GAZI PRIMARY SCHOOL; STATUS AFTER FIRE, AN INVESTIGATION ON PERFORMED RESTORATION AND RECONSTRUCTION WORKS

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Abstract- Only the outer walls of the historical building used as Zafer Primary School which is located in Karaağaç Neighborhood, map section 25.30.D.C and block 655 parcel 5 in Uşak city center were able to surviveafter the fire. The necessary permissions and approvals were taken from the Directorate of Regional Directorate of Conservation of Cultural Assets of Kütahya and it was decided for the restoration of the surviving outer walls and reconstruction of the inner parts.According to the signed protocol between the contractor and the Provincial Directorate of National Education, it was decided the rough construction and inner walls to be fulfilled by the Provincial Directorate of National Education and the next stage, trim works to be financed and fulfilled by the constructor (benefactor).
Post-fire surveying, restoration and static projects and after restoration pictures and information about the building are included in this study. The connection details between the outer shell and the inner structure have been examined.

Index Terms- Historical buildings, reconstruction, restoration, survey

I. INTRODUCTION

Reconstruction practices which are performed when historical buildings, called as cultural assets, lose their authenticity and are destroyed completely due to wars, natural disasters, user-originated factors, etc. in time are considered as an important step in bringing the buildings back to the historical cultural heritage of the city [1].Historical structures, defined as cultural assets, lose their state or they disappear completely due to over time as a result of war, natural disasters etc. As a result of this situation, the reconstruction practices are considered as an important step in bringing the buildings back to the historical cultural heritage of the city. In the Second World War, 460,000 buildings were demolished in France. In Warsaw, 75 % of the city was destroyed, and in 1953, most of it was reconstructed and rebuilt [2].
Even if historical buildings reach today with serious damage, investigating and presenting the causes of damage can contribute as a separate field of study.When we examine the historical buildings in general, we see that many factors are important in calculations such as strength of building materials, time-dependent deformations, earthquake effects, ground effects, stress conditions, designing features. The information obtained through these researches is very important in the protection, restoration and safe transfer of the buildings to the future[3].
Historical buildings are the living spaces that bridge the past and the future. More important event is able to provide continuity rather than to protect these buildings.Researching and evaluating the historical environments and therefore the importance of historical buildings and providing social awareness in this topic is the primary issue to handle in order to provide that continuity[4].
Cultural assets have disappeared along with disasters such as fires, earthquakes, wars, as well as legal, administrative, cultural, economic and social reasons.In terms of conservation, reconstruction is the last desired method to choose, but a partially or totally destroyed building is reconstructed with its own material or new material that is preserved or liberated by leaningon documentation[5].In this study, similarly, the interior volumes were madewith entirely new generation materials by being loyal to the original.
Cracks on buildings which occurred during the research works, shifting movements on the building, decays and deterioration of the materials are the necessary inventory for reinforcement, restoration and reconstruction works to be performed[6]. A building to be restored should be organized as a restoration project by selecting reinforcement techniques that would not damage the building and also by preparing static projects besides surveying and restoration projects[7].

II. CONSTRUCTION TECHNIQUE AND MATERIAL USE

A. Exterior Façade

The windows are rectangular on all floors on the exterior façade. Door and window frames are made simple and rectangular. Balcony emphasizes the entrance by being located at the entrance door.The decorations on the exteriorfaçadeare located on the floorand roof connection points. The overall external appearance is dominated by symmetry.

Depending on the climatic and regional characteristics, different materials are used in each region. On the exterior façades yellow colored stones; sandstone and conglomerate, other colored stones; volcanic andesite stones and also in some places terracotta bricks were used. (Fig. 1)Inside and outside of the building was plastered with lime-based plaster.However, exterior elements such as cornices, frames, floor beads were made of andesite; the elements such as doors and ceilings were made of timber.



Figure 1. View of exterior of the building after fire

B. Survey Works After Fire

The survey drawings of the building after the fire have been given in figure 2, 3, 4and 5.

