

# **Recent Advances in Railway Geotechnics and Geodynamics**

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## **Extended Abstract**

The railway industry continues to aspire towards higher passenger train speeds and higher freight axle loads. This includes operational high-speed train speeds now reaching 350km/h and freight axle loads exceeding 40 tonnes. These characteristics result in track and subgrade challenges such as differential settlement, bearing capacity issues, soil non-linearity and dynamic amplification. This presentation will therefore present new advancements in these fields, with the aim of addressing the railway challenges of today and tomorrow. Train speed induced dynamic amplification will be discussed, including new equivalent-linear modelling strategies which can simulate the effect of non-linear stiffness and damping, which arise from elevated strains in the track-subgrade structure. Bearing capacity is also discussed, including promising new shakedown approaches to assist with track design. Further, new approaches for studying differential track settlement, including the effect of moisture content, are presented which allow for the scheduling of railway ballast maintenance.