Analysis of Rock deterioration in Naqsh-e Rustam relief by Geospatial Technology

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Introduction

Naqsh-e Rustam is known as an ancient periphery which is located in northwest of Perspolice in Fars Province, Iran. (Fig. 1). The oldest relief at “Naqsh-e Rustam” is severely damaged and dates to 1200 BC. There is a Rock relief thought to be Elamite, originally. Four tombs (Fig. 2) belonging to Achaemenid kings are carved out of the rock face and seven oversized rock reliefs at Naqsh-e Rustam depict the monarchs of the Sassanid period. (Fig. 3)

In Sasanian epoch, Naqsh-e Rustam site was very important because of its religious and national role. This historical site which is one of the most unique evidences in Iran, is suffering from some problems like erosion and deep cracks. These works are located in orographic mountains which expose overall to interaction with their surrounding environment. Therefore existing deterioration as well as erosion process is mainly observed due to climatically conditions and geo-environmental factors that have influence of causes such challenges.

Methodology

Overlaying and combining information in Geographic Information Systems (GIS) with considerable analysis and visualization methods can provide an important contribution for the sustainable development of the historic areas. Thereby the survey and analysis of cultural data are playing a special role in the management of Naqsh-e Rustam site. (Fig. 4)

As a result of the combination of Remote Sensing data (Aerial photos & Satellite Images) valuable hints arise from the procedures in site and can be used for future planning.

Result

Transverse Cracks and micro cracking are most kinds of damages that will result erosion in whole of these works. The focal pressure sources, which cause cracks in rock surfaces, has been studied with Aerial Photography and Satellite Imagery and analyzed with respect to GIS system. (Fig. 7)

According to observations and results, the gullies effect has been identified in the back of the rocks. (Fig. 8)

Conclusion

In the recent years, the usage of Geographic Information Systems has been rapidly increasing and it became the main tool for analyzing spatial data in unprecedented number of fields of activities. The integration of GIS, Remote Sensing and modeling technologies applied to the field of Cultural Heritage Conservation can be an important tool for management and decision making. This article will present a study regarding the applicability of GIS in cultural heritage conservation, documentation and promotion in Naqsh-e Rustam site.

Existing natural factors like fault and earthquake in this area or any other faulted or seismic areas, also human factors and vibration resulted in intensive quakes, are not necessarily creation factors of cracks and just gullies is the main factor for creation of main cracks in Naqsh-e Rustam site. The effects of gullies are serious and this site is endangers of more deterioration.

References