



Slope Stability Problems in North – East Part of Tehran, Iran

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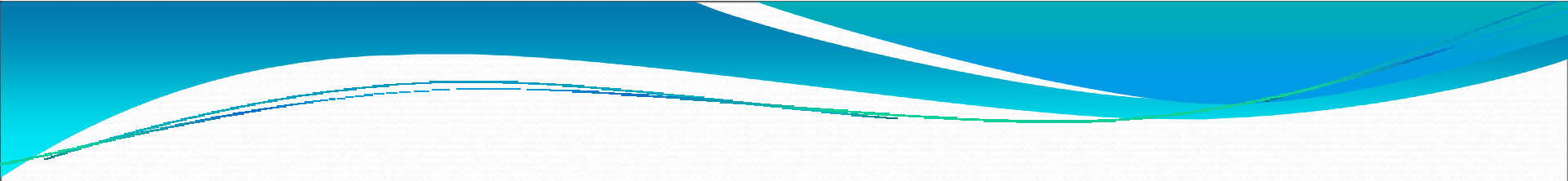


INTRODUCTION

Instability of soil and rock slopes in North East part of Tehran is one of the most important problems that every year causes enormous damages to the surrounding building, Villas and the main access road in this region. The study area is located in North East part of Tehran along the Zardband - Fasham road.



Figure 1 – Location of the study area

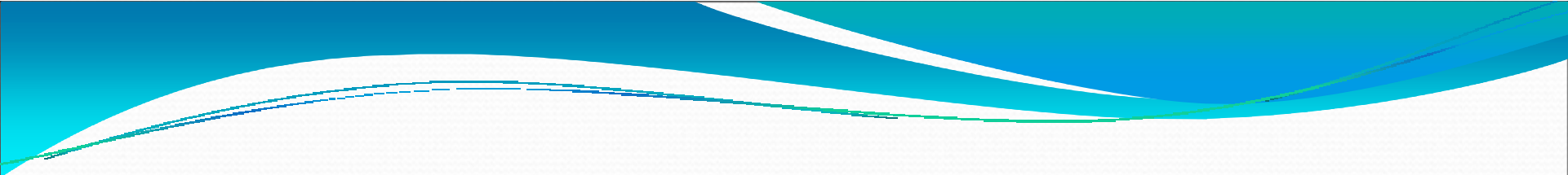


Different parameters such as lithology, climate, human activities, topography and geomorphology are affected on the instability of slopes in this region. The most important types of instability are debris slide, rock fall, toppling and rock slides. Among these types, debris slides and rock slides are the most common in frequent.



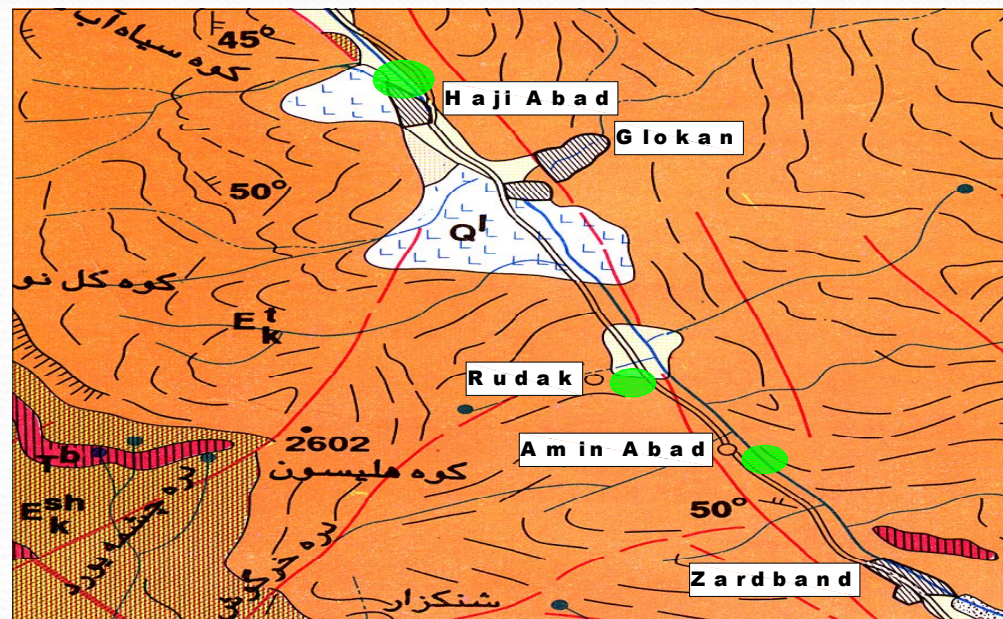
Geomorphology and geological setting of the study area

