CONSTRUCTION TECHNOLOGY CLUSTER

Research Profile

The research activities of the Construction Technology Cluster are oriented towards practical applications in the construction industry.

Numerical modelling and experimental techniques are employed to develop new design methodologies and innovative construction technologies. The objectives of the Construction Technology Cluster are to implement research outcomes into codes of practice and disseminate them to the construction industry.

Research Topics

The technology cluster brings together researchers from 3 KU Leuven campuses to develop research in the following domains:

Structural Mechanics
- Human-induced vibrations
- Steel, concrete and composite structures

Sustainable Buildings
- Energy performance and indoor climate
- Timber constructions and use of organic fibres
- Social and ecological sustainability of buildings and communities
- Life cycle analysis
- Building Information Modelling - Improved process management for all life cycle stages of buildings
- Commissioning, building management and monitoring

Building Materials and Building Technology
- Ready-mixed and self-compacting concrete
- Concrete mix design and durability of concrete structures
- Sustainable materials management: recycling & re-use, selective demolition, demountable construction

Coastal Engineering
- Environmental structural loading
- Beach and dune dynamics

Applied Soil Mechanics
- Dynamic soil characteristics and liquefaction analysis

Geomatics
- Laser-scanning, photogrammetry and 3D geometry of buildings
- Geo data management (GIS) and GIS – BIM link
Unique infrastructure

The infrastructure of the TC Construction is dispersed over three KU Leuven campuses.

- Near Zero Energy test building with two lecture rooms, certified compliant Passive House standard. The building has an integrated, open system for Building Management and extensive, long-term monitoring.
- Large equipment for structural tests including a test floor (19.5m - 7.2m) for full-scale structures, a hydraulic press with a 1000 kN capacity for testing columns up to 3 m long, frames for four-point bending tests up to 750 kN per load, tension-compression bench with a 1500 kN capacity and a 250 kN dynamic bench.
- Laser scanner, total stations and photogrammetry equipment for on-site high-resolution measurement of buildings and infrastructure.
- Laboratory infrastructure for concrete technology
- State-of-the-art welding facilities through collaboration with the Welding Engineering Centre
- Cyclic triaxial testing cell
- Dynamic testing of structures: data-acquisition system, dynamic excitation (impulse hammer for modal analysis, shaker vibration system), acceleration sensors for structural vibrations (wired and wireless tri-axial sensors), 3D wireless human motion tracking system, force plate capturing 3D ground reaction forces.

Collaboration

- An extensive network of SMEs, research centres and universities in Belgium and Europe has been developed through collaborative research projects, EU projects and consultancy.
- Researchers from the technology cluster act as Belgian representatives in various groups, including the Evolution Groups of Eurocodes, Technical Committees of ECCS European Cost Actions and the IEA EBC programme.
- The Construction Technology Cluster strives for complementarities with all sections of the Department of Civil Engineering. Our research often bridges the gap between more fundamental research and the practical needs of SMEs.

Contact

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The research groups of the Construction Technology Cluster are active on the campuses in Bruges, Ghent and De Nayer Sint-Katelijne-Waver.