

Evaluation of Reducing Effect of USP on Ballasted Track Vibration based on Loading Frequencies

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Since resilient sleepers were applied to the railway lines, solid rubber has been mainly used for under sleeper pad (USP). Recently, cellular rubber is newly used for the material of USP. As for the cellular USP, it can absorb plastic deformation generated by the angular ballast grains which press into USP. The authors focused on dynamic viscoelasticity of the USP and evaluated characteristics with focus on loading frequencies. Referring to the evaluation results, the authors carried out cyclic loading test with 2 cases of frequencies on ballasted layer, using 2 types of loading plates with/ without USP. Furthermore the authors carried out vehicle running simulation by using simple vehicle-track model to evaluate reducing effect of USP on ballasted track vibration. These results show that USP has a good effect on reduction of ballast vibration and that the effect is predominantly at the cases of faster running velocity of vehicle and of larger stiffness of subgrade.