

Concrete cylinders – mechanical tests in laboratory conditions

Nerve-Sensors: Case Study

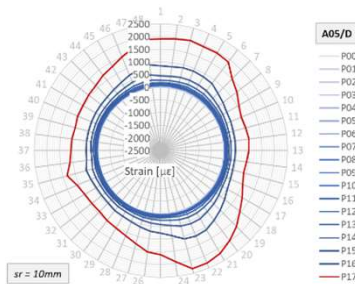
Nerve-Sensors provide new tools for structural analysis of small-size laboratory specimens made of concrete. In this case, 20 standard cylinders were investigated in mechanical axial compression tests up to their failure. DFOS strain sensors allowed for measurements of both compression (longitudinal) and tension (circumferential) strains at the same time. Thanks to the unique data, advanced structural analysis was possible.



Benefits of application

- Simultaneous measurements of **compression and tension strains**
- New approach in structural **failure prediction** based on Poisson's ratio analysis
- Thousands of gauges in the small-size cylinder **without disturbing its behaviour**
- Unique data inc. impact of **aggregate size, eccentricity, pores, cracks, imperfections**

Example results



This laboratory research shows the great advantage of DFOS-based strain sensors over conventional techniques. Compression and tension strains were recorded at the same time to calculate Poisson's ratio and predict the time of structural failure. Taking into account mechanical properties (such as elasticity modulus), other parameters were studied, e.g. size of the aggregate, pores, local imperfections and microcracks developed within circumferential (tension) sections – see example results in spatial and pie charts.

 **7 200** measurement points

 **36 m** of sensing path

 **20 x** strain sensor

 **short-term** lab tests



Project **partner:**



**Cracow University
of Technology**

