# Priority program 2187 - Adaptive modularized constructions made in a flux

## Coordination project

Prof. Dr.-Ing. habil. Peter Mark
Ruhr University Bochum

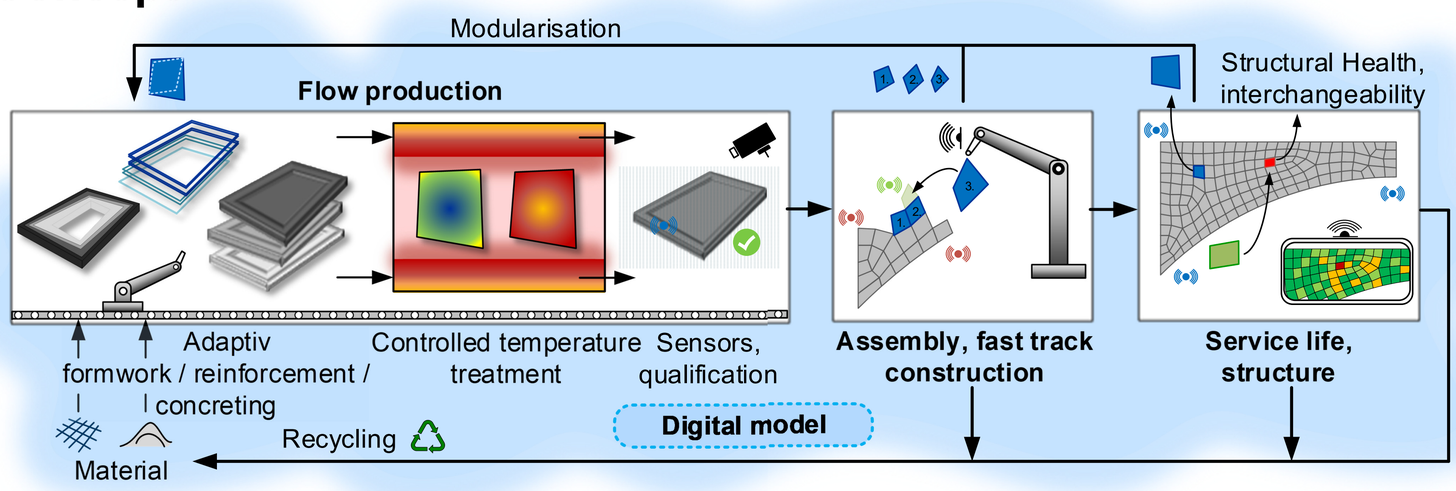
SPP 2187

## Motivation

### Challenges

- Replacement and new structures
- Minimization of interferences in infrastructure
- Industrialization of construction

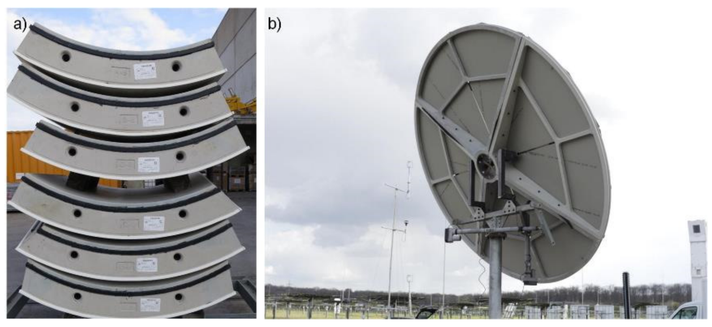
### Concept




## Methods

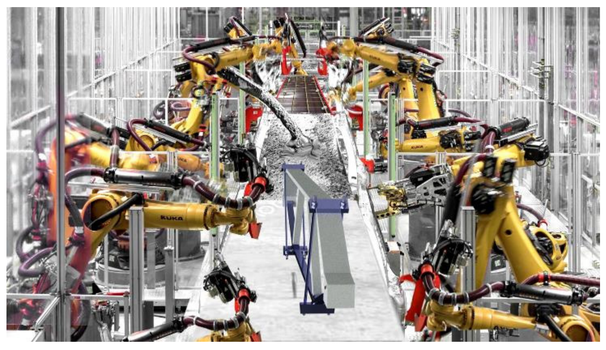
### Modularization

- „bottom-up“/ „top-down“
- High-performance material
- Steered by load or geometry



