1. INTRODUCTION

Road cuts created next to highways pose a problem for human life. Disturbances on road cuts such as changing the geometry, weathering the apertures of discontinuities with excavation and stress relief eventually increase the weathering on the slope face and can affect the stability. The change in stability combining with a wrong design on a cut slope can come up with a critical incident. The purpose of this study is assessing statistics of different kind of road cuts by using SSPC system.

2. SLOPE STABILITY PROBABILITY CLASSIFICATION (SSPC)

SSPC introduces a very easy data collection. Therefore all the data were gathered according to this system in the field. Parameters needed for the Exposure Rock Mass (ERM) which are UCS, Excavation type, Weathering degree, Slope height and orientation, and stability condition are given in Table 1 and Discontinuity properties in Table 2. Data collection, reference rock mass (RRM) and slope rock mass (SRM) properties, and table probabilities against discontinuity dependency/independency are given in Table 3 as a sample for Step 8.

3. DISCUSSIONS & CONCLUSIONS

Discussions

Both weathered and relatively fresh samples were gathered from the field as it can be seen from Table 1. Fresh column that is indicated in the table is related to relatively fresh samples compared to the samples taken from different rock - material weathered zones (Lindsay et al., 2001) and focusing on discontinuity parameters (Canal & Alk, 2016).

According to limit equilibrium analyses overall stability of the slopes are determined above the level (Table 1), which means Fc(Fs) > 1 for Fc(Fs) > 1 for dynamic conditions.

SSPC system is capable of collecting samples and obtaining data from the surface of the slopes, which is weathered and located in the study area. From the data relatively fresh rock properties can be evaluated. It is fortunate that the depth of weathered/disturbed zone was determined in the field which gave better idea about the results of SSPC system. Supposing, according to field observation, it is known that surficial degradation takes place at the study area. Considering this, the results of original rock mass are shown in Figure 1. This shows that SSPC works with a success rate of 85% (corresponding to field observations on surficial degradation). Considering the above mentioned relatively fresh rock and strength application on SSPC without any weathering effect’ success rate decreases to 85%, which is also coherent. The meaning of 85% success rate is that the SSPC system can evaluate the weathering effect on-strength really well.

CONCLUSIONS

SSPC Stability Probability Classification (SSPC) system was used to determine stable probabilities in this study. SSPC revealed reliable data for the surface condition via weathered/disturbed zones of the slopes. According to these analyses, SSPC showed 85% success for the surficial failures using original method. SSPC method can be applicable for this surface of the road cut however more further investigations and analyses used to be done for relatively fresh/disturbed zones of the cut slopes.

REFERENCES


SSPC System

SSPC is a probabilistic classification system considering weathering degree and excavation type, and having Exposure Rock Mass (ERM) Number 2 (Figure 1), Reference Rock Mass (RRM) (Figure 1) and Slope Rock Mass (SRM) Number 3 (Figure 1).

STUDY AREA

The study area is located at North West Black Sea region in Turkey (Figure 1), 29 road cuts (Figure 2) which are located in North West Black Sea region of Turkey were evaluated by six different rock types - medium-grained sandstone, granite, granitoid and schist - are encountered in this study. The North Anatolian Fault Zone (NAFZ) is located southern part of the study area (Figures 2). The road cuts from 1 to 9 and 10 to 20 are located in the 1st and 2nd degree earthquake zones, respectively (GDBA, 1996).

Throughout the study area, road cuts are mostly simply jointed on the slope facets. Considering these preliminary information, these road cuts are group to fit with different mechanisms.

DETERMINISTIC vs. PROBABILISTIC

- Limit Equilibrium Method (LEM)
- Finite Element Method (FEM)
- Strength Reduction Method (SRM) etc.
- Regression analysis
- Variance propagation
- Monte Carlo sampling etc.