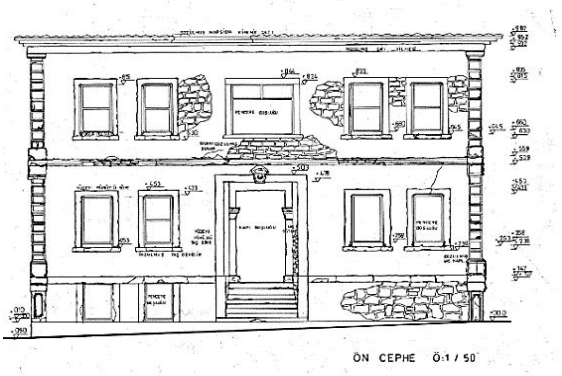


Figure 2. Survey drawings of front exterior façade

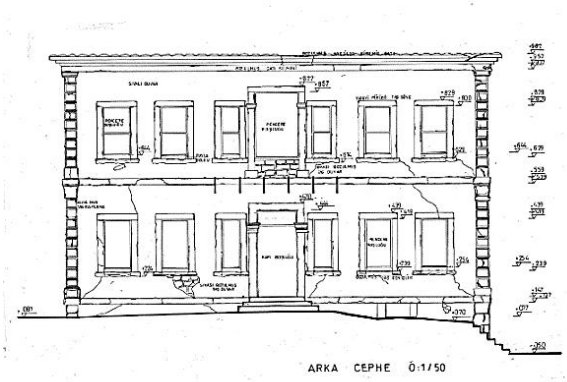


Figure 3. Survey drawings of rear front exterior façade

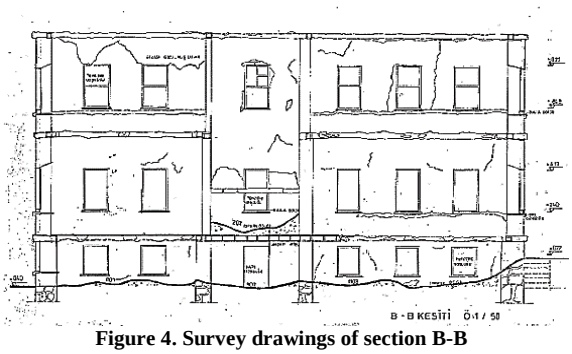


Figure 4. Survey drawings of section B-B

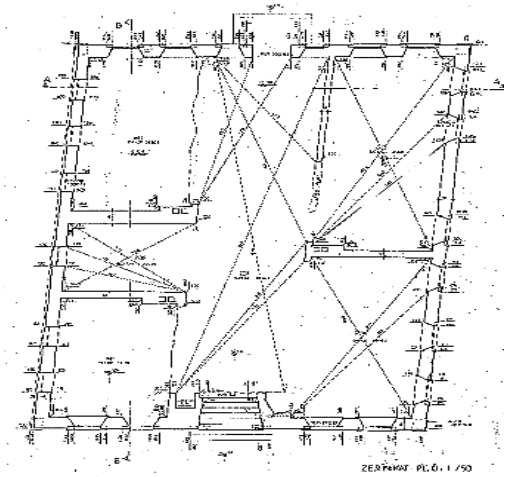


Figure 5. Survey drawing of the ground floor plans

C. Structural Problems



Figure 6. Partly spalling plasters on interior and exterior façades of the wall

The spalling of many coating elements in the building for various reasons (fire, earthquake etc.) and the plaster losses on the exterior façadeenabled the opportunity to examine the structure of the building and identify the material deteriorations visually. When the status of materials forming the building is appreciated, post-fire deflections, decays, cracks and surface impurity are observed after fire. Problems such as joint discharge, piece deformation, surface erosion and impurityin masonry parts and partly deteriorationsin wooden frames and bonds are observed.(Fig. 6)

III. RESTORATION INTERVENTION DECISIONS

The restoration period started with the protocol signed between the contractor and the administration.

A. Application Period

Zafer Primary School; with the decision of the Board of Protection of Cultural and Natural Assets No. II, dated 05.04.2007 and numbered 2902 was determined as the second group structures of the conservation groups. The buildings that make up the urban environment, the locality character and built with the traditional construction technique, are in the second group [8].

The material to be used in the visible areas should be the same in size, texture and color [9].

The bearing walls form the exterior and interior of the building. It's the only thing that transfers the burden to the ground [10].

As a requirement of the contract signed between Provincial Directorate of National Education and benefactor BekirGüneşhan (contractor), according to the architectural project approved by Ministry of Culture and Tourism, Regional Directorate of Board of Protection of Cultural and Natural Assets of Kütahya, rough construction works were fulfilled by Provincial Directorate of National Education and trim works were fulfilled by the benefactor.

In 1994, it had a fire. It protectedthe interior layout and survived until that year. After the fire, only the outer wall of the body wall could survive.In this sense, the reconstruction method has been adopted as the main intervention decision. Static projects produced by the firm "Evrenkent Engineering" played an active role and bearing system components were produced in accordance with this project.

B. Restoration Projects

The restoration projects of the building are given in figure 7, 8, 9 and 10.



Figure 7. Back façade restoration project

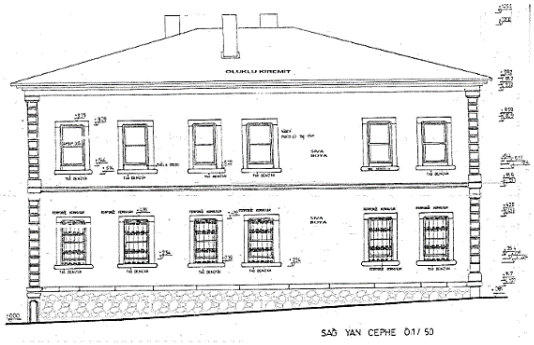


Figure 8. Right façaderestoration project

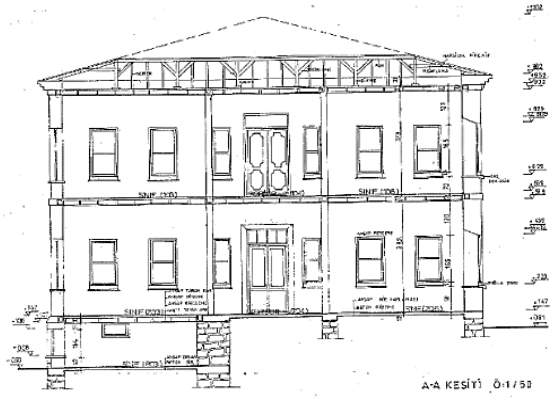


Figure 9. A-A Sectional restoration project

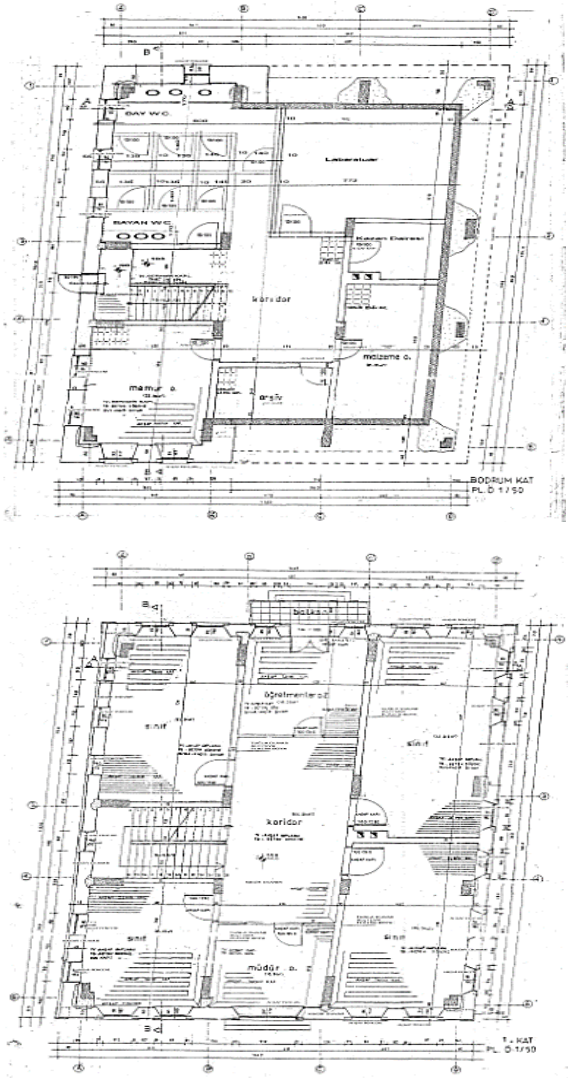


Figure 10. Restoration project of basement (a) and ground floor (b) and 1st floor (c) plan

C. Bearıng System

In the renovation work, it is not possible to apply the wooden system before the fire. (This is because only the outer walls survived after the fire. In this case, the constructed bearing system have been fixed with fasteners permanently so as to carry the outer walls).The new bearing system was built as reinforced concrete.