Shemiran city is located in North East of Tehran. It has two parts: First part is in East and second is Roudbar-Ghasran in West part of Shemiranat. Roudbar-Ghasran is located in central part of Alborz Mountains which is limited to the Mazandaran Province from the North and limited to Shemiranat from the South.


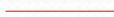




The highest point of the Roudbar-Ghasran (Kolonbastak Mountains) is 4000m above the sea level. Study area is a part of 1/100000 geological map which is prepared by Geological Society of Iran and contains Tehran and Fasham regions Geological units. Location of the study area is shown in Figure 1. The study area is located in Middel Tuff (Etk) unit. With Green Tuff (Karaj Tuffs), Tuffy shale, a little bit Lava and Braccia.

Geological Map and Site area

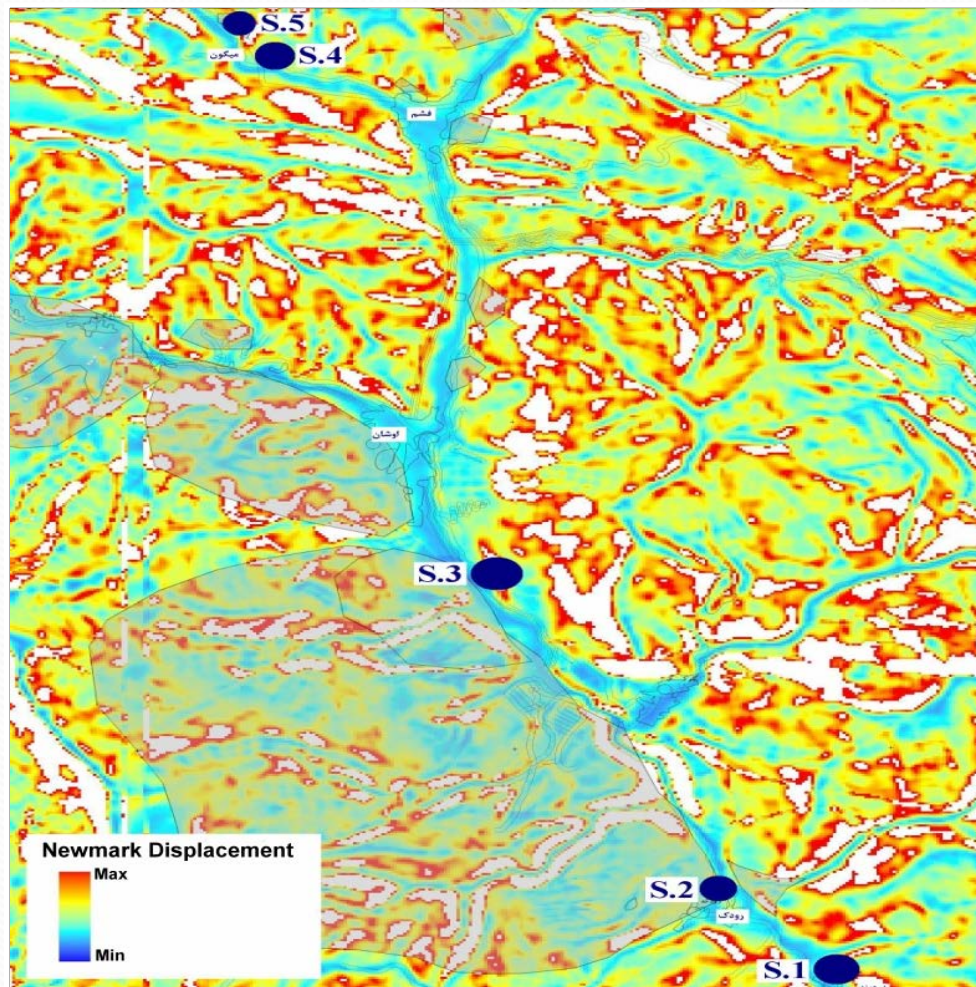


LEGEND

- | | | | |
|------------|--|---|--------------|
| E_k^t | Green thick-bedded tuff, tuffaceous shale, minor lava, pyroclastics and tuff-breccia |  | Debris slide |
| E_k^{sh} | Calcareous and siliceous dark colored shale, tuffite and pyroclastics |  | Faults |
| T^b | Igneous rocks |  | River |
| Ql | Landslide, rock fall and rock stream |  | Main road |
| | Buildings | | |

Geological map of the study area. Geological Society of Iran (1997).

Based on the studies carried out by Nasiri (2004) in the this area, Zardband – Maygon road is recognized as a region with high and very high risky landslides. According to studies, most of the risky areas are located in residential zones, linear constructions or agricultural plains. Next figure shows the position of the highly risk stations which are studied in this research. It should be noted that the first station is located near Amin-Abad village.



Location of S_1 - S_5 stations in the study area.
Nasiri & Rezai (2004).



A general view of first station.

The second station is located near the Varjin village. General slope in this area is 35° and it has a potential of debris slide.

The third station is located near the Haji-Abad village where large scale landslide occurred in March 2004. General slope in this station is 30° and the slide was a debris one.



A general view of second station (Varjin)



A general view of third station (Haji Abad)

The fourth station is located near the Maygon village. Due to the special topographical conditions and presence of very sharp slopes and bedding planes which are parallel to the slope faces, the potential of sliding in this station is very high. The presence of shaley layers between the shale and limestone are another factors affecting to the instability of slopes in this area.



A general view of station 4 (Maygon area).

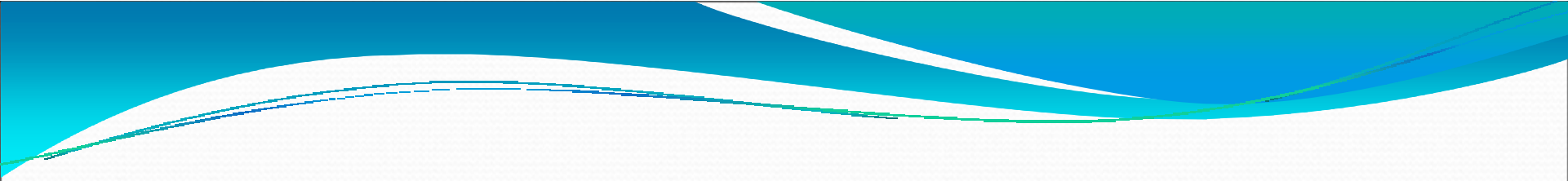
The fifth station is located in 1.5 Km from North East of Maygon village. Lithology of the is containing of shale and sandstone belong to Zagon formation (Lower Cambrian). This area has been selected for construction of a living building that after removing of the toe, a local sliding occurred. It means that there is a potential of sliding in this station.



A general view of fifth station (North- East of Magion)

CONCLUSIONS

- **The main aim of engineering geological investigations in this research was, recognition of relationships between the parameters affecting to instability of slopes. Both field investigations and a comprehensive laboratory tests have been carried out in order to asses the potential of instability of s_1 - s_5 stations in the study area.**
- **According to the results, geotechnical properties, climate conditions, topography, lithology, hydrology and hydrogeology are the most important factors affecting to the instability of slopes in the study area.**



➤ It should be noted that, other parameters such as rock cutting and trenching, excavation and removing of the toe of the slopes, lack of the vegetation and plants, and variations in natural drainages are additional factors affecting to the instability of slopes in this region.

Thanks for your attention

