HYDRAULIC MODEL STUDIES FOR RESERVOIR SEDIMENTATION AND FLUSHING, DEVSARI H.E. PROJECT, UTTARAKHAND

CENTRAL WATER AND POWER RESEARCH STATION, PUNE

Service Through Research

BACKGROUND

The Satluj Jal Vidyut Nigam Ltd. (SJVNL) has proposed to implement Devsari Hydro Electric Project (252 MW) on river Pinder in Alaknanda basin, Uttarakhand. The project is planned as a run of the river scheme with 35 m high dam at about 2.5 km downstream of confluence of river Kailganga with Pinder river.

OBJECTIVES

➤ Assessing the performance of the reservoir as a desilting basin and extent of sediment deposition in the reservoir.
➤ Estimating the quantity of suspended sediment entering in the Intake for different discharges and reservoir operating levels.
➤ Assessing the extent of flushing for different discharges in different durations.

STUDIES CONDUCTED

➤ The studies were conducted on the model of Devsari Hydroelectric Project reservoir constructed to a geometrically similar scale of 1:60 for estimating the quantity of suspended sediment entering in the Intake for the discharges of 300, 500 and 700 m^3/s at dam site and various reservoir water levels.
➤ Flushing studies were carried out for discharges of 200, 300, 500 and 700 m^3/s and 12 and 24 hrs durations, to estimate the quantity of sediment flushed.

Bird eye view of Devsari model
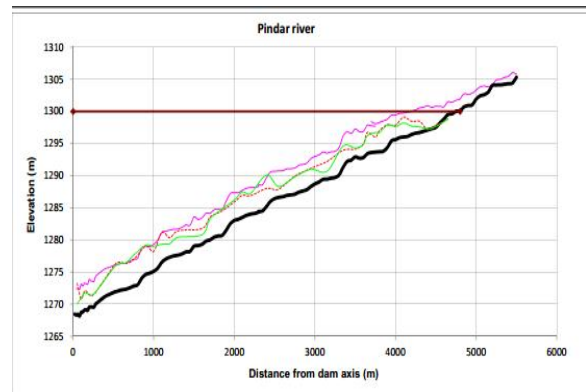
Longitudinal sections after flushing

OBSERVATIONS

➤ The suspended sediment concentration in the intake was insignificant for both FRL and MDDL operating conditions for all incoming discharges of 700, 500 and 300 m^3/s. The maximum sediment concentration observed in the intake was of the order of 37.90 ppm for the incoming concentration of 3500 ppm.
➤ The volume of sediment flushed in 12 hours was 0.008 and 0.011 Mm^3 for the discharge of 300 and 500 m^3/s respectively. It was observed that reservoir capacity can be restored with annual flushing during peak flows.

SIGNIFICANCE OF THE STUDIES

Studies helped the project authorities in designing the project with provision for annual drawdown flushing and without conventional desilting basins. The design helped in considerable saving in project cost.