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Simulate the Failure of Embankment Due to High-speed Train Moving Load

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Abstract **-** The stunning development of modern railways coincides with the appearance of high-speed trains, which led to an inevitability complex analysis with a focus on dynamic soil behaviour. One of the critical engineering challenges with increased speed is that dynamic behaviour which amplified within the track and supporting earthworks. The three-dimensional analyses are necessary to achieve a better simulation of train-induced ground vibrations in order to study certain effects of this problem. The developed numerical modelling must represent a realistic simulation of the railway track, trainload, and subsoil. This paper investigates the results of numerical modelling in PLAXIS 3D for simulating moving loads on a typical soft soil. Several static point loads; with amount load equal to train axle load; were applied along the railway track. The dynamic multiplier is assigned as a time-shear force signal for each point load. The shear forces calculated by modelling the beam under unit loads on the elastic foundation. The resulting shear forces in the beam were applied to the 3D model as factors of the dynamic. The results of numerical models showed that acceleration and velocity decreased with depth and increased with soil stiffness.

Keywords**:** PLAXIS 3D, High-speed railways, ground vibrations, soft clay, numerical modelling