

The Edenville Dam: A Valuable Lesson Learned

American Dams believes in learning from our past in order to prevent reoccurrences in the future. The Silver Lake Dam (Michigan) failure and the Oroville Facilities (California) spillway failure are two notable examples with valuable learning lessons. Another one is the Edenville Dam failure. On May 19, 2020, the 6,600-foot-long Edenville Dam, located on the Tittabawassee River in central Michigan, failed after receiving roughly four to seven inches of rain. The rain resulted in flow on May 19, 2020 at about 30,000 cubic feet per second (cfs) downstream, high but below the flood of record.

A study conducted in 1994 by the engineering firm, Mead and Hunt, Inc. determined that the spillway capacity of the dam was 26,200 cfs. Once the flows exceeded this capacity, the water levels in Wixom Lake increased about 5.5 feet higher than the normal lake level. However, the Independent Forensic Team (ITF) studying the failure determined that the dam did not overtop. So why did the dam fail? The IFT determined that the failure was caused by static liquefaction instability (sudden loss of soil strength) of saturated loose sands in the downstream section of the embankment caused by the high water levels.

Several steps could have been taken to lessen the rapid increase in water levels, including (1) continuation of the winter drawdown levels, (2) full opening of the spillway gates, (3) recognizing the foreseeable high spring runoff and acting upon that, and (4) increasing the spillway capacity. Upgrading the spillway capacity was the source of a major dispute between Boyce Hydro Power (the dam owner) and the Federal Energy Regulatory Commission (FERC) that ultimately resulted in license termination. As noted above this may have been a factor but was not the root cause of the failure. Unfortunately, the embankment instability was never recognized and likely could have been remedied by decreasing (flattening) the embankment side slope. The IFT found that dam safety evaluations must include periodic comprehensive reviews of original design and construction, performance, operations, analyses of record, maintenance, and repairs.

It is clear from the event at Edenville Dam, that proper dam maintenance and safety procedures is essential to prevent such events from occurring. American Dams would like to highlight the importance of the responsibility that dam owners have in the proper maintenance of their dams, land and resources. Improper maintenance can threaten the environment, downstream property and human life. If affordability becomes an issue, American Dams wants dam owners to be rest assured that they can come to us for guidance and a helping hand in these challenging financial decisions.

The Association of State Dam Safety Officials presented their final forensic report of the May 19th dam failure and released said findings in September of 2021. More information can be found at:

https://damsafety-prod.s3.amazonaws.com/s3fs-public/files/Edenville-Sanford_Final%20Report_Main%20Report%20and%20Appendices.pdf

