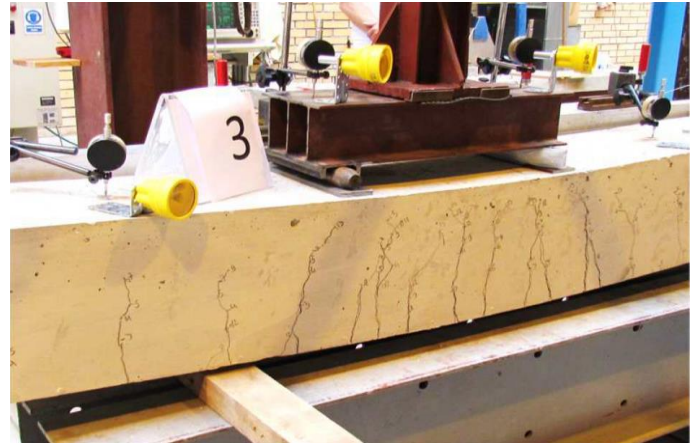


Prestressed concrete beams working in the extreme large crack state



EpsilonSensor: Case Study

Prestressed concrete beams, equipped with EpsilonSensors, were investigated during prestressing and mechanical load tests. Twelve beams were made to provide statistical confidence about the obtained results. One EpsilonSensor was arranged in such a way to create four measurement sections at different beam heights. Thanks to that approach, it was possible to detect cracks and calculate their widths, but also to assess the crack depths depending on the load step.



Benefits of application

- **Full knowledge on crack morphology** during entire research (all load steps)
- No risk of sensor breakage **during the extreme crack-induced strains**
- Calculation of **crack widths**, but also identification of their **depths** inside the beam
- **Reliable scientific data** on structural performance

Example results



EpsilonSensors embedded inside concrete allowed us to assess the effectiveness of prestressing process. However, the critical research stage were mechanical bending tests, where the knowledge on crack morphology was of key importance. EpsilonSensors provided spectacular results, measuring extensive cracks (> 2 mm) with crack-induced strains exceeding 2.7% (27 100 $\mu\epsilon$). Such values were not previously described in the literature. Our sensors provided reliable data for scientific analysis.

 **60 000** measurement points

 **300 m** of sensing path

 **12 x** EpsilonSensor

 **short-term (laboratory)**

 **project partner:**

