

Concrete column-slab system: simulation of column failure



EpsilonSensor: Case Study

The performance of full-scale concrete structure was investigated during the simulation of column failure. **EpsilonSensors** were installed inside the slab by tightening to the existing reinforcement. The main aim was to observe the crack morphology. What is more, additional optical fibres were glued to the steel reinforcement to analyze its behaviour during yielding process. The **Nerve-Sensor** system was able to measure strains successfully during entire research up until the structural failure.







Benefits of application

- Detection of **all the cracks** inside the concrete up to the **structural failure**
- Thousands of measurement points with **very fast and easy installation**
- Analysis of **steel yielding in extremely large strain levels**
- Max. registered strains **10 times higher** than in conventional foil strain gauges

Example results



EpsilonSensors allowed for detailed structural performance analysis during few research steps: (1) mechanical loading in elastic range, (2) changing the static scheme by removing the column (see the first cracks in the figure) and (3) additional loading through hydraulic jacket up to the total structural failure. Max. registered strains were 10 times higher than in case of conventional foil strain gauges, which were destroyed very early.

-  **4 000** measurement points
-  **20 m** of sensing path
-  **2 x** EpsilonSensor
-  **short-term** (load tests)

 project partner:  **RZESZOW UNIVERSITY OF TECHNOLOGY**

