Design Treatment of Instability of Intake Block at Runniperunadu Shep, Kerala

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Abstract

A 7.35m high and 124 m long concrete weir is constructed across Kakkad River at Mampara in Perunad Village in Pathanamthitta District of Kerala, to divert tail waters of the existing Maniyar power house to generate 4 MW of power at the dam toe power house located on the right bank.

Dark grey, hard charnockite of Archaean age is the main rock type exposed at the weir site and is feebly foliated swinging from N65°W - S65°E to E -W with 10° to 20° towards NE i.e., downstream. Geological mapping of blocks revealed that the strike of foliation joint is almost parallel to weir axis, dipping at low angle (< 20°) towards downstream. It is very prominent on the excavated wall between block no 6 and 7, and is critical from the stability point of view. A 5.25 m deep pit, from the general foundation level, was excavated to R.L. 4.00 m to accommodate turbines at the dam toe power house. Absence of toe support and day lighting of the joints resulted the block (intake block) above the joint susceptible for sliding.

While pondering over the treatment measures, the site conditions were considered and utilized for augmenting the shear resistance of the intake block. Three treatment measures are suggested to improvise the shear resistance.

a. There was a vertical wall of about 9.0 m height, available between intake block and right abutment block. This wall was found favorable and considered for this treatment. A deep vertical groove of 2 m x 2 m was cut on the vertical wall at ch. 92.00 m from the surface level (R.L.19.690 m) to the foundation level of block no.6. R.L. 9.750 m ensuring intact rock at the downstream side of the grove and extending the reinforced concrete block into it.

b. The length of intake block no.6 was increased on the other side (towards block No.5) so as the block extends well beyond the power house pit to have a downstream support from rock.

c. The anchor rods provided in foundation of block no-6 were extended to a level below the power house pit.