

Steel ground anchorages in an axial tension test

Nerve-Sensors: Case Study

The research performed in the laboratory of AGH University of Science and Technology was focused on the analysis of the structural performance of steel ground anchorages. The challenge in this project was to measure not only uniform elastic strains caused by axial tension but also extremely high and unregular strains during yielding. Thanks to DFOS strain sensors, it was possible to analyse this process in a very detailed way, e.g. indicating the areas where yielding starts.







Benefits of application

- Strain measurements **during elastic and plastic behaviour** of steel
- Detection of the **areas (zones) initiating the plastic behaviour** (yielding)
- Knowledge about **residual strains** after removing the load
- Thousands of measurement points for **scientific analysis and design purposes**

Example results

One of the research goals was to monitor the yielding process of steel anchorages during their axial tension tests. Thanks to distributed fibre optic sensing, it was possible to observe this phenomenon **both in length and time domain**, creating a 3D plot as shown below. In the initial load steps, uniform distribution of strains was observed over the entire length, but later, after exceeding the value of 2000 $\mu\epsilon$, the local yield zones were formed and identified by the DFOS-based system.

-  **3 076** measurement points
-  **2 m** of sensing path
-  **2 x** strain sensor
-  **short-term** (load tests)



project
partner:

