THE EXPERIMENTAL DRY-STONE WALLS AND CONTROLLED BLASTING

3 replicas of the most exposed walls were built at 52, 55 and 62 m from the limit of the future pit. They represented the most susceptible walls to collapse by blasting. Raw materials, technical construction, length, height, inclination, orientation and site conditions were matched with the archaeological ones (Figures 2 and 3). In addition, planimetry of the replicas was established in order to assess any changes. In addition, the Geomaterials department worked on decreasing the PPV below the critical level. Data monitored during the controlled blasting at 52 and 55 m, were 120 mm/sec, equivalent to a level 0 in damage. That was corroborated by the archaeologist Diego Salazar, who was present during the detonations (Figures 4 and 5). The mine extension is currently 50-70 m from the archaeological structures (Figure 6), none of which show any alteration related to blasting.

CONTROL AND MONITORING PROPOSAL

The control and monitoring proposal for the sites was based on the following:

- Carrying out a photogrammetric study of the complex, in order to systematically detect the transformation processes, projecting in time its speed and dynamics.
- Studying the rainfall regime of the area, so as to establish an ordinal scale that would evaluate the intensity of geoclimatic events
- Stabilizing unconsolidated sediments using geotextiles and eventually managing rainfall runoff
- Rebuilding collapsed walls to safeguard vulnerable structures

NOWAYS

This work redefined the hierarchy of the agents of transformation for the mining complex. It was found that the modern mine blasting was not the main threat for the preservation of the archaeological sites; if not, paradoxically, its “archaeological” state. How ever, only part of the control and monitoring measures were implemented. Images of a 3D scanner were taken, and the sites are monitoring biannually for research purpose and verification of the conservation state. Today, gullies are bigger and deeper, and mining activities are surrounding the area; soon or later it will be an island with a difficult access. Nowadays, San José del Abra mining complex is confronted and threatened by two main agents of deterioration: the forces of nature and the forces of progress.

**BIBLIOGRAPHY**