

Installation of cables for monitoring purposes in the ground by using Horizontal Directional Drilling – An opportunity to harvest interesting results and to attempt it again in a near future.

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Sweden currently bases a significant part of its power generation on hydropower plants, most of which were created more than 50 years ago. This is why it is important that the dams that store this energy in the form of water are in good condition.

Vattenfall, the Swedish state power company, has long sought ways to improve methods for accurately knowing the condition of dams.

An idea that seems promising at the moment is based on observing the internal changes of certain properties of the materials of the dam structure. If there are unexpected changes, it is likely that the dam has internal problems that can be catastrophic in the long run.

To do this, it is necessary to install cables with a series of sensors inside the dam, something that a priori seems very risky because, during installation, damage could be caused to the structure of the dam.

So how would it be possible to install those sensors without damaging the dam or the sensors themselves? Once the cable is installed, could its exact position inside the dam be known?

To answer these questions, it was proposed to investigate the use of a relatively modern drilling method called Horizontal Directional Drilling.

For safety reasons, it was decided not to directly test the drilling method in a dam, but in a place with similar geological conditions as its internal structure. A study was carried out to find a suitable place for the test and then the drilling method was tested.

Unfortunately, the installation attempt was not successful, so the cable could not be installed. It has not been possible to assess the objective of this thesis satisfactorily and therefore it is not possible to make an accurate judgment on whether Horizontal Directional Drilling is suitable for installing sensors in hydropower earth embankment dams.

Although the main objective could not be achieved, certain recommendations can be drawn from it:

It is important to carry out a proper preliminary study sufficiently in advance to choose the optimal drilling site.

For future drilling attempts, it is also recommended to carefully choose the drill rig to find out if it is suitable for the job.