TailorCrete

The TailorCrete project has been launched to develop an integrated, automated process to enable cost-effective use of concrete in buildings that embody individualized solutions to challenges of function, climate, location, and aesthetics. TailorCrete will apply new digital design tools, on-site and off-site robotics, and automated formwork and reinforcement systems to bring concrete technology up-to-date with the potentials of contemporary architecture.
TailorCrete will make feasible the widespread application of complexly curved architectural forms and optimally shaped structural elements, thereby leading to a richer, more variegated architectural environment.

TailorCrete is an initiative of the Danish Technology Institute and is being implemented together with partner organizations drawn from the public and private sectors within the EU and neighboring states. The project is part of a Europe-wide drive to transform the construction industry from material-intensive to knowledge-intesive and is funded by a multi-year grant from EU's Seventh Framework Programme. The TailorCrete project commenced in 2009 and is scheduled for completion in 2013.

The TailorCrete project consists of ten interactive work streams, each drawing on the core expertise of its participating partners.

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Design of buildings that surpass the technical and economic limits of present-day concrete technology and serve as test-cases throughout the project.

Architectural Cases

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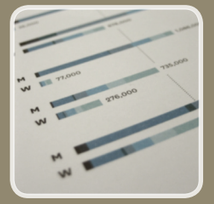
Design, engineering, and bench-scale testing of alternative robotically-operated formwork systems.

New Formwork Concepts

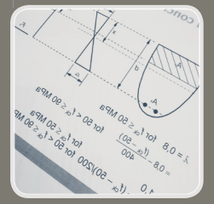
Simulation of concrete flows in relation to selected formwork and reinforcement types and development of optimal concrete composition.

Self Compacting Concrete



Comparative life cycle analyses of projects designed and built using the TailorCrete process versus present-day craft methods.

Life Cycle Assessments

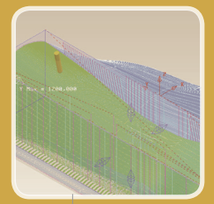


Identification of possible barriers in European construction standards and codes. Suggestion of necessary modifications to relevant standards and codes.

Compliance

TailorCrete

Design Tools
Development of computerized design tools to enable architects to formulate and apply innovative designs for robotic implementation in the field.



New Reinforcement Concepts
Specification and assessment of reinforcement materials, and techniques suitable to robotically formed concrete.

Digital Fabrication Techniques
The production and testing of full-scale robotic prototypes capable of implementing formwork and reinforcement.

Dissemination
The announcemant of the TC project results through channels including: websites, scientific papers, workshops, seminars and international conferences.

Application
The design of a full-scale, concrete-based architectural project demonstrating application of the TailorCrete process.

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The Partners

Lead Partners

Danish Technological Institute (DTI). This independent, not-for-profit institute develops, applies, and disseminates technological information and know-how in the public and private sectors. DTI's Concrete Center is one of Europe's largest organizations providing expertise in self-compacting concrete, sustainable concrete, microstructure analysis, and the use of robots in concrete production. DTI's Center for Robot Technology is the focal point for advanced robot development in Denmark. *www.dti.dk*

Dragados. This Spanish construction company, part of ACS Group, is a large international contractor involved in building and civil works. The company has subsidiaries in Spain (Drace, FPS, SEIS, Geocisa, Tecsa, Dravosa), USA (DRAGADOS USA, Schiavone, Pulice Construction Inc., John P.Picone Inc.), Poland (Pol-Aqua), Argentina (DYCASA) and Venezuela (DYCVENSA). Dragados chairs the TC Steering Committee. *www.dragados.com*

Private Sector Companies

Bekaert. This Belgium-based international company is a long-time leader in drawn steel wire products, coatings, and advanced metal transformation technology. *www.bekaert.com*

designtoproduction (D2P). This Swiss company specializes in the implementation of digital process chains. D2P is expert in implementing customized CAD-based parametric models for design and manufacturing.
www.designtoproduction.com

El Caleyo Nuevas Tecnologías S.A. This Spanish company specializes in the manufacture of concrete and concrete components. The company maintains facilities for producing full-scale prototypes of architectural elements from digitally produced molds. *www.elcaleyo.es*

Gibotech A/S. Is one of Denmark's largest suppliers of advanced robotics and other automation solutions for industry. *www.gibotech.dk*

Grace Bauprodukte GmbH. This German subsidiary of Grace Production Products provides concrete admixtures and fibres, products for architectural concrete, cement processing additives, and products for light and heavy precast concrete.
www.grace.com

Paschal Danmark A/S. This Danish supplier of formwork solutions provides technical drawings, calculations, on-site support, and hardware for all types of projects involving in-situ concrete.
www.paschal.dk

Superpool LTD. Is an Istanbul-based architectural and design practice with training and experience in developing customized design solutions in concert with engineering specialists. *www.superpool.org*

Unicon A/S. This Danish company is a major producer of ready-mix concrete and has applied its experience in complicated concrete castings to numerous projects throughout Scandinavia.
www.unicon.dk

Academic Institutes

Chalmers University of Technology. The Concrete Structures Research Group of this Swedish University focuses on load-carrying capacity, stability, functional design, and durability of concrete structures. *www.chalmers.se*

Czech Technical University. The University's faculty of civil engineering brings to TailorCrete advanced expertise in construction technology and life-cycle analysis. *www.cvut.cz*

Eidgenössische Technische Hochschule Zürich (ETH). ETH's Professorship for Architecture and Digital Fabrication examines the changes that result from introducing digital fabrication techniques into architectural production and design.
www.dfab.arch.ethz.ch

University of Southern Denmark. The University's Maersk McKinney Moller Institute specializes in research and development in the application of robotics for optimization of industrial and medical processes. *www.sdu.dk*

TailorCrete

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