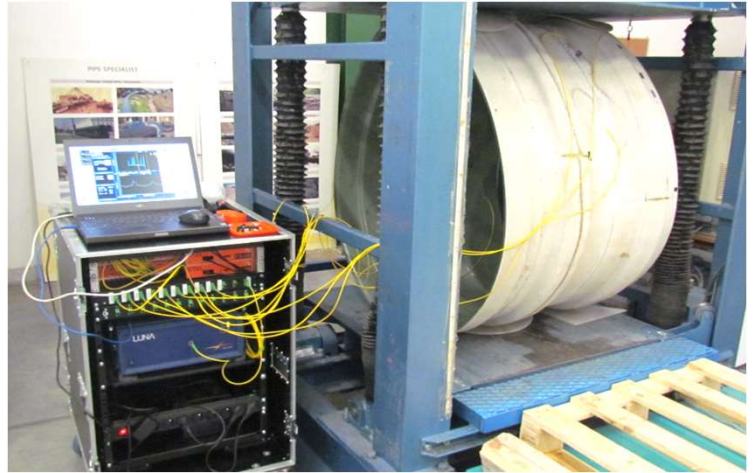


Smart composite pipelines capable of DFOS-based self-diagnosis

Nerve-Sensors: Case Study

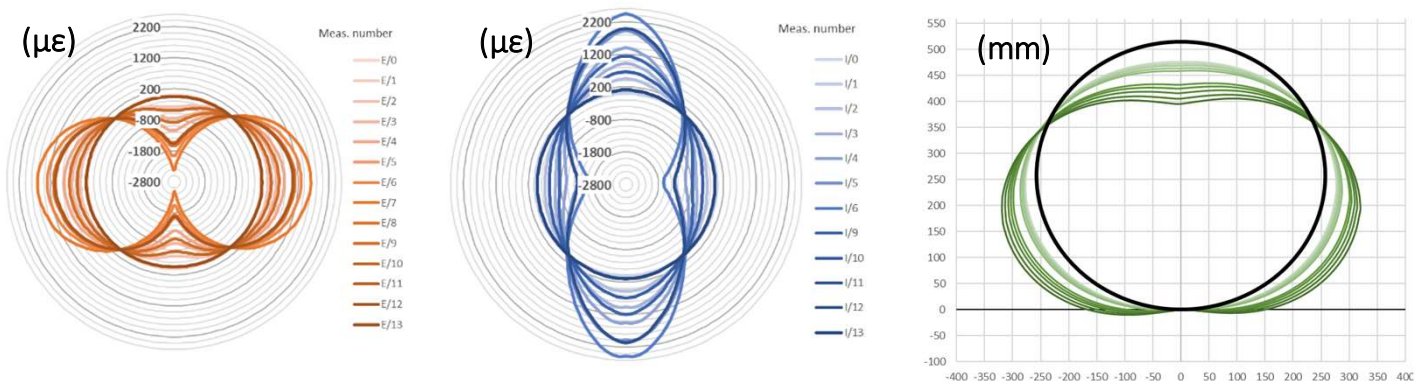
Composite collectors and pipelines were investigated in collaboration with the Warsaw University of Technology. The specimens were equipped with surface-mounted optical fibres for internal and external strain measurements. Thanks to that approach, 3DSensor could be utilised to calculate displacements (shape changes) expressed directly in millimetres. The research included pipe specimens with different geometry of the cross-section.



Benefits of application

- Simultaneous strain analysis over the **internal and external surface of the pipe**
- **Shape change calculations** according to the 3DSensor's algorithm
- **Thousands of measurements points** within a single element for self-diagnostics
- **Unique scientific data** on structural performance

Example results



 **9 200** measurement points

 **46 m** of sensing path

 **7 x** DFOS strain sensors

 short-term (**laboratory**)

The above figures show the example results obtained during laboratory load tests. The raw data for further calculations are **external strains** (left Fig.) and **internal strains** (middle Fig.). Using the algorithm of 3DSensor, it was possible to estimate the **shape changes** during subsequent load steps (right Fig.).

 project partner: **Warsaw University of Technology**

