

Fatigue behaviour of Vossloh SKL14 tension clamps

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Abstract

The reliability of the railway superstructure depends, among other things, on the actual fastening of the rail to the sleepers. This structure is extremely dynamically loaded. In the paper, the attention is paid to the flexible Vossloh W14 fastening system with the use of SKL14 tension clamps. These clamps are often damaged by fatigue failures, especially in curves of small radii ($R < 400$ m). Within the research, fracture areas were identified and a fractographic analysis was performed. The analysis proved fatigue failure and, therefore, an estimation of the service life of the clamps was made. The evaluation was focused on a selected area of railway track where the fatigue-damaged clamps were found. The strain gauges were placed directly on the clamps at critical points and the obtained values were confronted with the experimentally obtained fatigue curve. Based on the presented findings, the service life of the clamps in the selected track was identified.

Keywords: railway superstructure, Vossloh W14, SKL14 clamps, fractographic analysis, fatigue curve, service life.

1 Introduction

Railway transport currently plays a very important role, and it is therefore necessary to have a safe and reliable railway with as few closures as possible. The overall reliability and safety of railway tracks is given by the reliability and safety of particular objects such as bridges, ladder tracks and fastening systems. Each of the objects consists of individual structural parts that directly affect the reliability and safety of the object. One of the parameters determining the reliability of the railway superstructure is the so-called geometric parameters of the track. These depend, among other things, on the actual fastening of the rail to

the sleepers. This structure is extremely dynamically loaded.



Figure 1. Fracture of the SKL14 clamp arm