



GPR use and activities in the Czech Republic

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In the field of civil engineering applications in the Czech Republic, Ground Penetrating Radar (GPR) is used particularly for the diagnostics of roads and bridges.

There is no producer of GPR in the Czech Republic, sets of different producers are used, particularly Geophysical Survey Systems, Inc. (USA) and MALÅ GeoScience (Sweden). The measurement results are mostly processed by software Radan, Road Doctor Pro, ReflexW and RadEx.

The only technical specification in the Czech Republic is TP 233 issued by the Ministry of Transport, which describes the diagnostics of roads by GPR. Apart from a basic description of the method and a measurement system, it mentions possible applications. The only application where accuracy is mentioned is the locating of dowels and tie bars in concrete road pavements, which states that if calibration is performed, the expected depth accuracy is up to 1.0 cm.

The following R&D project is currently in progress:

New diagnostics methods as a supporting decision tool for maintenance and repair of road pavements - their contribution and ways of their usage (2012-2014)

The project aims to test possible non-destructive methods (particularly GPR and laser scanning), make recommendations when and how to use specific methods for individual applications and for changes in technical specifications.

The following R&D projects have been recently completed:

Position of dowels and tie bars in rigid pavements and importance of their correct placement to pavement performance and service life (2012-2013)

The project included an analysis of individual NDT methods used for the location of dowels and tie bars and for testing of their accuracy – GPR, MIT-scan and GPR in combination with a metal detector.

Multichannel ground penetrating radar as a tool for monitoring of road and bridge structures (2009-2011)

The project included detection of hollow spaces under non-reinforced concrete pavements, detection of excessive amount of water in road construction layers, and measuring of crack depths in road pavements.

The concrete structure diagnostics development through the use of WPR (Wall Penetrating Radar) scanner (2008-2010)

The project was focused on the development of WPR for non-destructive diagnostics of concrete structures, as an accurate and reliable device for diagnostic survey, even at less easily accessible places.

The results of road diagnostics by GPR are still not stored in the Road Database. In 2013, CDV designed a method how to perform assessment of the position of dowels and tie bars in concrete road pavements and the way how to register the measurement results of road layer thicknesses in the Road Database.

The comparative measurements of devices used for the measurements of variable parameters of roads are performed according to technical specification of the Ministry of Transport TP 207: Accuracy Experiment. The specification deals with devices measuring surface properties and deflections of road pavements. GPR is not included there. In 2013, CDV designed a method how to perform this experiment for continual measurements of pavement layer thicknesses by GPR on reference road sections. The designed method is based on the first realized comparison measurement of pavement layer thicknesses at two-kilometre asphalt motorway section. 6 Czech companies participated in the comparative measurement.

Wider use of GPR method will allow to clarify measurement accuracy for individual applications. The performance of comparative measurements together with issuing of authorization for measurement will guarantee that the measurements on Czech road network are only performed by companies with required knowledge and experience.

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