attention. They reflect the essential and characteristic elements of an architectural culture, which evaluates external space as a natural extension of internal features.

The window is a significant functional element of a Turkish house and room. Fixed glass windows located above the lower ones were the light sources; whereas, the lower windows protected by wooden shutters or bars were used for ventilation or scenery. A shelf, which extended along the four walls of the room used to be placed between the upper and lower windows. The height of this continuous shelf was low enough for use.

The traditional Turkish homes had partitioned glass windows rather than large one-piece types. Windows composed of small square glass partitions are the characteristic types of windows in traditional Turkish homes. This is a convenient architectural style both for privacy and external perspective. Based on the above-mentioned features, the windows of civilian architectural structures in Kırklareli are very similar to the windows in Traditional Turkish Homes.

The aim of this work is a formal analysis of the windows in these historical buildings from structural and functional aspects. The analysis is composed of the establishment and evaluation of architectural characteristics associated with existing elements of these structures.

The structural features are evaluated by comparing them to the architectural characteristics and materials used in different historical periods, as well as in relation to new techniques. Finally, particular attention is given to the state of degradation and damage observed and to the restoration of traditional characteristics.

### **1. INTRODUCTION**

The window is a significant functional element of a Turkish house and room. Fixed glass windows located above the lower ones were the light sources; whereas, the lower windows protected by wooden shutters or bars were used for ventilation or scenery. A shelf which extended along the four walls of the room used to be placed between the upper and lower windows. The height of this continuous shelf was low enough for use (Uluengin; 2000).

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The lower casement windows of the 17th century homes, which were protected by wooden shutters, had immovable glass partitions so it was necessary to have high upper windows for lighting. In Turkish homes, the finished floor according to which the window-heights were adjusted, was constructed to meet the functional requirements of the particular room. This is a mere consequence of the social structure, customs and usage.

There was no furniture in Turkish homes; meals were eaten sitting on the floor, either cross-legged or on knees, and people slept on floor-beds. A room served different functions depending upon the time of day. People would sit cross-legged on couches raised off the floor that were placed around the room in front of the windows. In the traditional Turkish home, the window parapet was kept low in relation to the couch.

The traditional Turkish homes were made of timber. Timber was favored for its particular characteristics and as a consequence of the Turkish philosophy. In Turkish architecture, due to the indispensability of timber frame construction, specific dimensions had to be used depending on the structure of the material utilized. The first floor had block stone walls and the floors above were of timber frame panel walls. The narrow,

vertical spaces between the posts and braces, which constitute the timber skeletal system, are covered with a filler. Thus, a modular plan of construction is established for window organization and for the overall façade of the structure. In the timber frame system of construction, posts with cross-sections of 15x15 and 12x12 cm are placed 120-150 cm apart and are supported by in-between posts. The skeletal frame mostly composed of three centerlines forms, the room with bay windows having a three-sided view. This healthy and practical type of construction was used in building Turkish homes for four hundred years in the Ottoman Empire.

Based on the above mentioned features, the windows of civilian architectural structures in Kırklareli are very similar to the windows in Traditional Turkish Homes.

### **2. MATERIALS AND METHODS**

The present work is part of the study carried out on windows of traditional homes in Kırklareli in 2004. A total of 103 homes of traditional style were found in the old districts of the city. Among these, 57 homes constitute the topic of this study. The windows in these buildings were studied in detail, were photographed and their plan, sectional elevations and views were obtained by scale drawings. The evaluations were based on these data obtained.

### **3. WINDOW CHARACTERISTICS**

The windows in single and two-storey houses are grouped in pairs. The window frame is mounted on the inner edge of the wall thickness. The window is either placed directly on timber structure or timber lining or on a jamb which is also used as the shutter frame.

The pivoting windows always have a double-casement. The

casements are either rabbeted<sup>1</sup> or grooved<sup>2</sup>. These direct the order in which they open. In the case of rabbeted casements, they open in sequence; whereas, if grooved, they may open and close simultaneously.

The connection of the window frame and the casements may be rabbeted or grooved. However, in the case of vertical sash window the frame-casement connection is flat (lath supported) and there is a dovetail<sup>3</sup> joint between the upper stationary casement and lower movable one.

The pivoting windows have vent sash above and below. Each casement is generally divided into two horizontal and three or four vertical sections.

The window dimensions are mostly in a 1:2 ratio, but 2:5 and 3:5 ratios are also found. Metal guard-rails slightly ornamented with motifs are present. The fact that the railing is used only on the first floor windows clearly indicates that they were put up for security purposes. In addition, wooden window shutters were also placed for further security and insulation. In some houses guard-rails were used in conjunction with shutters. The window casements were locked from inside with monkey bolts or espagnolettes. Grooved projections designed to channel rainwater away from a window were arranged on window casements or on window frames in many cases.

