

## PROJECT DESCRIPTION



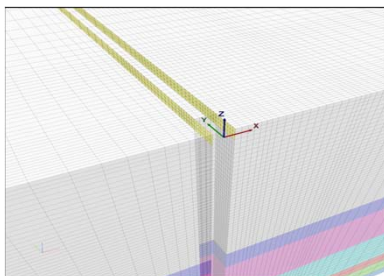
For the construction of the diaphragm-walls of a cut & cover tunnel in sand-fill, *Itasca Consultores S.L.* has been analyzing the stability of the slurry walls of an excavation panel.

Panel dimensions are 1.5 m wide, 4.5 m long and 36 m depth. The upper part of the panel will be excavated in sand-fill, and the lower part in weak deltaic soils below the groundwater table. The trench is planned to be stabilized constructing a 1.5 m high guide-wall at the grade level and using bentonite slurry to support the walls.

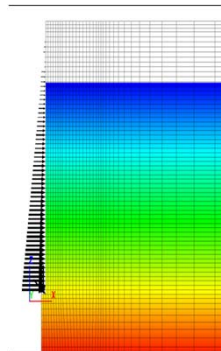
3D models have been developed to analysis the stability of the panel. Figure 1 shows the guide-wall (modeled with embedded liners) and Figure 2 shows the groundwater pore pressure distribution and the mechanical effect of the bentonite slurry.

Due to the low resistance of the sand fill, the weight of the excavators is the most critical aspect in excavation phase. Therefore, the crawler crane load has to be specifically modelled; several hypotheses have been considered: as a load uniformly distributed (Figure 3), and with the effect of a timber mats below the crawler cranes (Figure 4). The timbers have been simulated with structural pile elements.

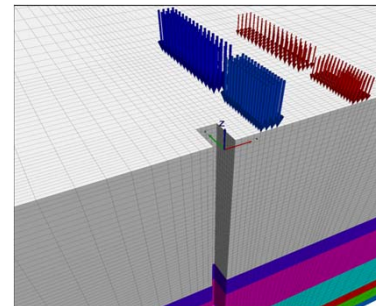
For the different hypothesis considered, the global Factor of Safety, and the location of the potential instability, was calculated using the shear strength reduction technique, both for the sand-fill and for the natural soil (Figure 5).



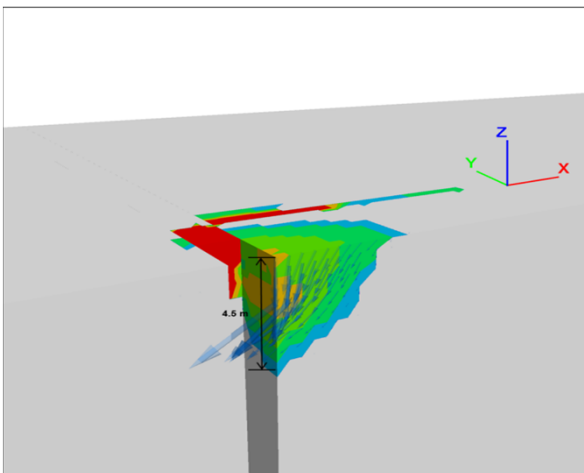
1. Guide-wall with liners



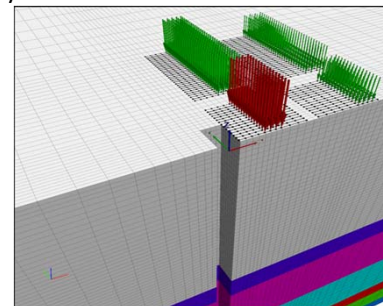
2. Mechanical effect of the bentonite slurry



3. Crawler crane as a uniform load



5. Location of the potential instability



4. Crawler crane load through timber mats