

# Steel bridge in interaction with modern slab track fastening systems under various vertical load levels

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**Abstract.** In modern slab tracks the continuously welded rail (CWR) is coupled through the fastening system with the substructure. The resulting restriction of expansion movement causes significant rail stress increments, which in the case of extreme loading may cause rail failures. These interaction phenomenon effects are naturally higher on a bridge due to different deformation capabilities of the bridge and the CWR. The presented contribution aims at investigating the state of the art European direct fastening system that is suitable for application on steel bridges. Analysis involves experimental determination of its nonlinear longitudinal interaction parameters under various vertical loads and numerical validation. During experimental procedures a two and a half meter long laboratory sample equipped with four nodes of the Vossloh DFF 300 was tested. There have been checked both DFF 300 modifications using the skl 15 tension clamps and the low resistance skl B15 tension clamps. The effects of clamping force lowering on the interaction parameters have also been investigated. Results are discussed in the paper.