

# 24 m long prestressed concrete girders as a part of the smart production hall



## EpsilonRebar: Case Study

Three 24 m long prestressed concrete girders were equipped with **EpsilonRebars** embedded inside. The sensors were delivered on-site in coils and tightened to the existing reinforcement. This fast and easy installation process allowed the creation of smart elements able to self-diagnose during all stages: concrete hardening, prestressing, mounting in the structure, as well as during the load tests. Currently, the girders are under continuous operation in one of Polish production halls.



## Benefits of application

- Structural performance **control during all construction stages and load tests**
- Detection of **all the cracks** formed during early-age concrete (gardening process)
- Analysis of the **effectiveness of prestressing** process, including control of the cracks
- **Reliable system for short-term** load tests and **long-term** structural monitoring

## Example results

The monitoring system created based on **Nerve-Sensors** provided unique data for structural analysis. The first stage (1) was concrete hardening when a number of microcracks were detected. However, all of them were closed (see the plots) during prestressing stage (and activation of dead weight at the same time), so girders could be installed on columns (2) without any risk. Finally, the structural performance was checked during mechanical load tests (3), which showed that the girders work in uncracked conditions. This knowledge was extremely valuable for designers and could be successfully used, e.g. for optimisation.

 **57 600** measurement points

 **576 m** of sensing path

 **24 x** EpsilonRebar

 **short & long-term**

 project **partner:**



