

Military technology coupled with dam monitoring

Equipments help obtain information on tailings' dams

To monitor the existing structures at the Germano complex, Samarco now has an advanced Monitoring and Inspection Center (CMI), operating 24 hours a day, 7 days a week. The CMI was increased based on the learning obtained after the collapse of the Fundão dam, on November 5, 2015.

The monitoring system has around 480 state-of-the-art equipment, such as: robotic and meteorological station, millimeter precision radars, laser scanner, cameras, drones, piezometers and accelerometers.

The data is transmitted in real time and presented on LED screens with Full HD resolution. The monitoring is carried out by the management of Geotechnics, currently composed of 48 people, among technicians and specialist engineers.

For the first time used for large-scale monitoring of dams in Brazil, radars are equipment developed during World War II, originally for military use. The name of the technology comes from the acronym in English (Radio Detection and Ranging), that can be translated freely to Portuguese like Detection and Telemetry via Radio. Later, these equipments were adapted for geotechnical use and are able to measure, through interferometry, deformations or sub millimetric movements in the massifs of the dams.

In addition to surface radars, Samarco is also one of the first companies in the country to use orbiting satellites. This technology allows the detection of movements in large areas, allowing the analysis of the whole region where the company operates.

In addition, periodic field inspections are carried out. In these inspections, possible anomalies associated with failure modes of geotechnical structures are detected. The results are analyzed by experts and compiled into reports, which are then verified by companies specializing in dam geotechnics.

Equipment and technologies that monitor

Accelerometers

They are instruments used for ground vibration monitoring.

Drone

Assists in inspections in hard to reach areas.

Weather station

It consists of equipment that measures pluviometric indexes, air temperature, humidity, pressure, speed and wind direction.

Robotic Station

It is composed of equipment that accurately monitors horizontal and vertical displacements.

Inclinometers

They measure horizontal deformations and displacements below the soil surface.

Visual Inspections

They detail the security conditions using the Geo Inspector system to record the information.

Flow Meters

They are instruments that measure the volume of water at the outlet of the dam.

Piezometers

They monitor the internal pressure level inside the dams.

Radar

Six monitoring radars identify minimum displacement variations on dam surfaces.

Satellites (InSAR)

They monitor displacements by means of radars installed in satellites.

Emergency Alert System

To ensure the safety of its employees and the population residing in the areas surrounding Germano's industrial unit, Samarco has deployed new equipment in the Emergency Alert System, as set forth in the Mining Dam Emergency Actions Plan.

The review of the plan and implementation of the new equipment began shortly after the dam broke in November 2015. In total, 31 sirens were installed, interconnected via wireless networks, between the municipalities of Mariana and Barra Longa, to ensure evacuation of residents in emergency situations.

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