

Stability Analysis for the Bedding Plane Fault Existing in the Slope of A-Dam Reservoir

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On B-slope within the reservoir of A-Dam under construction, authors made detailed investigation for a bedding plane fault and evaluated slope stability for B-slope affected by the impounding.

A-Dam is located at the mountainous district in southwest Japan. The river in the vicinity of the dam site flows to cross obliquely the regional geological structure. The right bank is opposite to dip slope, the left bank makes dip slope structure. The largest tributary of all branch rivers joining A-river exists in 700m up the dam site. B-slope corresponds to the left bank of the valley where this tributary flows.

The basement rocks on this area consists of an alternation of slate, sandstone, green rock, and chert belonging to Mesozoic sedimentary rocks. Slate indicates intense anisotropy along schistose planes and bedding planes, while the others are massive. The weak layer composed of clayey materials, existed in B-slope. On the primary stage, the weak layer was regarded as a rock sliding plane, and B-slope was considered to be the secondary deposits. As the condition of drilling cores were generally bad, and quantities of investigations were short in order to conclude the final evaluation. We suggested extra geological investigations, jet foam drillings, trench, and adit to get more detailed information of B-slope.

As the results of trench, adit and jet foam drillings, stratigraphy and geological structure of B-slope become clear. Stratigraphy of B-slope is mentioned in order of the upper layer as follows; 1.overburden, talus deposits (C-layer), 2.alternation of massive green rock and chert (B1-layer), 3.alternation of slate and layered green rock (B2-layer), 4.massive green rock (B3-layer), 5.slate (B4-layer). The weak layer exists in the boundary between B-3 and B-4, and it has the direction to slightly cross the bedding planes of both rocks. This layer is not regarded as a sliding plane but a tectonic fault. Properties of the tectonic fault are classified into 2 categories. One is the fractured material with clay, the other is breccia material. The fractured materials with clay occupy the center part of the distribution area of the fault, breccia materials are recognized at the lower part of the distribution area. For the upper part of the fault indicates the tightened geological boundary.

The stability analysis should be considered for the slide within C-layer and along the fault. Both cases are checked on condition that the water level increases in the primary stage of the impounding and it rapidly decreases. For the analysis of the fault, the normal analysis and the revised inverse analysis are adopted. The object of the analysis is the fractured zone and the brecciated zone, the upper part is omitted because it is tightened geological boundary. On this calculation, residual pore pressure is exaggeratedly assumed 50%.

Detailed investigations made it clear for suspicious rock slide slope with, that it was not a sliding plane but a tectonic fault. Based on stability analysis for B-slope, countermeasures against the impound will be decreased than what were considered on the previous investigations.