

Cable-stayed bridge: localised effects due to the steel anchorage

Nerve-Sensors: Case Study

The steel cable-stayed bridge in Przemyśl was put into the service in 2012. At the time of construction, it was the fourth highest bridge in Poland. It is supported by two 61.5 meter high pylons, and its total length (inc. overpasses) is equal to 530 m. In 2017, the bridge was equipped with distributed fibre optic sensors (DFOS) dedicated for strain and temperature measurements. Two measurement sections were installed in collaboration with university graduate students.



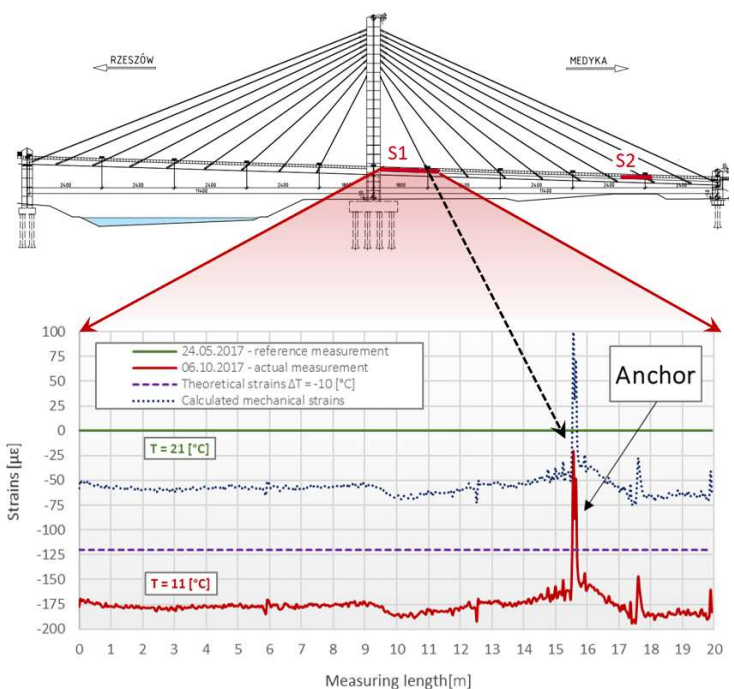
Benefits of application

- Detection of **local events**, including steel anchorages
- Distinguish between **mechanical and thermal strains**
- Observation of bridge performance due to the **non-uniform temperature load**
- Very **high compliance** with reference measurement methods (total station)

Example results

Distributed fibre optic strain sensors were installed at the bottom flange of the steel girder, which is suspended by 18 cables. Two measurement sections were created: the first 20 m and the second 13 m long.

The measurement sessions were performed acc. to the planned schedule, incl. periods with significant temperature differences. Thanks to our system, it was possible to detect localised effects in the steel girder caused by the cable anchorages – see the strain profile in the figure.



 **3 300** measurement points

 **33 m** of sensing path

 **2 x** strain sensor

 **long-term** monitoring