

Application of Complex Reinforced Structure near Fault Zone

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1. Introduction

This roadway repair project is on the slope near fault zone and is located inside the water supply reserve of Reservoir Ming-Tan, its fragile geology with poor drainage and influence of storms were causing massive landslide. Before the damage, only the soil anchor method was adopted to repair the structure; however, the soil anchor durability not only depends on soil anchor module control but also superior grouting quality, and the grouting requires precise judgement from experienced engineers.

Therefore the installation complication, labor cost and grouting material cost are making it far more difficult and inconvenient than flexible structure-reinforced soil retaining wall. The wrap-around reinforcement method is adopted by the design company taking advantages of its basic required installation equipment, easy installation without topographic constraint and low labor cost. With the help of dredged gravel backfill combining with complete drainage system, piles and soil anchors were installed to stabilize the toe of the slope, landslide issuccessfully controlled based on the inclinometer and water level indicator surveillance.



2. Problem

Located on County Route No. 131 in Taiwan, the regional geologic map shows that the several fault zones cuts through the job site area, rock mass is fragile and weak. A great landslide up to 80m wide and 30m high was caused by a torrential rainstorm in 2007. The existing anchored slope was severely damaged with main structure being pulled out and exposed after the landslide, forming a huge heave on the toe of the slope.



3. Solution

A design was adopted to drilling concrete piles of 1.5m diameter, 20m and 30m long installed every 2.5m beneath the 8.5m high of RC retaining wall. Three stages of soil anchors, bond length 10m, free length 30m, anchorage load 60t, were also installed from the wall surface every 2m both horizontally and vertically.

Above the RC retaining wall, wrap-around reinforced structure was constructed: 10m and 8m long of ACEGrid® installed within the structure, slope inclination 1V:0.3H, wall height 17m dividing into 4 stairs. A full interior and exterior drainage system was installed in the reinforced structure to effectively resolve the poor drainage problem.