



Civil Engineering Applications of Ground Penetrating Radar in Finland

Terhi Pellinen (1), Eeva Huuskonen-Snicker (2), Martta-Kaisa Olkkonen (3), and Pekka Eskelinen (4)

(1) Department of Civil and Environmental Engineering, Aalto University, Finland (terhi.pellinen@aalto.fi), (2) Department of Civil and Environmental Engineering, Aalto University, Finland (eeva.huuskonen-snicker@aalto.fi), (3) Department of Electrical Engineering and Automation, Aalto University, Finland (martta-kaisa.olkkonen@aalto.fi), (4) Department of Electrical Engineering and Automation, Aalto University, Finland (pekka.eskelinen@aalto.fi)

Ground penetrating radar (GPR) has been used in Finland since 1980's for civil engineering applications. First applications in this field were road surveys and dam inspections. Common GPR applications in road surveys include the thickness evaluation of the pavement, subgrade soil evaluation and evaluation of the soil moisture and frost susceptibility. Since the 1990's, GPR has been used in combination with other non-destructive testing (NDT) methods in road surveys. Recently, more GPR applications have been adopted, such as evaluating bridges, tunnels, railways and concrete elements. Nowadays, compared with other countries GPR is relatively widely used in Finland for road surveys. Quite many companies, universities and research centers in Finland have their own GPR equipment and are involved in the teaching and research of the GPR method. However, further research and promotion of the GPR techniques are still needed since GPR could be used more routinely.

GPR has been used to evaluate the air void content of asphalt pavements for years. Air void content is an important quality measure of pavement condition for both the new and old asphalt pavements. The first Finnish guideline was released in 1999 for the method. Air void content is obtained from the GPR data by measuring the dielectric value as continuous record. To obtain air void content data, few pavement cores must be taken for calibration. Accuracy of the method is however questioned because there are other factors that affect the dielectric value of the asphalt layer, in addition to the air void content. Therefore, a research project is currently carried out at Aalto University in Finland. The overall objective is to investigate if the existing GPR technique used in Finland is accurate enough to be used as QC/QA tool in assessing the compaction of asphalt pavements. The project is funded by the Finnish Transport Agency. Further research interests at Aalto University include developing new microwave asphalt radar for the thickness evaluation of thin asphalt layers.

This work benefited from networking activities carried out within the EU funded COST Action TU1208 "Civil Engineering Applications of Ground Penetrating Radar".