EXPERIMENTAL INVESTIGATION OF COMPONENTS FOR FASTENING THE RAILS

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1. Introduction

The submitted paper is dedicated to the modelling in laboratory the operating conditions to which the tension clamps and the track panels are subjected during the operation. EWEM tension clamps are the topic of the analysis, Fig. 1. Within the installation the tension clamp is stressed, the pressing arm is picked up in vertical direction and the tension clamp starts to press on the foot of rail with the pressing force proportional to the picking up of the pressing arm. During a transport of tract panels the tension clamps are stressed with additional forces from the gravity of hanging sleepers and from the inertial forces arising due to oscillating motion of track panels. The tension clamp acts as a linear element only to the certain value of picking up of the pressing arm. After the crossing of the limit value of picking up the plastic deformations come into existence. The tension clamp is weakened in this stage because of its ability to activate pressing force is reduced proportionally to the value of the permanent irreversible deformation. It was the reason for modelling in laboratory the operating conditions to which the tension clamps and the track panels are subjected during the operation. In such a way it is possible to determine the limit value of the picking up and to estimate the conditions of overloading the tension clamp and to predict its behaviour in real conditions.

Fig.1 EWEM tension clamp

2. Static and dynamic test

The set of 16 tension clamps were tested in static and dynamic load regime. The stiffness characteristics described the dependence of acting pressed force versus deformation of a clamp have been the subject of static tests. Except of static test the part of a rail was subjected to the dynamic cyclic load simulating the three years operation in real conditions, Fig. 2.

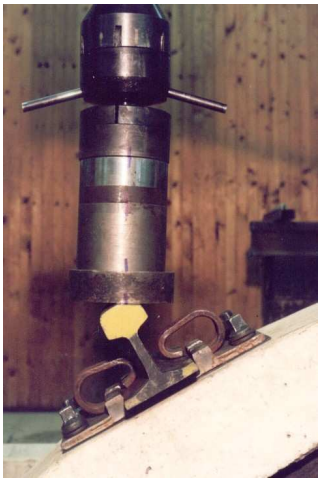

Fig. 2 Dynamical experimental testing

After the dynamic test the static test was carried out again. The influence of dynamic loading on the degradation of mechanical properties was estimated. Also the influence of additional load by the gravity forces and the inertial forces within oscillation of track panels during transport was modelled in laboratory conditions, Fig. 3. All influences were estimated and recommendations for praxis were yielded.

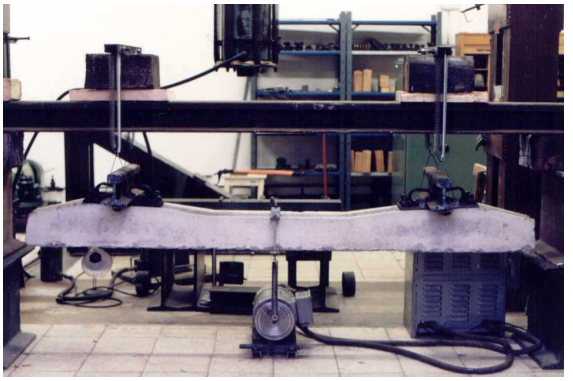

Fig. 3 Experimental modelling of additional load

3. References

[1] Kuchárová D.: Experimental Estimation of rail response on the effect of moving vehicles. *Proceedings of the 37th International Conference on Experimental Analysis of Stress – EAN´99*, Frenštát p. Radhoštem, 1.-3-6-1999, p.91-94.

[2] Melcer, J.: Experimental modelling of dynamic additional load of tension clamps used for fastening the rails. *Proceedings of the 39th International Conference on Experimental Stress Analysis 2001*. June 4-6, 2001, Tabor, Czech Republic, Czech Technical University, Prague, 2001, p.221-224.