

English summaries

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Fatigue loading tests of concrete railway sleepers

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Summary. In fatigue load tests, unused Finnish concrete railway sleepers B97 and BP99 were loaded. The purpose of the loading tests was to analyse the fatigue properties of the sleepers and the effect of the fatigue on the stiffness of the sleeper. Furthermore, the significance of cracks was estimated in the study. The load levels were chosen so that it was possible to estimate the significance of the fatigue in a real operating situation. The fatigue limit that has been determined based on the loading tests and the computational limit state of crack formation are distinctly higher than the bending moments that have been measured in the field tests. Consequently, the deterioration of the railway sleepers under the traffic load and due to the fatigue is very unlikely.

Key words: concrete railway sleeper, loading test, fatigue

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Modelling the effects of rail side wear

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Summary. The aim of this paper is to examine the effect of rail side wear on rolling stock movement. Rail side wear increases rail gauge which directly leads to increasing rail clearance. Rail clearance regulates the emergence of flange contact, and increasing rail clearance enables larger lateral movement to the wheelset i.e. two wheels connected by an axle. The vehicle model assembly and simulations with different track sections aim to clarify the dependency of rail loads and vehicle accelerations on rail side wear level. The vehicle model selected for simulations is Ex-passenger coach, which is a single-floor IC-coach. The effect of rail side wear level on rolling stock movement is examined with different rail profiles. The chosen rail profiles are mildly worn rail profile, heavily worn rail profile and extremely heavily worn rail profile. Simulations are performed in straight track and in curves with different curve radii. The areas of switches & crossings have been outlined outside this survey. Based on the simulation results, rail side wear has no remarkable negative effect on rolling stock movement and rail loads.

Key words: rolling stock, rail side wear, wheel-rail contact, simulation, vehicle modelling, multibody dynamics