1. For the new basement to be built in a non-basement part, a basement was built at least 100 cm. away from the existing stone wall foundation. Thus, the foundation of the stone wall should be prevented from being damaged. (Figure 11)
2. Unimportant foundation settlement that do not affect reinforced concrete structures can create significant cracks in the masonry [11]. The survived outer body of the walls were suspended supporting by steel systems to prevent the collapse of them during construction. (Figure 12)
3. At the floor level of the existing wall, it was anchored with the steel elements to the new reinforced concrete system inside.(Figure 13a)
4. The decayed wooden elements on the existing wall wasremoved from their places and they were poured into concrete filling to provide adaptation between the newly constructed reinforced concrete system and existing walls while pouring the reinforced concrete. (Figure 13b)
5. The spalling plaster on the outer and inner side of the structure was cleaned by rasping.
6. The building was covered with the wooden construction roof as the original.
7. The existing window and door frames were cleaned and protected.

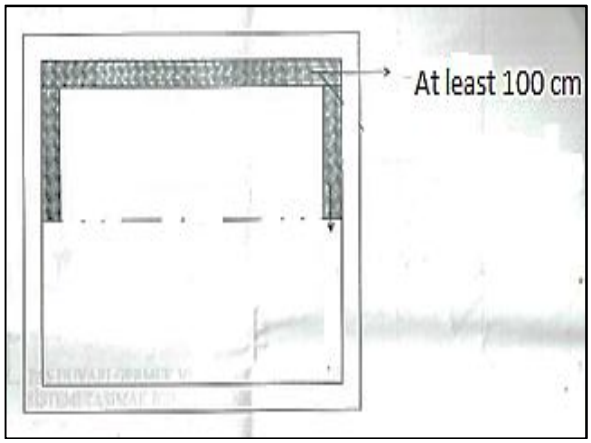


Figure 11. Supporting the basement floor

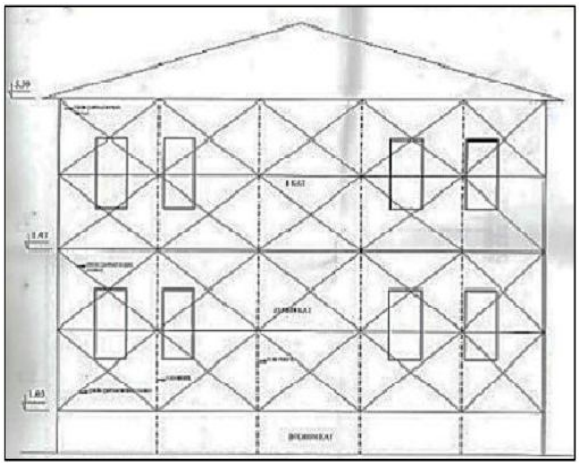


Figure 12. Exterior walls with steel systems during restoration

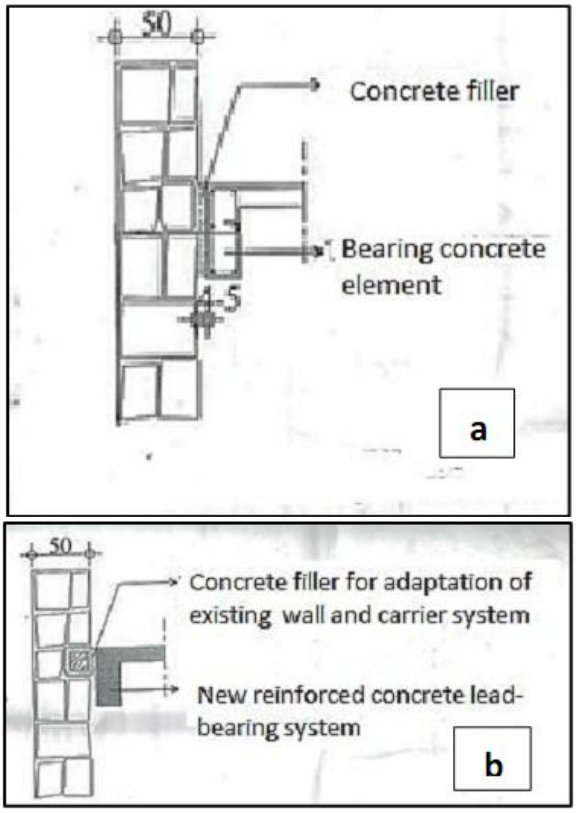


Figure 13. Connection detail between the new flooring and the existing exterior wall

The images of reconstruction works are shown in figures 14 and 15.



