

PROJECT DESCRIPTION

Ellatzite MED AD
Mirkovo, Sofia, Bulgaria

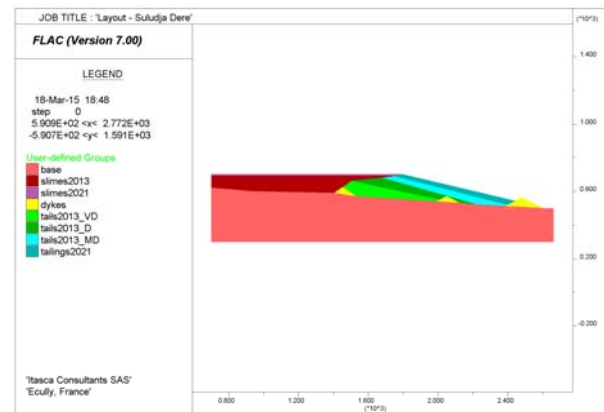


The tailings dam “Benkovski 2” is located about 7 km away from the flotation plant in the village of Mirkovo, Sofia region. It occupies an area of about 4 km², and consists of two main gullies with different names for the two main negative landforms, "Ai Dere" and "Suludja Dere". A dynamic analysis of the tailings dam, considering the liquefaction potential, is essential for assessing the stability of the tailings dam.



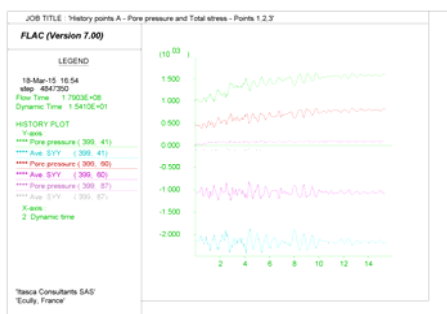
ITASCA'S ROLE

Itasca Consultants SAS (Itasca) was asked by Ellatzite Med AD (Ellatzite) to set up a numerical model using FLAC, to investigate the stability of the dam in case of seismic ground motions. Fully dynamic simulations accounted for the liquefaction potential. The effective stress plasticity model UBCSAND was adopted for the tailings material, to account for the variations of pore pressure and the occurrence of liquefaction.

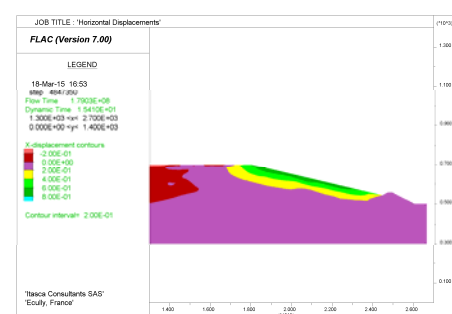


PROJECT RESULTS

Seven design earthquakes were adopted for the dynamic analysis. All the tested cases show some sliding of the downstream slope. Soil liquefaction behind the dam crest may be considered as one of the triggering mechanisms. However, the displacements are relatively limited and do not compromise for the stability of the dam.



Example of pore pressure and total stress evolution during the earthquake



Final horizontal displacements after an earthquake

REFERENCES

Itasca Consulting Group, Inc. (2011), FLAC (Fast Lagrangian Analysis of Continua) user's manuals, MN

Itasca Consulting Group, Inc., UBCSAND - An effective stress plasticity model, Minneapolis, MN.

Ishihara K. et al., Cyclic Strength Characteristics of tailings materials, Soils and Foundations, Japanese Society of Soil Mechanics and Foundation Engineering, Vol. 20, No. 4, Dec. 1980