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Stone material problems in Mardin historical İzzetpaşa Old Prison

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Keywords

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Abstract

Types of deterioration in stone structures have different effects when they occur on different elements of the building. Therefore, the identification of material deterioration along with the classification of structural elements is important for accurate damage classification. The aim of the study is to reveal the material problems of the historical Mardin İzzetpaşa Old Prison. In this context, the deteriorations occurring in the structure were classified and exemplified with visuals. ICOMOS (illustrated Glossary) stone deterioration classification was used to define the deterioration types in the structure. When the structure was examined, it was observed that deterioration caused by physical, chemical and human effects was common. Physical deterioration in the structure, loss of surface, wear and joint discharge; chemical degradation, surface pollution, color change examples are seen. There are also deteriorations caused by human effects such as faulty repair and lack of maintenance.

Introduction

Conservation of stone cultural heritage is a primary concern in all countries. In this context, it is crucial to develop effective and integrated methodologies aimed at diagnosing material problems of a structure [1-4]. If the necessary investigations and precautions are not taken on the cultural heritage structures that have suffered material deterioration, small-scale deterioration types can turn into a larger-scale anomaly. This causes loss of historical trace over time. Therefore, the detection of deterioration, which is the most important step in preserving the traces of cultural heritage in historical areas, constitutes one of the most important stages of restoration work [5-16]. Types of deterioration in stone structures have different effects, especially when they affect structural (roof, facade, etc.) and non-structural elements (windows, doors, etc.). Therefore, the classification of structural elements and the identification of material deterioration is important for a systematic damage diagnosis [17]. In this context, the aim of the study is to make a detailed damage classification of the structure by revealing the types of deterioration on the different elements of the building.

Study area

İzzet Paşa Police Station Building is located in Mardin Province, Artuklu District, Nur Neighborhood. It is referred to as the Gendarmerie Station Building in 1400 block 4 parcel with an area of 18,612,42 square meters. The Police Station Building, Çelbira 1st Degree Archaeological Site, remains in the interaction area and was registered and protected as a Class I Cultural Heritage with the decision of Diyarbakır Cultural and Natural Heritage Conservation Regional Board dated 11.07.2008 and numbered 1690. The area where the building is located is located in a location where concentration is foreseen in terms of urban planning and where the establishment of important living spaces is planned. In addition, it is an important advantage that it is located in the Çelbira 1st Degree Archaeological Site interaction area (Figure 1).



Figure 1. A view from the Celbira Workshop Area, 1st Degree Archaeological Site

Material and Method

In the first stage, the general features of the architecture of the historical structure of Mardin İzzetpaşa Old Prison were examined. Secondly, the information and documents obtained from the building were examined, and its current situation was documented with photographs and drawings. As a result of the documentation and field work, the deterioration of the structure and the factors causing the deterioration were determined. In the study, observations were made about the stone deterioration that occurred in the Mardin İzzetpaşa Old Prison building within the borders of Mardin province. The different types of degradation detected were identified and photographed and documented. ICOMOS illustrated Glossary stone deterioration classification was used to define the deterioration types in the structure. Finally, the documentation and research on the building are summarized in the conclusion, together with the suggestions.

Results

Joint loosening, use of cement, color change, loss of surface, loss of parts, incorrect paint application, stone material problems were encountered in the building (Figure 2-5).



Joint discharge (a), Cement use (b, c), Surface loss (d), Color change (e)

Figure 2. Stone deterioration on the south façade of the building



Joint discharge (a), Cement use (b, c), Surface loss (d)

Figure 3. Stone deterioration on the east façade of the building



Cement Usage(a,c,d), Surface Loss(b), Surface Loss(c), Joint Discharge(e)

Figure 4. Stone deterioration on the northern façade of the building



Joint discharge (a), Surface loss (b), Incorrect paint application (c)

Figure 5. Stone deterioration in the interior of the building



Joint discharge(a), Color Change(b), Piece Loss(c)

Conclusion

In this study, the deteriorations in the historical structure of Izzetpasa Old Prison in the central district of Mardin province were examined. When the structure was examined, it was observed that deterioration caused by

physical, chemical and human effects was common. As physical deterioration in the structure: loss of surface, wear and joint discharge; As chemical degradation: surface pollution, color change examples are seen. In addition, there are deteriorations caused by human effects such as faulty repair and lack of maintenance. Combining the above-mentioned data with a GIS system in future studies will help to monitor the life cycle of the structure under consideration in terms of sustainability. Various repairs on the building, using insufficient materials in the last centuries, have increased the damage and created critical stability problems, especially on the south wall. Within the scope of the study, the forms of decomposition were mapped in detail. In situ analyzes (micro-piercing resistance, Schmidt hammer rebound test, capillary water absorption) provided data on the degradation state of the major lithologies. Petrophysical data show that stratigraphically comparable building blocks exhibit different technical properties and weathering behavior. All data serve to characterize the weathering state and provide dataset for planning future restoration work.

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