ABSTRACT

Ensuring the safety of embankment dams during seismic events is largely dependent on their seismic performance and stabilization. Deformation brought on by earthquakes can frequently cause embankment dams to fail or sustain significant structural damage. This study investigates the use of geosynthetic reinforcement as an effective technique to enhance the seismic stability of embankment dams.

A crucial component of geotechnical and hydraulic engineering is making sure embankment dams are seismically safe, especially in the face of fluctuating seismic and hydraulic circumstances. This work uses PLAXIS 2D for sophisticated numerical modeling to assess the performance of geosynthetic-based embankment dam stabilization. The reinforcing and draining properties of a variety of geosynthetic materials, such as geotextiles, geogrids, geonets, and geocomposites, were examined in both rapid and slow drawdown situations. To describe the mechanical behavior of the materials and supply precise input parameters for numerical modeling, laboratory testing was carried out using tensile strength (UTM), pull-out, and puncture resistance tests.

The use of geosynthetics is a viable and efficient technique for improving the seismic resilience and hydraulic stability of embankment dams. The integration of laboratory data with numerical simulations provides a reliable approach for the design and safety assessment of such critical infrastructure.