SACRAMENTO CHAPTER

DECEMBER MEETING

When: December 2, 2021 from 12pm to 1:30pm (PST)

Where: Online (TEAMS MEETUP LINK)

Cost: Free and open to all. Click on the link above to join the webinar

NEWS AND EVENTS

Links to Past Meeting Presentations Now Available (https://sacramento.eeri.org/)

Interested in serving or working on a committee or volunteering? Questions? Let us know! (eeri-sacramento@googlegroups.com)

The Upper and Lower San Fernando Dams:
50 Years of Advances in Seismic Analysis of Dams Potentially Susceptible to Seismic Soil Liquefaction

Raymond Seed[1], Khaled Chowdhury[2], Ethan Dawson[3], Joseph Weber[4], Vlad Perlea[5], Kenichi Soga[6], and Ezra Y. S. Tjung[7]

The well-documented field performance case histories of the Lower San Fernando Dam (LSFD) and the Upper San Fernando Dam (USFD) during the February 9, 1971 San Fernando earthquake (M_w = 6.61) have been foundational to the development of the field of modern seismic geotechnical dam engineering, and to the inception of the U.S. national seismic dam safety programs still ongoing today. The liquefaction-induced upstream flow failure of the LSFD, and the only small to moderate deformations that occurred for the similarly constructed USFD, provide an unusually valuable pair of case histories for back-analyses of the behaviors of embankment dams subject to soil liquefaction and strong near-field seismic loading.

Together, these two similarly constructed dams, but with two very different performance outcomes, represent an important and challenging pair of tests for analytical methods. This paper (and presentation) briefly present key elements of these two important field performance case histories, and discuss early geoforensic studies and back-analyses of them. It then looks ahead fifty years later to still ongoing developments in current practice with regard to seismic analyses of dams potentially susceptible to soil liquefaction. Our engineering capabilities with regard to performing fully complete analyses, from nonlinear seismic deformation analyses of cyclic pore pressure generation and initial dynamic displacements, right through full runout of the liquefaction-induced flow slide of the Lower San Fernando Dam, and our abilities to now "predict" key details of the displacements and final deformed shapes and conditions of both the Upper and Lower San Fernando Dams with increasing accuracy and reliability, represent powerful tools for evaluation of seismic safety of existing dams, and for remediation of dams requiring seismic mitigation. Some of the analysis methods and protocols presented are relatively recent developments, and are somewhat ahead of most current common practice, as advances continue in this important area of geotechnical earthquake engineering.

Prof. Seed will present and discuss this paper, and a copy of the draft paper will be available for downloading at www.geoengineer.org

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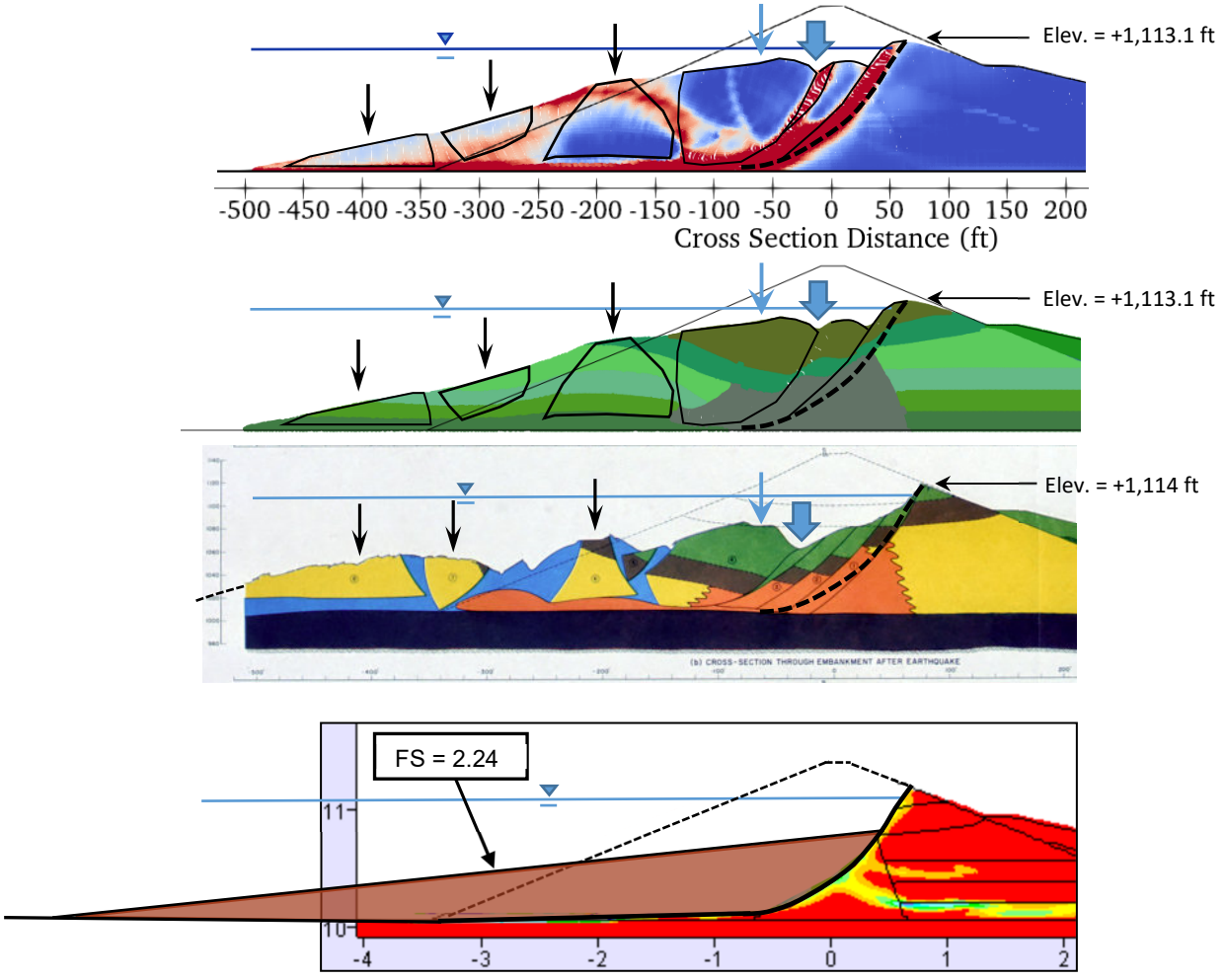

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