

# Stabilization of Hillside in the work terraces of Alcaidesa in San Roque (Cádiz)

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## ABSTRACT

In the locality of The Hills of Alcaidesa in San Roque (Cadiz) has been constructed three blocks of housings called " The Terraces Alcaidesa" in a hillside in part virgin and in part with a refilling terrain without compaction with a width of 50 m and with a difference of levels between the most extreme points of 10 m.

For the containment of the terrace, a retaining wall with blocks of limestone was constructed by an average height of 6 meters. The wall according to the Geotechnical Report had to be constructed with a fixing of 1,0 m in the litified marls underneath.

The terrace in the zone of the intermediate block was affected in February, 2003 by intense rains, breaking of the sewage collectors placed in this area producing both the slide of the retaining wall and breaking the piles that had been constructed for the foundation of this block.

As consequence, it was proceeded to the substitution of the fallen wall, for other one more safely, providing that the foundation was fixing of the same 1,0 m in the litified marls. For this it was necessary to withdraw the blocks of the shoe's primitive wall and to excavate up to finding the litified marls. Such conditions were not realized as it was discovered finally.

Later to the reconstruction of the wall it was proceeded in August of 2003 to reconstruct the fill of the terrace and after this, the sewage collectors.

Later rains happened in the Autumn and Winter of 2003 provoked new slides of the wall and a new collapse, being requested INGEAL INGENIEROS, S.L. by the property, to project the definitive solution and the stabilization of the hillside.

As result of a new Geotechnical Campaign it was confirmed the existence of a slide under the wall as a consequence of a lack of fixing the wall in the litified marls.

The solution of stabilization of the hillside consisted on a double sheet-pile walls of great diameter arranged in two lines spacing 5 meters and tied with a concrete pile cap of 7 meters width. Over this it was constructed a reinforced concrete wall of 5 to 7 m of height to retain the lands of the terrace.

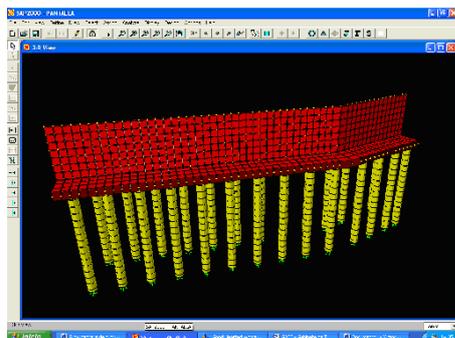


Figure nº 1 Model of finite elements of the wall sheet-pile