

Koysha HEP

Physical model investigation of the middle level outlets



Visualisation of the Koysha dam
Source: www.ethiopia.salini-impregilo.com

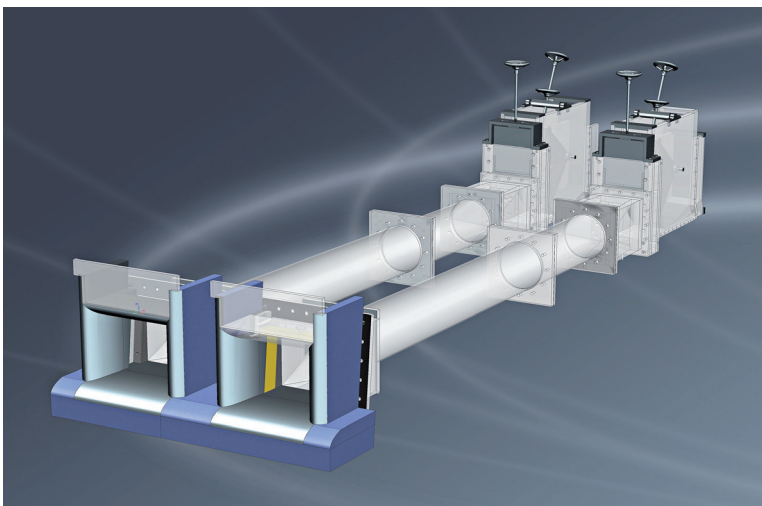
The Koysha Hydro Electric Project is located at the Omo River in Ethiopia. The plant has an installed capacity of 2200 MW and will produce 6500 GWh of electricity per year. The Ethiopian

Electric Power Corporation (EEPCo) is the owner and project execution institution.

The 178 m high roller compacted concrete (RCC) gravity dam impounds a storage volume of 6000 million cubic meters. The dam is crossed by three power waterways feeding an outdoor power house which is equipped with eight turbines located at the left bank riverside. A gated spillway is a separate and independent structure on the left

bank that discharges the water downstream of the dam and the powerhouse back into the Omo River. Two middle level outlets are foreseen to be located in the central part of the dam.

Each middle level outlet has a diameter of 6 m and is around 100 m long. The maximum discharge is around 900 m³/s per outlet. The conduits are steel lined and have to withstand a static pressure of about 98 m WC at the maximum storage level. Each conduit is equipped with a bulkhead gate at the intake and with a wheel gate and a radial gate at the outlet.



Construction of the Koysha middle outlets

VAW is commissioned by the contractor Salini Impregilo S.p.A. to perform physical model test on the middle level outlets. The investigation is separated into three main parts. The first part is the optimization of the hydraulic behavior inside the conduits including the observation of vortex formation for low water levels and flow detachments, extensive pressure measurements and cavitation analysis. The second and third part comprise the extent of the jet trajectories and the formation of the scour in the downstream section.

Keywords: RCC dam, middle outlets, hydraulics, jet trajectories, scour
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