

EGU2020-12032

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



Investigating the Causes of Roads Deterioration in the Form of Potholes using Non-Destructive Testing

Muhammad Naveed, Kanishka S. Turrakheil, Fabio Tosti, and Amir M. Alani

School of Computing and Engineering, University of West London (UWL), London, United Kingdom of Great Britain and Northern Ireland (Muhammad.Naveed@uwl.ac.uk; 21365051@student.uwl.ac.uk; Fabio.Tosti@uwl.ac.uk; Amir.Alani@uwl.ac.uk)

Potholes are one of the public's main local concerns as they cost a lot to the economy in terms of repair bills, delays while repairs are carried out and vehicle wear-and-tear. According to the Annual Local Authority Road Maintenance (ALARM) survey, eliminating the pothole backlog in England and Wales would cost £9.8bn and take a decade to complete despite increased local roads investment. The aim of this study is to research why potholes occur in the first place using non-destructive testing (NDT) and potential remedies in terms of the development of effective design and innovative materials to prevent their formation in future.

To investigate the causes of potholes formation, in-situ use of NDT methods such as ground-penetrating radar (GPR) has proven effectiveness as roads remain in continuous use. Analysis of GPR data can provide information on layer depths, material condition, moisture, voiding, reinforcement and location of other features [1, 2, 3].

Through our results, we will test two hypothesis; (i) shallow potholes are formed on loss of adhesion of the surface course, (ii) deep potholes are formed due to the loss of bearing capacity or settlement of the subgrade. Poor drainage in combination of heavy loads trigger shallow potholes while extreme wetting-drying cycles as a result of climate change decayed subgrade conditions of the pavement.

Results presented in this abstract are part of a PhD project funded by the University of West London.

References

- [1] Saarenketo, T. and T. Scullion (2000). Road evaluation with ground penetrating radar. *Journal of Applied Geophysics* (43): 119–138.
- [2] Benedetto, A., Tosti, F., Bianchini Ciampoli, L., and F. D'Amico (2016). An overview of ground-penetrating radar signal processing techniques for road inspections. *Signal Processing* (132): 201-209.
- [3] Benedetto, A., Benedetto, F., and F. Tosti (2012). GPR applications for geotechnical stability of

transportation infrastructures. *Nondestructive Testing and Evaluation*, 27 (3): 253–262.