

# Research on composite wind turbine blade for bridge applications



## Nerve-Sensors: Case Study

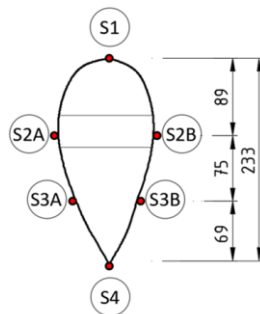
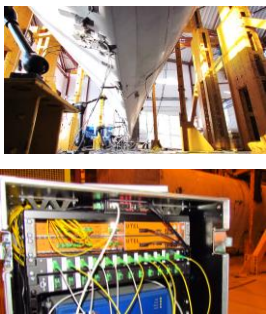
Many composite wind turbine blades are already reaching their design time. Thus, new ideas are investigated to give them a second life in new applications. In collaboration with the Rzeszów University of Technology, the blade's part was tested by multiple surface-mounted optical DFOS fibres. Thanks to that approach, we created a big 3DSensor from the structural component itself, able for self-diagnostics by measuring strains ( $\mu\epsilon$ ) and calculating displacements (mm).



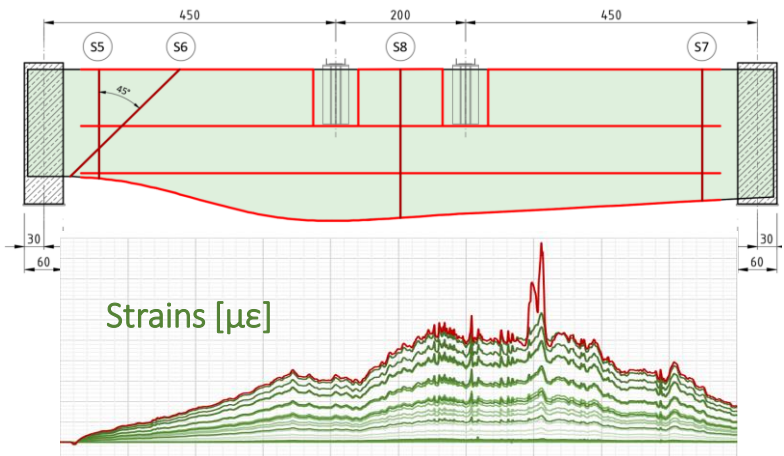
## Benefits of application

- Measurements of **strains distributions in a static and high-frequency way**
- **Shape change calculations** according to the 3DSensor's algorithm
- Thousands of sensing points allowing **for direct damage (fracture) detection**
- **Unique scientific data** to verify the possible ideas for component reuse

## Example results



Six measurements lines were installed on the surface of a composite wind turbine blade at different positions around the cross-section. After dynamic reading during load cycles, the component was loaded statically. The DFOS-based system allowed not only for strain and displacement measurements over the entire length but also for the identification of safety-critical cross-sections and, finally, the fracture.



**126 000** measur. points



**66 m** of sensing path



**6 x** DFOS strain sensors



short-term (**laboratory**)



project  
partner:

