High pressure gas pipeline: measurements of safety-critical structure

nerve-sensors.com

ER & 3D: Case Study

The 500-mm diameter gas pipeline in question is located in a mining area, where extremely large displacements could appear. 180 m long section was equipped with a number of **EpsilonRebars** and **3DSensors**, installed both directly on the steel surface of the pipe as well in the surrounding ground. Reliable structural control of such safety-critical structures is necessary due to the extremely high consequences of failure. **Nerve-Sensors** allowed for precise control during long-term monitoring.

Benefits of application

- Detection of **all the local events,** including welds, turns and potential leakages
- Full knowledge of **strains, stress, displacements and temp.** over entire length
- Measurements during high-pressure **water-tightness test** and in **annual cycle**
- Reliable health monitoring for **risk management** of the safety-critical structure

Example results

81 000 measurement points

1 620 m of sensing path

6 x EpsilonRebar, **3 x** 3D

load-tests & **long-term**

project **partner**: Cracow University of Technology

Nerve-Sensors allowed for measurements of strains, displacements and temperatures over the entire gas pipeline section. All local events (including welds and turns) were clearly detectable during tightness tests and one-year monitoring. Sensors were read using different optical dataloggers at the same time. Also, a number of reference spot gauges proved the perfect accuracy and performance of Nerve-Sensors in difficult geotechnical conditions. Example results of temperature distributions from three subsequent months (April, May, June) are shown below.