

CASE HISTORY VINEYARD DRAINAGE - IDROSAC-MONTALCINO (SIENA)

1 - Description of the soil protection measures

The purpose of the intervention is to create a shallow trench drainage system using the IDROSAC 500 system. Specifically, it is necessary to drain excess water at the contact point between the schistose clay and the fill soil in order to stabilise the movement occurring in the central portion of the vineyard, which has caused instability and damage to the new plant (Figure 1). From the information gathered from the owners and those involved in the work, it appears that the area in question has always been used for agriculture, with crops grown for the wine sector, and that drainage is of primary importance in order to remove excess water from the soil to improve its use and safeguard the growth of the plants, with a consequent increase in agricultural production and speeding up of agricultural operations. It should be noted that vines clearly suffer from excess moisture in the soil; interventions that allow rapid disposal of excess water reduce and/or prevent erosion and at the same time create a subsoil environment that is more suitable for root activity. For hilly terrain, it is therefore a priority to sow and/or maintain grass cover, which prevents surface water runoff and the transport of soil particles, as well as to install underground drainage systems to reduce unproductive areas. The IDROSAC 500 system (Figure 2) was chosen both for the lightness and versatility of the material and for the logistics of the intervention area, which had to be minimally invasive in order to preserve the condition of the vines and not damage the end posts, columns, rows, etc.

As a result, IDROSAC flexible bags proved to be easily transportable by hand along the rows, unlike wheelbarrows filled with gravel and/or PVC pipes, which would have required considerably more care, time and effort.



Figure 1 – Ground movements that destabilised the vineyard.



Figure 2 – Flexible non-woven drainage bags, model IDROSAC 500, used

3 - Implementation phases

The installation of the IDROSAC system was carried out in the following stages:

- 1) excavation and construction of a trench using a mechanical excavator;
- 2) paving of the bottom of the excavation by laying TNT and flexible drainage bags;
- 3) filling the excavation with the previously excavated material;

The individual construction phases followed for the completion of the work are described in detail below.

3.1 – Excavation and trench construction

The first phase of the work was the excavation using a mechanical excavator equipped with a universal excavator bucket (Figure 3). Taking into account the above, the excavation operation was carried out with minimal earthworks in order to preserve the crops from damage. Based on the exploratory test carried out with the excavator and taking into account the client's operational requirements (at least 1 m of lateral clearance from the rows of vines to ensure future vineyard operations), the Project Manager (PM) deemed it possible to excavate an area of separation close to one and a half metres. It was therefore decided to excavate between the rows (18 in total) with a 40 cm bucket until reaching the vineyard slope downstream, so that the drained water would flow outside the unstable area. To facilitate the subsequent installation of the drainage bags, it was recommended to take care in profiling the walls of the excavation and to finish the bottom of the excavation so that it was as flat and horizontal as possible and as undisturbed as possible.



Figure 3 - Excavation carried out with a mechanical excavator for the installation of the IDROSAC 500 system at the Montalcino estate (SI).

No support works were necessary for the excavation as it was stable, being set on compact clayey lithologies at a maximum height of 1.5 m from the ground level.

It should also be noted that the duration of the work is almost instantaneous, as the IDROSAC 500 system is not only easy to install but also extremely quick, thus avoiding problems of instability at the excavation face due to the excavation operation and lateral soil pressure.

3.2 – Placement of TNT and laying of drainage bags

The DL deemed it appropriate to use a layer of geotextile (Figure 4) of the non-woven fabric (TNT) 2 m wide as a cover for the IDROSAC 500 drainage bags.

The DL decided on a laying system along the excavation line (Figure 7 drainage bags). Once the drainage bags had been laid, the non-woven fabric was manually closed over the bag itself (Figure 8).



Figure 4 – Pieces of non-woven geotextile (TNT) used to cover the IDROSAC 500 drainage bags at the estate in Montalcino



Figure 5 – Positioning of IDROSAC 500 drainage bags at the bottom of the trench



Figure 6 – Manual covering of the drainage bags with TNT inside the trench



Figure 7 – Laying the TNT piece lengthwise with respect to the direction of the excavation



Figure 8 – Manual closure of the non-woven fabric over the IDROSAC 500 drainage bag

With regard to the joining of the drainage modules, necessary to provide hydraulic continuity to the system, it was proposed to the DL to:

- make this connection outside the excavation, before laying it at the bottom of the trench;
 - join the head of each drainage module with wire;
- so as to obtain a drainage cylinder equal to the length of the trench excavation.

3.3 – Filling the excavation

For the section of excavation in which the IDROSAC 500 system was installed, the previously excavated trench was backfilled. The excess excavated material was placed in position up to the final planned level and adequately compacted so as not to create areas of preferential rainwater retention. This material is particularly suitable as it has similar permeability and filtration capacity to the adjacent material in place.

During the surface restoration, it was finally recommended to regularise the slopes according to the morphometry of the adjacent areas.

End of document