UC Berkeley GeoEngineering Seminar Series

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Enhancing Kinematic Slope Stability Analyses using 3D Geologic Modeling

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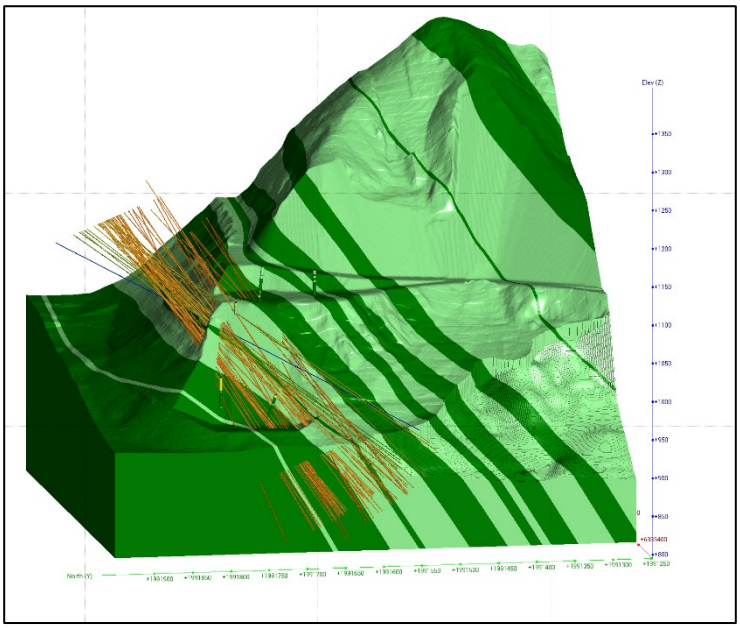

Abstract:

A 3D geologic model was developed to improve kinematic analyses of potential bedrock wedge failures in a proposed cut slope excavation. This model integrates topographic data, surface geologic mapping and subsurface exploration data to provide a realistic, spatially accurate representation of geologic features and conditions within the cut slope excavation.

Traditional methods, which use RocScience Dips and SWedge software, calculate all possible intersections between infinite discontinuity planes daylighting in an infinite slope, which significantly overestimates the potential hazard. In contrast, the 3D model facilitates the consideration of these plane intersections in real space and provides a visualization of a wedge's orientation, position and dimension as mapped onto the actual excavation surface.

3D modeling of the proposed cut slope advances the analysis beyond the limitations of SWedge and can better represent real-world conditions. The 3D model was central to the process of incorporating field observations, refining the SWedge model and identifying credible wedges for stabilization design.