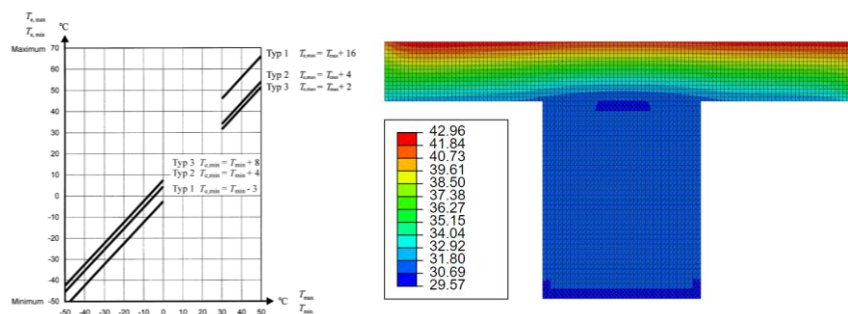


## Verification of the temperature load cases according to DIN EN 1993-1-5 for steel and steel composite bridges with numerical calculations

### Content

Structures are exposed to daily and seasonally changing climatic influences. These lead to a transient temperature state in the structure. As a reaction to the temperature loads, deformations or internal forces occur in the bridge depending on the geographical location, geometric properties and thermodynamic boundary conditions as well as the static system. The loads or temperatures that have to be applied in the design of bridge structures are defined in the design code DIN EN 1993-1-5 and DIN EN 1993-1-5/NA. Investigations have shown that the temperature values specified in the standard do not adequately represent the true temperatures of bridge structures. Furthermore, the temperatures specified in the National Annex of DIN EN 1993-1-5 are based on a limited data basis.

The aim of the work is to verify the temperature loads that are defined in the standard and to compare them with numerical simulations. For this purpose, in a first step, background information on the temperature load cases has to be obtained by a literature research. In addition, based on an already existing thermal model, the temperature distribution over 20 years shall be investigated at three bridge cross sections depending on different geographical locations and orientations. Following this, the constant and linear temperature components are determined from the generated temperature fields and evaluated according the safety level of the Eurocode. In the last step, these results shall be compared with the design values given by the standard.



### Tasks

- Literature review regarding temperature load cases
- Numerical temperature studies based on weather data in Abaqus

### Processing period

From now on

### Prerequisites

Basic knowledge in Matlab  
Basic knowledge in statistics

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