



Temperatures during Weld Repair on Orthotropic Steel Decks

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Abstract

The paper describes one particular problem connected with the repair of fatigue cracks in the stiffener-to-deck plate welds of orthotropic decks of road bridges. The bottom layers of the deck surface could be locally influenced by high temperatures due to welding on the bottom side of the deck plate. This fact is especially important when the mastic asphalt was only recently replaced and should not be damaged. Therefore, the repair procedure must be carefully proposed and executed.

Keywords: orthotropic steel decks, stiffener-to-deck plate weld, weld repair, temperature on steel surfaces, numerical thermal analysis.

1 Introduction

Old stiffener-to-deck plate welds of steel orthotropic decks of road bridges have often been designed as fillet welds, even with a thickness smaller than the stiffener web. As they are often prone to fatigue cracking, they must be replaced by partial penetration T-butt welds. During repair, the bottom layers of the deck surfacing can be locally influenced by high temperatures due to welding. This paper contains results of an experimental investigation of this problem and comparison with numerical analyses.

2 Issues of weld repair of existing bridge decks

If we consider an existing wearing surface on a road steel bridge with an orthotropic deck, we can assume that its composition will be as in Table 1.

MA 11 PMB is a mastic asphalt produced according to STN EN 13108-6 [3] with the largest grain $d=11$ mm. In Slovakia, the properties of the asphalt mixture must meet the requirements of STN 73 6242:2010 [5].

According to Sika Material Data Sheets, SikaCor HM Primer [6] in combination with SikaCor HM Mastic [7] is temperature resistant up to $+150$ °C.