



Instability of rock cut in Nymphopetra - Redina part of Egnatia highway (ch.25+215,89 - ch.25+373,95), to the East of Thessaloniki

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The slope in study is placed along the Egnatia road in Nymphopetra - Redina part, between ch.25+215,89 and ch.25+393,95. Nymphopetra - Redina area is located in Northern Greece, 80km to the east of Thessaloniki. The landslide was activated by the excavation of the slope, performed for the construction of an embankment (Fig.1). The rock mass consists of poor quality weathered gneiss with pegmatitic intercalations. Four discontinuity sets were determined: a) Smooth planar joints, parallel to a fault with direction of 195/60, with spacing of 10-50cm, b) gneiss schistosity, with direction of 221/36, consisting of slightly rough surfaces with spacing of 3-15cm, c) joints, with direction of 134/66, with slightly rough surfaces and pegmatitic intercalations 5cm thick, d) joints, with direction of 357/52, with spacing of 3-50cm that they have slightly rough surfaces and pegmatitic intercalations 30cm thick. The unfavorable orientation of schistosity affects the slope stability causing important sliding. For this purpose, the most suitable protection measures are examined for the stability of the slope, taking into account that it is necessary the slope to be designed with benches in order to not change the relief of the area significantly ensuring the safety of the highway. So, the geological formation is decided to be cut to an average inclination of 34° (2:3). The slope is proposed to be designed with two benches 10m high each, dipping to 34°. Low vertical benches, having width equal to 10m and height 2,5m - 3,25m, are designed to be created at the site of the embankment, so as the friction between the embankment and the slope to be increased. The safety factor, of the proposed geometry, is estimated 2, in unsaturated conditions decreasing to 1 in saturated conditions. Taking into account that the base of critical slip cycle is far from

the highway, inside the slope, the highway is safe using the above geometry. A wire mess system is proposed to protect the totally weathered rock in order to constrain undesirable rock falls.