Figure 14. Restoration works

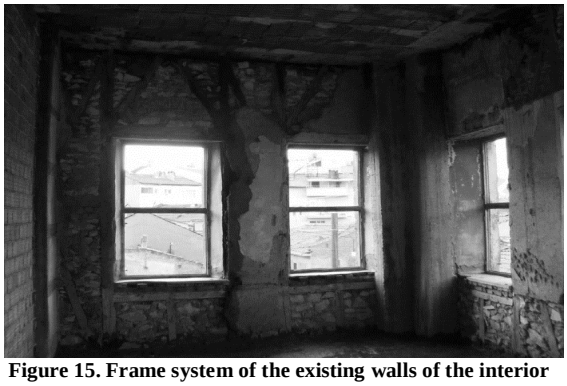


Figure 15. Frame system of the existing walls of the interior

D. Static Projects

Static projects, including the work of the reconstruction of the building is given in figure 16 and 17.

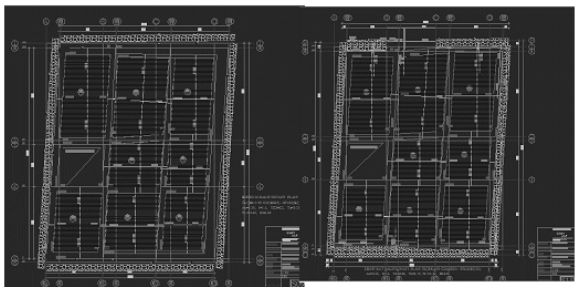


Figure 16. Application of the basement foundation and ground-floor floor mold-reinforcement plan

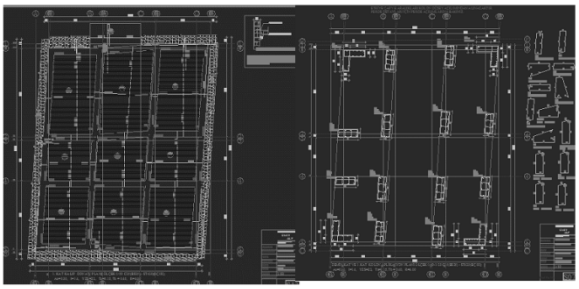


Figure 17. Ground floor column application plan 1st floor mold-reinforcement plan

E. After Restoratıon

Interior Setup;It was built as predicted in the restoration project. Ceilings, floors and doors were made of wood by being loyal to the original. (Fig. 18, 19 and 20)



Figure 18. Corridors after restoration



Figure 19. Classes after restoration





Figure 20. Stair (a) and door (b) detail after restoration

The general appearance of the outer façade after restoration is given in figure 21.

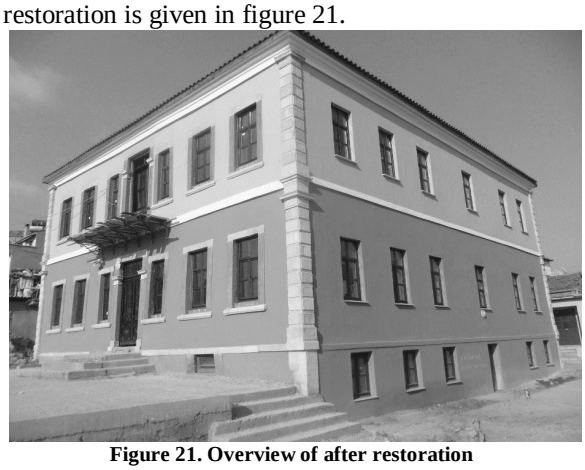


Figure 21. Overview of after restoration

CONCLUSION

Gradually increasing complex and irregular housing today along with the rapid urbanization affects the physical environment and therefore the historical environment negatively.It is also seen that these environments whose most of parts are destroyed, depleted or even left to be destroyed completely are taken a backseat with both the new constructions built around them or within the body of the historical buildings.

It is seen that even a building which experienced a fire and lost its functions completely may gain its functions again and it may be carried into the present and future. This study has been a sample work for the next generations.

Thanks to architect NurayYılmaz who drawn survey and restoration projects.

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