

ROCKFALL MITIGATION WORKS AT ST-1 OF TEESTA STAGE-III HEP, SIKKIM CHUNGTHANG VILLAGE, SIKKIM, INDIA

Dynamic Barriers

Problem

The Teesta Stage-III HEP(1200 MW) is located along Teesta river in the Mangan District of the state of Sikkim with a 60m high Concrete Faced Rockfill Dam at the Chungthang village and the Power House site at Singhik village. The project utilizes the fall of the head in the river course of about 800 meters between these two villages.

Rockfall is a major problem at the dam site, especially in the vicinity of spillway tunnels and chute spillways. The surface morphology shows that the moderately fractured weathered rock with vegetation over the slope. The exposed slope is formed with weathered rock strata that were subjected to rainfall during the monsoon seasons. The rainfall infiltration when accompanied by the erosion factors and the steepness, trigger the rock detachment. During past rockfall events, the dam infrastructure were damaged by the shooting stones. Hence, suitable rockfall protection measures are needed to address the problem.

Solution

As per the site observations and previous history of rockfall events, the critical location above the spillway tunnel, ST-1 has been identified based on the trajectory analyses and proximity to the structures for maintenance. Rocfall software (of RocScience) is used for the simulation of probable trajectories and in the analysis and design of rockfall barriers and two lines of dynamic rockfall barriers of nominal capacity 5000kj and height 7m has been proposed in 2 lines for stretch lengths of 40m and 30m (varies) above the tunnel portal base to mitigate the risk of rock detachments from upslope locations from affecting the tunnel and associated amenities.

The dynamic rockfall barriers installed are EAD certified and comprise of a primary interception mesh of MacRing (Ring Net) and a secondary interception mesh of DT Mesh. Skirting arrangement has been adopted wherever applicable. These rockfall barriers have braking system which maintains performance throughout the entire design life of the structure and are easy to visually inspect by maintenance engineers as it progressively deforms once the barriers are impacted.

Client: TEESTA URJA LIMITED

Designer / Consultant: Maccaferri Environmental Solutions Pvt. Ltd.

Contractor: Maccaferri Environmental Solutions Pvt. Ltd.

Products used (Qty.)

- Dynamic Barriers RMC 500/A	70 RM (2 lines = 40m+30m)
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Date of construction: 01/2021 - 04/2022



Figure-1 Initial site condition

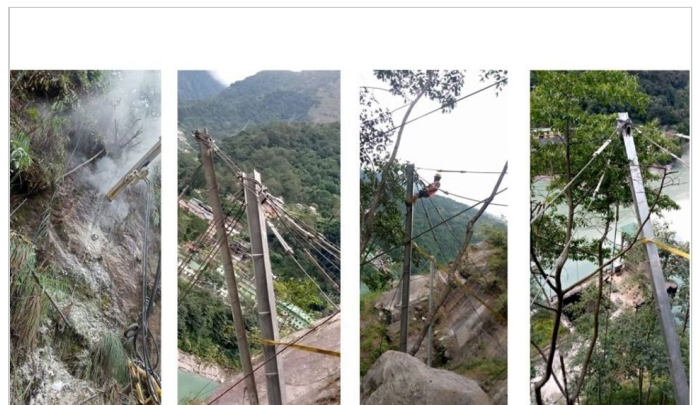


Figure-2 Barrier posts and various cable installation in progress



Figure-3 Installation of interception meshes (primary and secondary) in progress

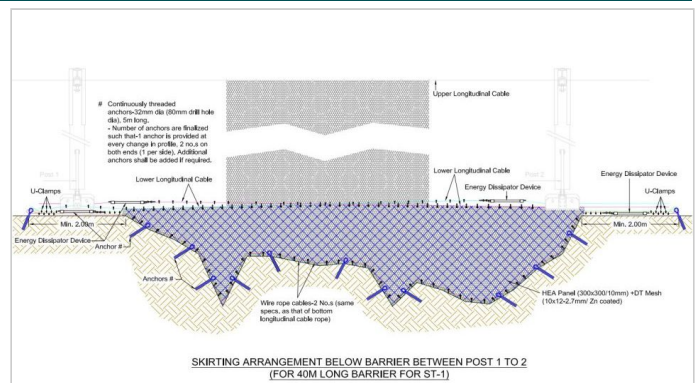


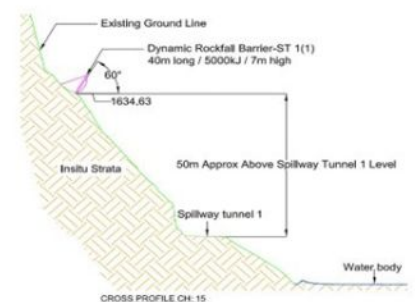
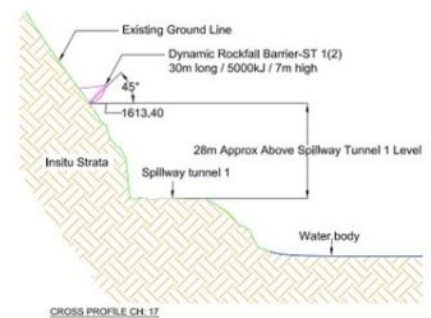
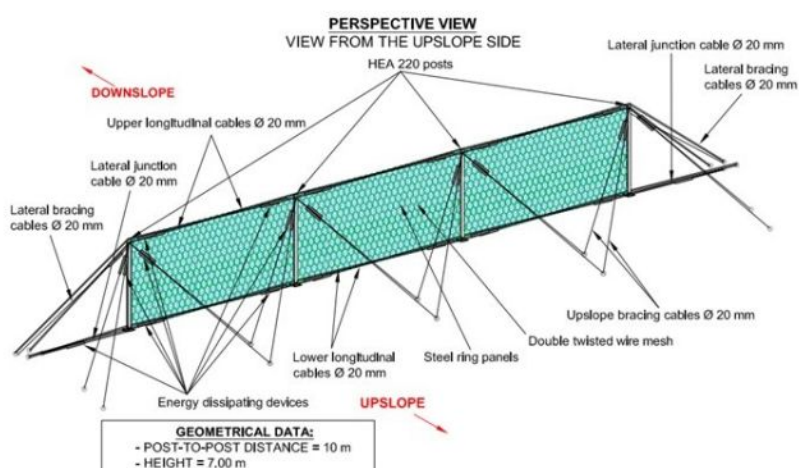
Figure-4 Skirting arrangement



Figure-5 Installed rockfall barriers above ST-1 portal



Figure-6 Overall site view after the installation of rockfall barriers



Scheme

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