CENTRAL WATER AND POWER RESEARCH STATION

PARALLEL SEISMIC TEST AT UPSTREAM AND DOWNSTREAM SECANT PILES OF SUNDILLA BARRAGE OF KALESWARAM LIFT IRRIGATION SCHEME (KLIS), TELANGANA

STUDY OVERVIEW

The Kaleshwaram Project is a multi-purpose and multi-stage lift irrigation project which is divided into 7 Links and 56 packages. The Kaleshwaram Project comprises of three barrages, 14 reservoirs, 31 lifts and 1,832 km of canals, tunnels and pipelines. Construction of one barrage across river Godavari at Medigadda near Kaleshwaram, and two more barrages between Medigadda and Sripada Yellampally Project at Annaram & Sundilla has been done to convey water from Sripada Yellampally Project to the command area spread over in 13 districts of Telangana. In order to ascertain the reasons of seepage through foundation of Sundilla barrage, parallel seismic test has been recommended by the National Dam Safety Authority (NDSA) Committee at upstream and downstream of Sundilla barrage.

APPROACH

Parallel seismic test has been conducted from bay/vent 31 to 54 in upstream and downstream side of Sundilla barrage as suggested by NDSA to study the characteristics of secant pile and portion of raft covering the cut off in the above mentioned bays. From the seismic test conducted at the site, a total of 48 seismic sections are generated to get the velocity distribution. The distribution of the velocity has been obtained in partial length and depth of the secant pile due to limited depth of the drilled hole and single hole drilled in the center of each bay on upstream and downstream cut offs. Compressional wave velocity distribution has been plotted for bays 31-54 on the Upstream and downstream of Sundilla baarage. From the distribution of velocity, it is observed that pulse velocity is varying in the range of 1000 m/s to 6500 m/s in most of bays. Significant area in almost all bays depicts distribution of low velocity.

KEYFINDINGS

A maximum depth of upstream about 7.76 m and width of 4.60 m and downstream maximum depth of about 13.21 m and maximum width of about 5.91 m is achieved in the middle of the bay/vent from the test results on the upstream side and downstream Anomalous low velocity signatures (< 3000 m/s) are observed in almost all bays in the raft and below the raft in secant pile cut off of upstream covering almost full plotted length of the bay. On the other hand, compressional wave velocities of greater than 3000 m/s are observed in the downstream side in most of the bays covering major area of the secant pile.

IMPACT

The parallel seismic test at upstream and downstream of Sundilla barrage provides the key findings to understand the integrity/continuity of secant pile. The results will give the information on present condition of the secant piles thereby project authority/National Dam Safety Authority (NDSA) can decide whether to store water in the barrage or not.

These results will also give the information on strength of the secant piles from structural safety point of view.

Schematic view of 3-D diagram of data acquisition geometry