SOIMON - New fast and reliable technology for soil inspection in contaminated sites with machinery condition monitoring

Currently, characterisation techniques of contaminated sites suffer from the complete absence of a fast and reliable in-situ method. The most common technique involves the laboratory analysis of the samples, which is time-consuming and expensive. The SOIMON project aims to develop an automated system capable of performing in-situ and real-time soil analysis, using drills with built in Analytical Sensors array (AS) for Volatile Organic Compounds (VOC) and heavy metal inspection. The former will be investigated using in-situ radiometric sensors.

Project objective

The SOIMON approach integrates AE and accelerometers, active drivers and electronics to continuously analyse and damp vibrations sourced by the whole drill structure with the ultimate goal of protecting the sensors case and its integrity as well as preventing failures of drill components. This approach will ensure the reliable response of the analytical/ radiometric sensors during drilling.

The expected benefits of the project are:

- Reduction of inspection costs up to 50% (through decreasing downtime of equipment and reducing inspection costs).
- Speeding up decisions on soil remediation activities.

The overall aim is to develop an advanced and reliable in-situ investigation method for identifying and characterising pollution in a wider type of terrains. The bore-pipes integrity will be fully checked using VTA sensors and the data will be fed to the AVC tool in order to attenuate their impact at the first bore-pipe where the analytical/ radiometric sensors case is located.

Furthermore, the vibration damping and analysis techniques will be either permanently or semi-permanently installed, reducing the need for an inspector to be on site for sampling in potentially hazardous environments. In addition, the downtime and costs associated will be reduced by analysing samples on site and in live time, which will provide a fast set of data for rapid decision making of soil treatment.

In parallel to this development, novel SAW sensors with improved sensitivity for VOC analysis will be integrated with the objective of increasing sensitivity and reducing the volume.

The advantages of the SOIMON system include:

- Increased reliability of the data acquired in-situ in a wider range of terrain types.
- Reduced cost of analytical/ radiometric sensors case (reduced volume and need of peripheral equipment) > 30%.
- Reduced disruption in normal service.
- Increased drill parts life span by allowing 100% in real time structural monitoring (bore-pipes, drill-head and sensors case).
- Reducing maintenance costs by predicting failure so that maintenance will be performed only as needed.
- Reduced soil inspection costs by up to 50% (reduction of operation time).
- Reduced time for site investigation thus enabling faster decision making foundation for soil treatment.

For further information, please visit the project website at **www.soimon.eu**.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant agreement number 605065.