CENTRAL WATER AND POWER RESEARCH STATION

ESTIMATION OF SAFE CHARGE WEIGHT PER DELAY BY CONDUCTING TRIAL BLAST FIELD INVESTIGATIONS FOR EXCAVATION OF HARD ROCK DURING CONSTRUCTION OF POWER HOUSE BY BLASTING OPERATIONS AT BHIVPURI HEP, MAHARASHTRA

STUDY OVERVIEW

Bhivpuri Hydropower Station, one of India's oldest hydropower plants (constructed during 1916–1922), presently has an installed capacity of 75 MW. To further enhance the generation capacity, Tata Power has proposed the 1000 MW Bhivpuri Pumped Storage Project (PSP) within the existing premises at Raigad, Maharashtra. The project, awarded to a joint venture of HCC and TPL, involves construction of a lower reservoir, a pit-type powerhouse, and an upper intake at Khand. The study involves excavation of huge quantity of extremely hard rock strata which is spread over an area of 20 Ha land by blasting operations.

In this connection, based on the request from Tata Power Company Ltd., Maharashtra project authority trial blast investigations have been carried out to optimize the blast design parameters

APPROACH

The scope of the study consists of the following activities:

1) To carry out 15-20 trial blast at the location by varying the blast design parameters.
2) To estimate safe charge based on several trial blasts and monitoring of ground vibrations at different distances from the blasting zone on bed rock as well as near the structures.
3) To recommend safe charge weight per delay to be used at site based on the trial blasts.
4) Adoption of safe vibration level for ensuring safety of nearby structures.

KEY FINDINGS

In most of the blasts, PPV level observed near temple has been found to be less than 25 mm/s. Vibration level recorded near Powerhouse and Anchor Block has been found to be far below the recommended safe vibration level of 25 mm/s. Air over pressure level has been found to be less than 133 dB when the distance from the blasting zone is more than 250 m which is considered to be safe for human beings.

IMPACT/SIGNIFICANCE /OUTCOME

Based on the trial blast studies carried out, blasting pattern to be used during actual excavation has been optimized. The recommended blasting pattern will ensure the safety of the nearby structures.