



Geophysical methods for road construction and maintenance

Hedi Rasul (1,2), Caroline Karlson (1), Imran Jamali (1), Robert Earon (1), and Bo Olofsson (1)

(1) Division of land and water resources, Royal Institute of Technology-KTH, Stockholm, Sweden (hedir@kth.se), (2) Faculty of Engineering, Koya University, Erbil, Kurdistan Regional Government-Iraq, (hedir.rasul@koyauniversity.org)

Infrastructure, such as road transportation, is a vital in civilized societies; which need to be constructed and maintained regularly. A large part of the project cost is attributed to subsurface conditions, where unsatisfactory conditions could increase either the geotechnical stabilization measures needed or the design cost itself. A way to collect information of the subsurface and existing installations which can lead to measures reducing the project cost and damage is to use geophysical methods during planning, construction and maintenance phases.

The moisture in road layers is an important factor, which will affect the bearing capacity of the construction as well as the maintenances. Moisture in the road is a key factor for a well-functioning road. On the other hand the excessive moisture is the main reason of road failure and problems.

From a hydrological point of view geophysical methods could help road planners identify the water table, geological strata, pollution arising from the road and the movement of the pollution before, during and after construction. Geophysical methods also allow road planners to collect valuable data for a large area without intrusive investigations such as with boreholes, i.e. minimizing the environmental stresses and costs. However, it is important to specify the investigation site and to choose the most appropriate geophysical method based on the site chosen and the objective of the investigation.

Currently, numerous construction and rehabilitation projects are taking places around the world. Many of these projects are focused on infrastructural development, comprising both new projects and expansion of the existing infrastructural network. Geophysical methods can benefit these projects greatly during all phases. During the construction phase Ground Penetrating radar (GPR) is very useful in combination with Electrical Resistivity (ER) for detecting soil water content and base course compaction. However, ER and Electromagnetic (EM) methods can also be used for monitoring changes in water content and pollutant spreading during the maintenance phase.

The objective of this study was to describe various geophysical methods which could benefit the road planning, construction and maintenance phases focusing on hydrological impacts.