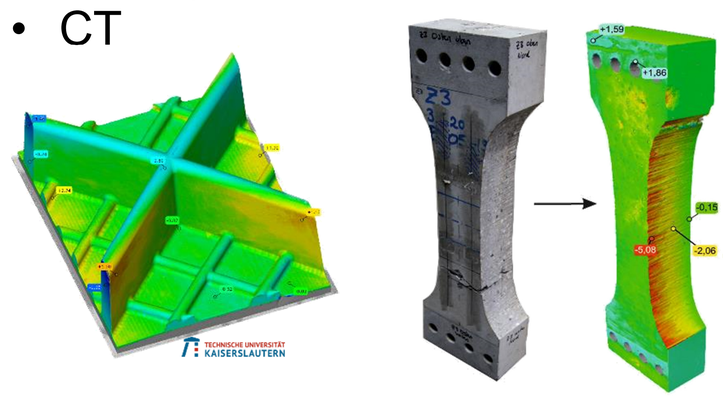

### Flow production

- Serial
- Scalable
- Automated



### Quality control

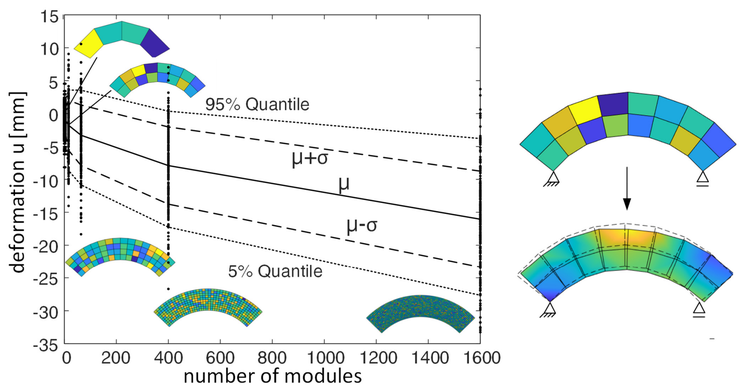
- Optical
- Photogrammetric
- CT



## Results

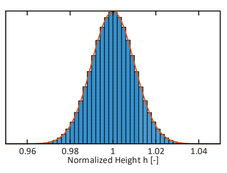
### Geometric uncertainties

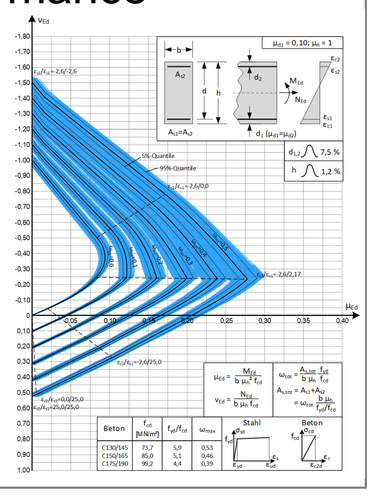
- Superposition of initial uncertainties for structures




### M-N-design charts

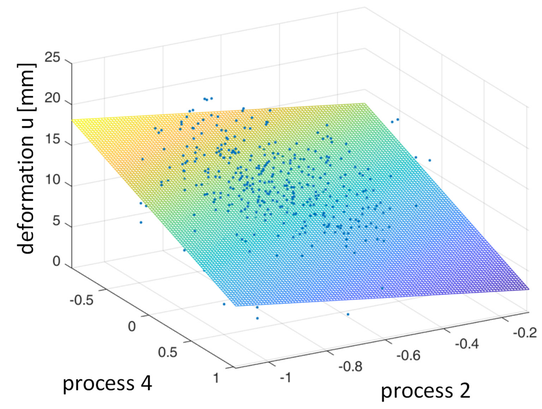
- Ultra-high-performance concrete
- Slender RC elements
- Geometric uncertainties



### Sensitivity analysis

- Identification of relevant processes for quality control




## Publications

[1] Mark, P.; Forman, P.: Schneller Bauen mit intelligenter Vorfertigung – das Schwerpunktprogramm 2187. In: DBV-Rundschreiben 263, Hrsg. Deutscher Beton und Bautechnik-Verein, Berlin, 2019, S. 12-15.

[2] Forman, P.; Mark, P.: Generalisierungsmethoden für den modularen Präzisionsschnellbau. BetonWerk International Nr. 4, 2020, S. 18-19.

[3] Mark, P.; Forman, P.: Schneller Bauen mit adaptiven Serienbauteilen – das Schwerpunktprogramm 2187. BFT International 87(2), 2021, S. 57.

[4] Forman, P., Penkert, S.; Mark, P.; Schnell, J.: Heliostate aus UHPC – modularer Ultraleichtbau. BFT International 87(2), 2021, S. 40-41.

[5] Mark, P.; Lanza, G.; Lordick, D.; Albers, A.; König, M.; Borrmann, A.; Stempniewski, L.; Forman, P.; Frey, A.; Renz, R.; Manny, A.: Vom Handwerk zur individualisierten Serienfertigung - Schwerpunkt adaptive Modulbauweisen mit Fließfertigungsmethoden. Bautechnik 98(3), 2021, S. 243-256.

[6] Mark, P.; Lanza, G.; Lordick, D.; Albers, A.; König, M.; Borrmann, A.; Stempniewski, L.; Forman, P.; Frey, A.; Renz, R.; Manny, A., Stindt, J.: Industrializing precast production - adaptive modularized constructions made in a flux. Civil Engineering Design 3(3), 2021, pp. 87-98.

[7] Forman, P.; Mark, P.: Interaktionsbemessung für schlanke Querschnitte aus UHPC. Beton- und Stahlbetonbau 116(8), 2021, S. 607–619.

[8] Forman, P.; Glock, C.; Mark, P.: Schnelles Bauen – Motivation, Historie und Konzepte. Beton- und Stahlbetonbau 116, Sonderheft Schneller bauen S2, September 2021, S. 2–11.

## Contact

**Ruhr University Bochum**
**Institute of Concrete Structures**

Dr.-Ing. Patrick Forman
patrick.forman@rub.de

www.rub.de/spp2187/