



Colombia: Transformation of Dam Safety with Real-Time Monitoring



A behind-the-scenes look at Colombia's largest automated dam instrumentation project



La Fe Dam (Photo courtesy of Empresas Públicas de Medellín [EPM] and Acerta)

In the mountains of Antioquia, Colombia, eight of the region's most important dams now share their story in real time, thanks to a bold shift from manual monitoring to automation.

For years, Empresas Públicas de Medellín (EPM) relied on technicians in the field to track water levels and dam stability. The system worked, but it left little room for speed or certainty in high-stakes situations. As the need for faster, more reliable insights grew, EPM saw an opportunity to modernize—strengthening safety, reducing risk, and setting a new benchmark for dam management in Colombia.

The Challenge: Manual Data in a High-Stakes Environment

EPM manages dams that are vital not only for energy generation, but also for the safety of nearby communities. Keeping them secure requires constant attention to subtle changes in water pressure, structure, and environment.

Until recently, most of this information was collected by hand. That meant slower decision-making, the possibility of human error, and data gaps during critical moments. In some cases, errors in manual logs persisted for months before being noticed. EPM knew it needed a system that could deliver reliable, real-time insights across all its dams.

The Solution: Connecting Every Dam to One System

Over the course of two years, from July 2022 to June 2024, EPM partnered with Acerta and Campbell Scientific to bring automation across eight of its dams: Troneras, Quebradona, Porce II, Riogrande II, Playas, El Buey, Santa Rita, and La Fé.

Case Study Summary

Application

Upgrading from manual to automated data collection

Location

Medellín, Colombia

Products Used

AM16/32B, CR6, CRVW3, PS200

Participating Organizations

Empresas Públicas de Medellín (EPM)

Measured Parameters

Water level and pressure, dam stability, displacements, water flow rate (discharge)

Participating Consultants/Integrators

Acerta



Instead of relying on less-frequent, manual readings, the new system continuously gathers and transmits data to a central monitoring hub in Medellín. Each dam was equipped with tailored instrumentation and connected into one unified network. For EPM, the result wasn't just new technology. It was a completely new way of seeing their infrastructure.

The Results: Faster Decisions, Greater Confidence

The transformation was immediate. Measurement readings that once took days now appear in seconds. Patterns that were once hidden in logbooks are now visible in real time. Automating the data didn't just improve speed, it helped correct long-standing errors, giving EPM new confidence in their dam models.

Key results included:

- ▶ Quicker response times during unusual events
- ▶ Increased accuracy compared to manual logs
- ▶ Lower long-term monitoring costs
- ▶ More reliable models for dam behavior
- ▶ A greater level of trust from nearby communities and stakeholders for EPM and its implementations

By the end of the project, 100 percent of planned activities were completed, and budget execution reached 98 percent, which was a milestone for Colombia's dam safety program.

Why It Worked: Collaboration at Every Step

Equipment, such as the CR6 Automated Monitoring Platform and the CRWV3 Three-Channel Vibrating Wire Datalogger, played a key role, but the real success came from collaboration. EPM, Acerta, and Campbell Scientific worked side by side through planning, installation, and testing, staying agile and focused on one goal: safer dams for Colombia.

Looking Ahead: A Model for the Future

With this project complete, EPM has set a new standard for dam monitoring in Colombia. They are already working to expand real-time systems across all their dams, ensuring long-term consistency and reliability.

What started as challenging manual data collection was transformed into a blueprint for dam safety's future. By embracing automation, EPM didn't just modernize their monitoring. They gave their teams better insight, their infrastructure stronger protection, and their communities greater peace of mind.

Are you looking to upgrade or improve your current systems? Reach out to our sales team at [infra-sales-](mailto:infra-sales-na@campbellsci.com)

na@campbellsci.com. We'd love to help you find solutions that best suit your projects and budget.



Porce II Dam (Photo courtesy of Empresas Públicas de Medellín [EPM] and Acerta)



Playas Dam (Photo courtesy of Empresas Públicas de Medellín [EPM] and Acerta)



Location of EPM dams in the Antioquia Department (Image courtesy of Empresas Públicas de Medellín [EPM] and Acerta)

View online at: www.campbellsci.co.za/colombia-transformation-dam-safety-real-time-monitoring



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