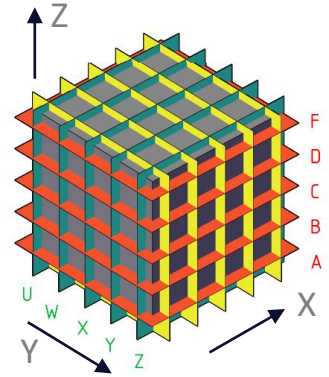


„Concrete tomograph” – early-age behaviour of massive element

Nerve-Sensors: Case Study

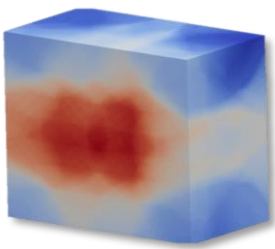
The very challenging experiment, were concrete cube was equipped with embedded optical sensors in three directions XYZ. The total number of 75 sections for strain and 25 sections for temperature measurements were created, without disturbing the structural performance of concrete. The aim of the research was to analyze spatial behaviour of massive element during hydration and shrinkage process, including temperatures and heat transfer.







Benefits of application

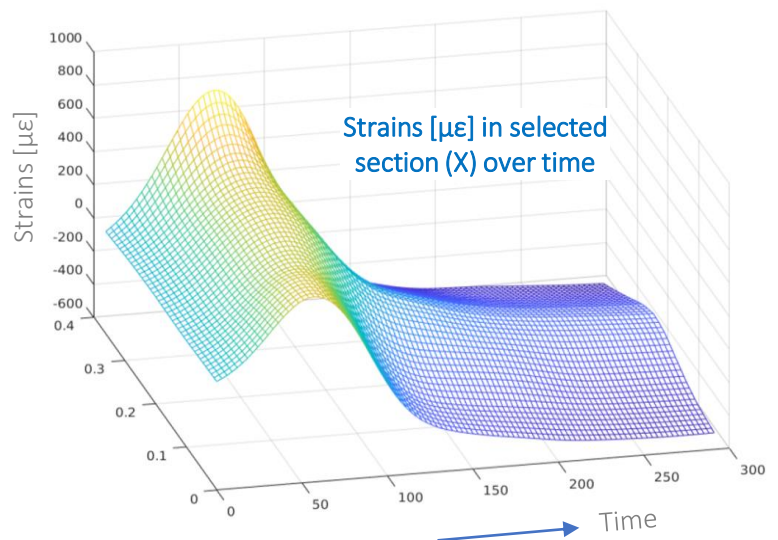
- Simultaneous measurements of **strains and temperatures in 3D space**
- Thousands of gauges in small element **without disturbing its behaviour**
- Unique data about massive structure for **designing purposes and FEM validation**
- Max. registered strains **10 times higher** than in conventional foil strain gauges

Example results



The 3D network of strain and temperature Nerve-Sensors was successfully embedded inside the cube concreted with self-compacting concrete. The installation process was challenging as it was no any reinforcement inside the element. The aim of the cube (35 x 35 x 35 cm) was to simulate behaviour of massive concrete element during its early age (hydration process). Finally, the spatial picture of thermal-shrinkage strains was obtained in all directions.

-  **7 000** measurement points
-  **35 m** of sensing path
-  **100 x** strain sensor
-  **early-age** concrete



project
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