

Cable-stayed bridge in Rzeszów: steel girder as a displacement sensor



Nerve-Sensors: Case Study

The T. Mazowiecki cable-stayed bridge in Rzeszów was put into service in 2015. The bridge is 482 m long, with two traffic lanes in each direction. The structure is supported by a 107-m long A-shaped pylon with 64 cables. In 2018, the bridge was equipped with distributed fibre optic sensors for strain and temperature measurements. One of the main aims was to create the displacement 3DSensor from the steel girder itself along the 150-metre long river span.



Benefits of application

- Detection of **local events**, including steel anchorages, welds and ribs
- Distinguish between **mechanical and thermal strains**
- Calculation of **vertical displacement profile** (deflection line)
- Creating a **smart sensor from the real, full-scale structural element** (steel girder)

Example results



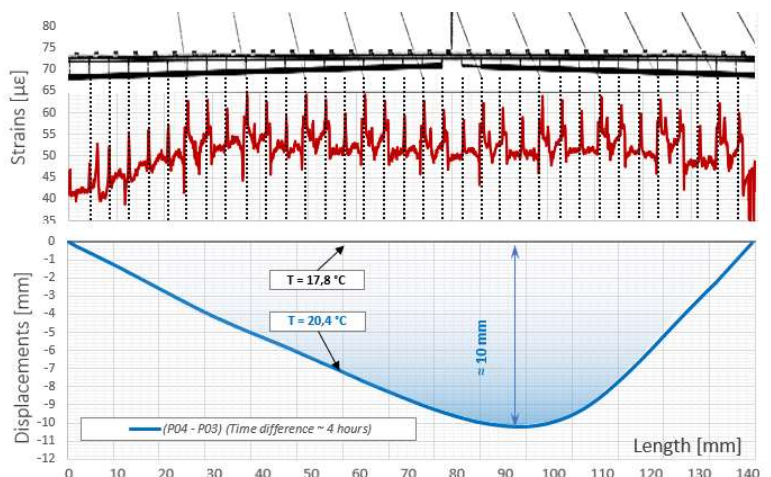
Distributed fibre optic strain sensors were installed at the bottom and upper part of the steel girder, along a 150 m long river span. All local effects, including perpendicular ribs, welds and anchorages, were clearly detectable in strain profiles. It was also possible to calculate vertical displacements [mm] based on the measured strains and the 3DSensor. Example results are shown in the figures.

 **6 000** measurement points

 **600 m** of sensing path

 **4 x** strain sensor

 **long-term** monitoring



project partner:

