



## **Abstract Submittal for 2023 ASDSO Conference**

### **“Liquefaction Triggering Analysis of Construction and Long-Term Surcharge Loading on Earth Embankment Dams”.**

Following the failure of the Edenville Dam, reconstruction design efforts included an updated Potential Failure Modes Analysis (PFMA). New Potential Failure Modes (PFMs) were identified related to static liquefaction triggered by a variety of load cases. These load cases included surcharge loads from flooding, construction equipment crest surcharge loads, toe excavations and long-term maintenance equipment crest surcharge loads. PFMs were related to static liquefaction of the embankment soils and foundation soils. The PFMA team identified these loads as potential load cases that could lead to failures but did not evaluate if the magnitude of those loads were sufficient to trigger static liquefaction. Therefore, the reconstruction design team checked for a strain weakening response due to the change in stress to determine if that load is sufficient to weaken the soils (e.g. trigger liquefaction). This evaluation step is an important intermediate step necessary to rule out PFMs or address potential failure concerns in existing and newly constructed earth embankment dams when foundation soils and/or embankment soils are susceptible to static liquefaction.

Reconstruction design for Secord Dam, Smallwood Dam and Edenville Dam followed this process for diligent consideration of these types of failure modes and to be critical of a load’s ability to trigger static liquefaction. The geotechnical data (boring logs, cross sections, lab data, etc.) from those three dams and a discussion on the analysis approach is presented.