Engineering Geological Assessment of the Proposed Kakasharaf Dam, Lorestan, Iran

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1. Introduction

The proposed Kakasharaf Dam will be built on the Kakasharaf River, 20 km south east of Khorrarmabad in Lorestan province, south western Iran (Figure 1). It will be used for flow control and water storage for irrigation projects. The Kakasharaf Dam has a crest length of 340m, a maximum high above river bed level of 70 m, and a total storage capacity of 26 million m³.

Geotechnical investigations have been carried out at the project site and in the laboratory. Various laboratory and in-situ tests were performed to assess the characteristics of rock masses. Detailed discontinuity surveying was also carried out.

2. The Geology of the Studied Area

Geological factors play a major role in designing and constructing a dam. Of the various natural factors that influence the design of dams, none are more important than the geological ones. There exist numerous examples of projects where the conditions of the foundation were not sufficiently known and the cost of construction and treatment greatly exceeded the original budget. Information on the regional geology of the area has given by Tamavan Consulting Engineers Company. The proposed Kakasharaf Dam site is located on sedimentary rock of the upper Cretaceous age and on Quaternary deposits. Sedimentary rocks consist of Buff-grey limestone, marl limestone and shale limestone.

Keywords: Dam, Permeability, Uniaxial, Modulus of elasticity, Stability

This paper describes the results of the engineering geological investigations and rock mechanics studies carried out at the proposed Kakasharaf Dam site. Analyses were carried out in terms of rock mass classifications for diversion tunnel, permeability of the dam foundation and determination of rock mass strength parameters. In this study, the Kakasharaf dam site, constructed on the Kakasharaf River to the south east of Khorrarmabad in Lorestan province, south western Iran, was investigated from the stand point of the aforementioned engineering geological aspects. The proposed Kakasharaf Dam site is located on sedimentary rock of the upper Cretaceous age and on Quaternary deposits. Sedimentary rocks consist of Buff-grey limestone, marl limestone and shale limestone. Studies were carried out both at the field and the laboratory. Field studies include engineering geological mapping, intensive discontinuity surveying, core drilling, pressurized water tests and sampling for laboratory testing. Uniaxial and tensile strength tests were performed and deformation parameters, unit weight and porosity were determined on the intact rock specimens in the laboratory. Rock mass strength and modulus of elasticity of rock mass are determined using Hoek-Brown empirical strength criterion. Engineering geological investigations, test result and computations indicated that there will be no foundation stability problems. Detailed geotechnical investigations are required for the final design of the dam.

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