

Sogamoso-Dam Columbia: Monitoring Deformation Profiles along 190m high Dam Core



The Sogamoso-Dam is a 190 m high concrete faced rock-fill dam located in northern Columbia on the Sogamoso river. With its installed capacity of 820 megawatts it will increase Columbia's generating capacity by 10 percent. The owner, ISAGEN has awarded JV Company Grupo ICT-II, on which the Company SALINI-IMPREGILO carry out the majority of the civil engineering work.

To carry out the turn-key based dam monitoring project, SISGEO and FIELD founded MONITORIZA S.A.S, a Colombian branch of Sisgeo Group. This contract included the design, the establishment of method statements, the supply of the system components, installation carried out under the supervision of MONITORIZA S.A.S, commissioning and working out of as-built documentation for the complete monitoring system of the dam.



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The monitoring design included following instrumentation:

- Open stand pipe piezometers and vibrating wire piezometers for monitoring groundwater level and pore water pressure.
- Borehole inclinometer for manual readings on the dam body and excavations.
- RMV settlement systems to measure settlement profiles along the core of the dam.
- DSM liquid settlement systems are installed under the dam for settlement monitoring.
- Crackmeters and tiltmeters are used to monitor displacements of the concrete face.
- Extensometers to measure radial rock deformations in the deviation tunnels and the underground caverns where the power house is located.

- The monitoring system is operated with a portable data logger type New Leonardo and Sisgeo's automatic data acquisition system.

SISGEO proposed to replace old technology RMV with an inclinometer-settlement column composed of:

- Inclinometer casing quick-joint model.
- Telescopic sections, suitable to bear the expected settlement of the dam (total estimated to be up to 2m).
- Special magnetic rings mounted to large steel plates in order to transfer the soil settlements to the magnetic rings.

This solution presented, it was accepted and approved by the designer, has double advantages:

- Within the same column both settlement and inclinometer readings can be performed by using the portable

manual operated Inclinometer and Magnet-Extensometer.

- In the future, it will be possible to automate this monitoring by installing a series of DEX-S probes to obtain 3D deformation profiles response to excavation work.

Each installation was performed by drilling and instrument installation of a borehole of approx. 10 m into the rock foundation. This column has then been extended with the build-up of the dam body up to the final height of 190 m. Readings were successfully performed manually during the construction and settlements measured were in accordance to the expected values.



LINKS:

ISAGEN
JV GRUPO ICT-II
MONITORIZA S.A.S
SISGEO
FIELD