

# Non-destructive Testing of Post-tensioning Anchors in Concrete Dams

## Situational Awareness

During the last 30 years, many concrete dams were retrofitted with post tension strands that tie the dam to an anchor point, usually in the rock foundation. The question of fully grouted versus retensionable anchors is currently an unresolved issue within the industry. CEATI International has an initiative looking into this question and the United States Society of Dams (USSD) Concrete Dams Committee is working on a white paper discussing anchors that will address the topic. Additionally, researchers at the US Army Engineer Research and Development Center (ERDC) are looking to develop engineering procedures to estimate the current state of the load-carrying capacity of a ground anchor, remaining life of the tendon, and the level of deterioration or relaxation of anchor capacity over time. However, more work is needed to fully understand the benefits and limitations associated with these techniques.



*Water being released through the Garrison Dam in North Dakota  
(Source: FEMA)*

## Project Overview

This project will conduct a field investigation on a dam with post-tensioned anchors. The investigation will be conducted by:

- Delivering a short duration load to the dam.
- Capturing load induced transient responses in the dam's monoliths.
- Identifying and separating monolith response behavior from anchor response behavior using spectral analysis techniques applied to the measured impulse induced responses in the dam.
- Developing Anchor Condition Indicators (ACIs) for the dam's anchors, allowing an assessment of the condition of the anchors to be determined.

## Next Steps

As a result of this project, new procedures for determining the condition of post-tensioned anchors will be available to the Nation's dam owners. The project team will seek stakeholder feedback to determine success. Based on that feedback, the project team will seek ways to further transfer this new technology to individual dam owners. This technology, along with training to use non-destructive testing, will equip dam owners with the skills needed to protect the Nation's concrete dams against extreme natural events, such as earthquakes and worst-case scenario flooding.



*Guajataca Dam damage in Quebradillas Municipality caused by heavy rains from Hurricane Maria, 2017 (Source: FEMA)*



To learn more about this project, contact  
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