PROJECT DOSSIER

PENCH IRRIGATION DAM

PROJECT OVEREVIEW

Project	Pench Diversion Irrigation Project
Location	Chhindwara, Madhya Pradesh, India
Client	Water Resources Department, Madhya Pradesh
Contractor	SEW
Consultants	CWC
Duration	2013 - 2017

Pench Diversion Project envisages construction of an earthen & concrete/masonry dam across river Pench, a tributary of river Kanhan in Godavari basin near village Machagora in Chourai tehsil of Chhindwara district.

The project is proposed to provide irrigation in Chhindwara & Seoni district of Madhya Pradesh. Besides, the project will provide water supply to the proposed 2 X 250 MW Pench Thermal Power Project under MPSEB. The project will also provide domestic water supplies in the command of the project.

The project components are as under:

- A 41 m high, 5,979 m long earthen dam with 350 m long concrete/masonry dam (including 173 m long spillway) with a maximum height of 26 m.
- Spillway with eight radial crest gates of size 18.29 m X 12.19 m.
- 28.5 km long right bank canal system.
- 20.91 km long left bank canal. Seoni branch canal system & Bakhari branch canal systems off taking from 20.91 km of left bank canal.

Monitoring solution

Encardio-rite was awarded the contract for:

- Supply and installation of geotechnical instrumentation for dam blocks 5 & 7
- Automatic datalogging of critical parameters and areas
- Web base data management system

INSTRUMENT USED

- **Piezometer:** To monitor the pore water pressure inside concrete structure at Block 5 & 7
- **Uplift Piezometer:** Installed in dam gallery to monitor seepage of water from the reservoir area into the dam foundation
- **Group of strain meter:** Embedded in concrete structures at Block 5 & 7 for monitoring strain in dams
- **Stress meter:** Embedded in concrete structures at Block 5 & 7 for monitoring total stress
- **Temperature meter:** Installed in concrete structures at Block 5 & 7 to monitor internal temperature of the concrete block.
- **Direct pendulum (DP) & inverted pendulum (IP):** Installed in dam body & foundation for monitoring of relative displacement between dam top and base (DP) and between the base and foundation rock (IP).
- **Survey target:** Installed on parapet wall to monitor deformation/movement of the dam structure
- **Three point extensometer:** Installed in dam gallery to monitor subsurface settlement of dam foundation
- **Joint meter:** Installed between two blocks to monitor of block joint opening
- **Automatic water level monitoring:** Installed at upstream side pier to monitor water level of the reservoir
- **Strong motion accelerograph (SMA):** Installed at dam gallery, control room and free-field. SMA was used to monitor and record the velocity of ground/structure particles at the point of installation caused due to any seismic activity like earthquakes, volcanoes, blasting, etc. Free-field SMA was used as the reference sensor for dam gallery and control room SMA.
- **Automatic data acquisition system (DAS):** Commissioned in control room at dam site. It collected data from the installed instruments, via BusMux, at programmed intervals. BusMux (multiplexers) were installed inside dam gallery at Block 5 & 7 in which the installed instruments were terminated.

Online monitoring was done for geotechnical sensors that were critical using advanced automatic dataloggers and data acquisition systems. Monitored data was available online through our web based data management system to the Contractor, Client as well as the Consultant on their desktops. Using WDMS, the data can be accessed anywhere around the World via internet.

WDMS processed the monitored data, presented the processed data in tabular and most suitable graphical forms for easy interpretation of the logged data and archived the data in a SQL database. Details like sensor identification tag, last recorded sensor reading and values of programmed alert levels could also be viewed on the first page of site that shows location of installations. The WDMS was also programmed to send SMS alert messages or e-mail to selected users as soon as any sensor data crossed its predefined alarm levels.

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