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Project Summary

Type of Site
Tailings Dam

Location
South America

Project Objectives

- To discover the soil material deposits within three cross-sections of the dam embankment
- To determine if the soil composition within a narrow valley was stable enough to support a tailings storage facility and dam

Products Used

PLAXIS[®] LE

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Tailings Dam Owner-Operator Generates 3D Model to Analyze Slope Stability at Mine Site

PLAXIS[®] LE Software Analyzes Cross-Sections of Soil for Safety Factor

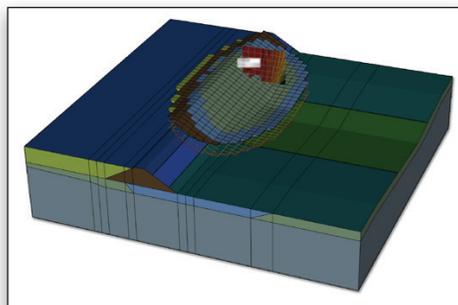
A mine site located in a narrow valley within a mountainous region of South America had a tailings storage facility with material retained by a tailings dam. Soft clay deposits made up the soil at the bottom of the valley, and the side walls of the valley were composed of coarse alluvial soil deposits. The owners of the mine needed to analyze the soil in this location to confirm that the tailings storage facility, which reached a maximum height of 50 meters, would be physically stable in this location.

The owners of the tailings dam used PLAXIS LE2D (formerly SVSLOPE) to analyze three cross-sections of the embankment, each of which represented various foundation conditions along the embankment. The lowest 2D safety factor was calculated in the cross-section that included the soft soil material, where a deep failure surface was discovered. This failure, which was defined as critical, was due to the soft, clay deposits within the soil. However, this designation did not take into account the surrounding coarse alluvial materials and the 3D effects that were

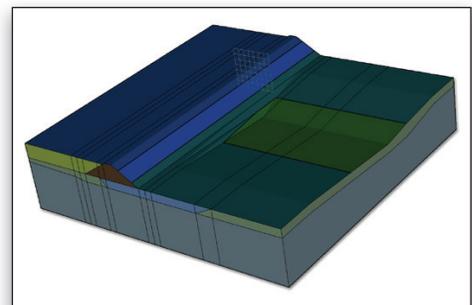
caused by the materials. Therefore, an analysis of the 3D effects caused by the narrow valley and the composition of foundation soil on the stability of the tailings storage facility needed to be conducted.

PLAXIS LE was used to conduct a 3D slope stability analysis. The data associated with the pre-existing cross-sections of soil were input into the software to generate a 3D model. Within this application, the materials and groundwater levels transitioned from 2D conditions to 3D conditions automatically. This analysis indicated a shallower failure surface and a higher safety factor because of the inclusion of the coarse, granular soil that is situated on the valley sides.

These findings will be considered when the organization chooses to further raise the embankment of the tailings dam in the future. Upcoming 3D analyses will also be conducted on the valley's soil. Transitioning 2D to 3D analysis by interpolating cross-section data with PLAXIS LE was simple and efficient at this South American mine site.



Tailings dam after critical slip found.



Tailings dam pre-analysis.

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