

## **Integrity assessment of the prestressed Trunnion beams of the spillway structure of Polavaram dam project through Acoustic Emission (AE) and advanced non-destructive evaluation (NDE) Techniques.**

Polavaram dam project, one the most prestigious and challenging national projects in India is located on river Godavari near Ramayyapet village of Polavaram Mandal of West Godavari district in Andhra Pradesh. This is a multipurpose major terminal reservoir project for the development of Irrigation, Hydro power and drinking water facilities to East Godavari, Vishakhapatnam, West Godavari and Krishna districts of Andhra Pradesh. The span of the dam is about 1.2 km, having a pier height of 54 m and a total of 48 radial gates (16mx20m) which are connected with 49 prestressed Trunnion Beams (5.5mx5.5m section and length varied from 9.5m to 16m depending on the location of the trunion). In order to assess the integrity of the prestressed Trunnion beams of the spillway structure of the dam, Polavaram Irrigation Project, Head Works Circle (PIPHW), Dowlaiswaram, East Godavari District, Andhra Pradesh, entrusted a project to CSIR-SERC for integrity assessment by conducting series of different Acoustic Emission (AE) and advanced non-destructive evaluation (NDE) tests on all the 49 trunnion beams. The *challenge* is to identify the presence of flaws/discontinuities inside concrete where the conventional NDT&E methods are not applicable due to massive size, high amount of reinforcement bars near surface concrete, presence of prestressing duct, cable and grout, and possibilities of flaws well inside the concrete surface.

A comprehensive and multi-point AE technique was used for the first time, to the specific task of investigating health of the trunnion beams. During the investigations, slow movement of the radial gates and high-speed acquisition of data through multi-channel were carried out using integrated and synchronized AE System. Using the AE parameters, existing flaws/discontinuities, if any, are identified through intensive signal processing. In order to assess the integrity, number of AE hits, signal amplitude and signal strength are considered.





**Figure: Integrity assessment of prestressed trunnion beams in Polavaram Dam using Acoustic Emission (AE) technique by CSIR-SERC team**