Wood frames were used in windows of timber frastructures; whereas, those of stone/brick block buildings were of stone molding. Some of the wooden frames have ornaments which are of no particular significance in terms of characterizing the era when they were built (Yüksek; 2004).

#### **4. DAMAGED WINDOWS: BUILDING PROBLEMS AND NATURAL CAUSES**

##### **4.1. Natural Causes**

- When timber is subjected to prolonged climatic conditions such as rain, snow, temperature changes, oxygen in air, direct or indirect ultraviolet radiation or winds, it undergoes cross-sectional shrinkage. As a result of this, the diameters of wooden pegs diminish threatening the stability of the joints. The looseness in joints is the cause of falling casements and window glasses (Figure 1).



Figure 1. Wear and tear on the window casements and jamb.

- Timber undergoing cross-sectional shrinkage loses its knots with time. As a result, the material is exposed to atmospheric conditions and, starting around the damaged part, decays much faster.
- The climatic conditions give rise to cracks on the timber surface which in time split. The rain water entering through the cracks and split parts dampens the timber. This enhances the development of fungi and termites. When the joints develop gaps upon shrinkage, particularly the window casements lose their stability (Figure 2).



Figure 2. Splitting along the connection points in the casements and surface cracking

The climatic conditions are more effective in timber decay during spring time; whereas, summer timber is sturdier and less prone to decay. The fibers near the surface become fluffy and rough, crack and fall off because of continual swelling and shrinkage. Timber affected this way exhibits damaged annual rings and exposed fibers. (Figure 3)



Figure 3. Insect damage to the window casements and textural damage

- Weather conditions and frequency of use produce more decay in some parts of the material. The looser areas on the surface are quickly corroded under the effects of winds, rain, snow, dust, etc. Since the accessories used in the windows of traditional houses are insufficient, various parts are more prone to decay.
- The woodwork in these houses is not thick enough and is subject to a lot of ultraviolet radiation. This fades the color of the material over a period of time. If no protective measures are taken the wood is bound to lose its natural color and becomes dark brown. (Figure 3)
- The wood-boring termites which live on the wood are the biological creatures that cause greatest damage. Most of these stay inside until they are fully grown. The tiny holes on the surface through which they fly, the inner tunnels, termite dusts and their remains are only detected by the void sound produced upon hitting the material with a hammer (Günay; 2002). As seen in Figure 3, part of the wood is about to be destroyed. Other dangerous living creatures are the fungi. They particularly originate on window sills where moisture is most dense and spread out from there. Fungi which settle in damp wood produce perpendicular cracks which enlarge and disintegrate the wood into small cubical pieces, eventually resulting in its complete decay (Figure 3).

#### 4.2. Structural Problems

- Damage for various reasons to load-bearing structure of the building affects the upper and lower rails upon which the window rests, as well as the side posts causing the window to lose its stability. Along with this, the material covering the façades of the building also begins to crumble and fall and the frames become exposed to external effects (Figure 4).



Figure 4. Decay in the timber frame structure

- Most of the structures studied in this work had been abandoned. As a consequence, they had not been attended to and more important than that they had been intentionally abused by people. All this is due to significant socioeconomical insufficiency. None of the families that presently live in these buildings are the original owners. It seems that some of them have left the country under the exchange plans. Others have moved to different cities or to newly developing quarters in the city. The present owners are unable to preserve or restore their homes to their original conditions. The woodwork in deserted-houses is taken and burned as fuel by families of low socio-economical status. Besides all of these, some buildings are intentionally destroyed or set on fire by their owners so that multi-storey structures can be built in their place.

#### 5. RESULTS AND DISCUSSION

It has been observed that some of the windows in 57 houses out of 109 which were analyzed have lost their original character. So, it is essential that projects be developed to prevent the complete banishment of these historical structures.

As to measures to be taken against natural damage, it does not seem feasible to restore merely the windows of a structure that has lost all of its other elements. Therefore, these structures should be restored as a whole.

Particularly, wooden pegs with longer diameter could be used for better stability, in place of the smaller ones utilized to join the elements of window casements. If necessary, the joints could further be reinforced by a transparent glue.

The hollow spaces formed by falling knots could be filled with a filling paste obtained by mixing wood shavings from sturdy trees with varnish. Here it is important that the kind of tree from which the shavings are obtained be compatible with the type of woodwork of the structure.

Termites and fungi could be eliminated by vacuum spraying with chemicals and injection of a pesticide through the termite holes. The revival of parts that can be saved should also be possible by cellulose absorption. The areas that have decayed completely could be removed and be replaced by kiln-dried and pesticide-treated pieces of wood obtained from a compatible tree.

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