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Assessment of highway pavements using GPR

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Highway infrastructure is a prerequisite for a functioning economy and social life. Highways, often prone to congestion and disruption, are one of the aspects of a modern transport network that require maximum efficiency if an integrated transport network, and sustainable mobility, is to be achieved. Assessing the condition of highway structures, to plan subsequent maintenance, is essential to allow the long-term functioning of a road network. Optimizing the methods used for such assessment will lead to better information being obtained about the road and underlying ground conditions. The condition of highway structures will be affected by a number of factors, including the properties of the highway pavement, the supporting sub-base and the subgrade (natural ground), and the ability to obtain good information about the entire road structure, from pavement to subgrade, allows appropriate maintenance programs to be planned.

The maintenance of highway pavements causes considerable cost and in many cases obstruction to traffic flow. In this situation, methods that provide information on the present condition of pavement structure non-destructively and economically are of great interest. It has been shown that Ground-Penetrating-Radar (GPR), which is a Non Destructive Technique (NDT), can deliver information that is useful for the planning of pavement maintenance activities. More specifically GPR is used by pavement engineers in order to determine physical properties and characteristics of the pavement structure, information that is valuable for the assessment of pavement condition.

This work gives an overview on the practical application of GPR using examples from highway asphalt pavements monitoring. The presented individual applications of GPR pavement diagnostics concern structure homogeneity, thickness of pavement layers, dielectric properties of asphalt materials etc. It is worthwhile mentioning that a number of applications are standard procedures, either separately or in combination with other NDT methods, but even for them there is still a room for improvement and there is still need to set stricter regulations Comparisons between radar results and ground truth data produce evidence in support of the statement that the accuracy and reliability of radar results is sufficient for facing many issues related to the evaluation of asphalt pavements. Thus, benefits and limits of this method are shown and recommendations for GPR inspections are presented.

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