

MATHEMATICAL MODEL STUDIES FOR RESERVOIR SEDIMENTATION FOR ARUN III HYDROELECTRIC PROJECT, NEPAL

BACKGROUND

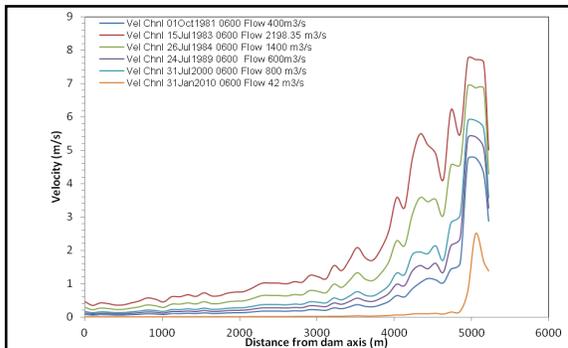
The Satluj Jal Vidyut Nigam Ltd. (SJVNL) has proposed to implement Arun III Hydro Electric Project (900 MW), Nepal. The project is located on Arun River, a principal tributary of Sapt Koshi, near Num village of Sankhuwashabha District in Nepal. The project is planned as a run of the river scheme with 59 m high dam and the provision for annual flushing of reservoir through low level sluice spillways to remove deposited sediment.

OBJECTIVES

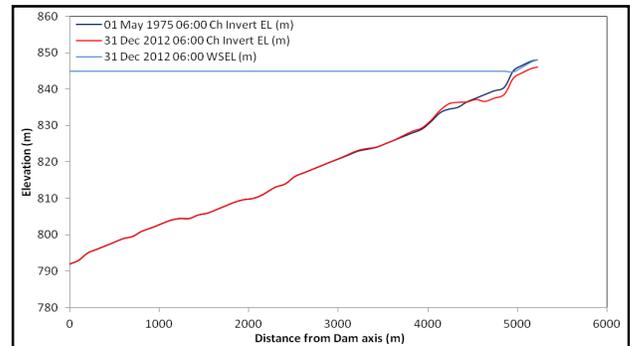
- To estimate the sedimentation profile and assess the extent of sediment deposition in the reservoir for the reach of river Arun from about 5 km upstream to dam axis .

STUDIES CONDUCTED

- The simulation studies were carried out with observed daily flow series for the period from January 2009 to May 2013 by maintaining the downstream water level at dam axis at the FRL (El.845 m) and MDDL (El. 835 m).
- The daily suspended sediment concentrations data at Uwagaon (600 m upstream of dam site) from March 1989 to November 1989 were used for developing sediment rating curve.
- Changes in bed level, cross section and velocity profile were computed at the end of the simulation period.
- Long term simulation studies were also carried out for the period from May 1975 to May 2013 using the daily flow series.



Longitudinal velocity profile with reservoir operating at FRL



Longitudinal bed profile with reservoir operating at FRL

OBSERVATIONS

- Sediment deposition in the form of deltaic pattern was observed at the upstream reach of the reservoir.
- Due to the prevailing low velocities, the reservoir was observed to function as a desilting basin.

SIGNIFICANCE OF THE STUDIES

- As the reservoir was observed to function as a desilting basin, no separate desilting basin was required.