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Behaviour Monitorization of a 13m High Gabions Wall

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BEHAVIOUR MONITORIZATION OF A 13M HIGH GABIONS WALL

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ABSTRACT

The paper refers a gabions retaining wall, located at Belas, about 30 km Northeast of Lisbon, in the North perimeter of an Organic Valorisation Central (Valorsul). After the wall completion some pathology occurred and it was detected that it had been partially executed with marl limestone blocks that loose mechanical resistance under rainy water. The wall was then demolished and rebuilt with adequate material. During the earth fill execution the wall was monitorized with a superficial topographical survey. The results obtained and the respective conclusions are referred.

INTRODUCTION

The Valorsul Central of Organic Valorisation (C.O.V.) is located in a very steep place.

So several retaining walls had to be foreseen along its perimeter.

From the various possible types to be adopted the gabions walls where chosen due to the following characteristics of this solution:

- It is environmental friendly as it consists of natural rock;
- has good drainage conditions;
- it is easy to built, as the stones are placed in precast wired cages

The highest wall is 13m high and on its top the soil has a slope of H=3; V=2 (See Fig. 1 and Photos 1 and 2).

After its execution, in the first months of 2003, and following a rainy period, it was noticed that some of its material had crashed and large deformations had occurred.

The wall was inspected and it was noticed that the adopted material was marl limestone that looses strength when in contact with water.

The tender documents specified that the rock material should have a minimum density of 22,0 kN/m^3 and should satisfy the following requirements:

Point load = 5,0 MPa
Los Angeles = 35%

So the wall had to be demolished and further rebuilt with the required stone material.

MONITORIZATION

After the new execution it was decided to monitorize the wall behaviour with a superficial topographical survey.

The maximum horizontal displacement was on the top and attained 46,0 cm decreasing to its base where 9,0 cm was measured (see Fig. 2).

The values obtained longitudinally varied from a minimum of 1,0 mm to a maximum of 2,0 cm.

The referred displacements were related to the most intensive fases of the earthfill execution on the wall back.

Some of the cages wires broke in the zones where the maximum displacements were measured.

However there was no overlaying between two consecutive gabions layers.

CONCLUSIONS

Gabions walls are flexible retaining structures. Even with a careful stones placement inside the wire cages there are significant voids on its structure.

So it is important to be careful when executing the backfill avoiding the use of equipments of great compaction energy in the zones adjacent to the gabions walls, to avoid significant displacements.

Photo 1. General view with backfill

Photo 2. Partial front view

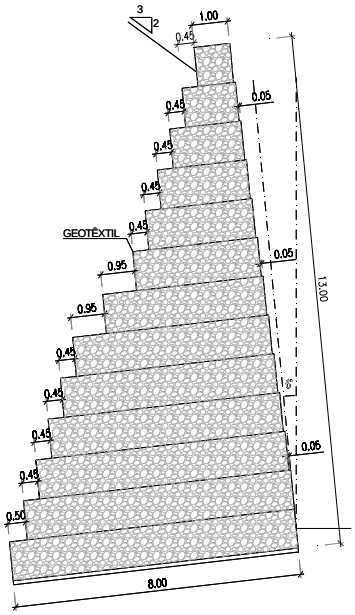

Fig. 1. Higher cross section

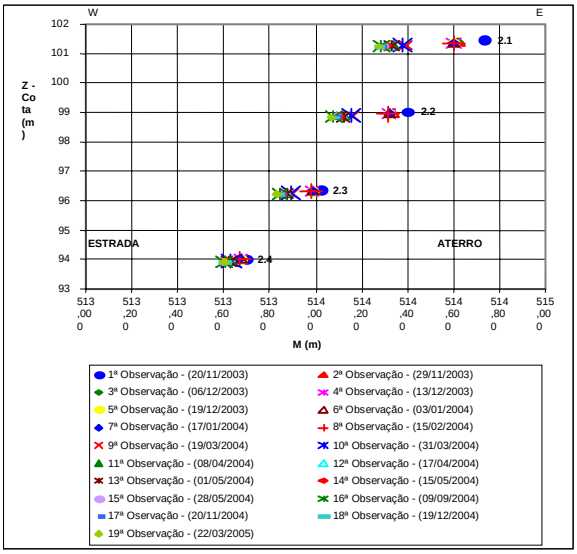

Fig. 2. Horizontal displacements of higher section