NRP 70

Building and settlement

Joint project: Low energy concrete

Overview

Energy consumption in Switzerland



How do we bend the curve?

Our project proposition

Cut energy consumption from building materials by developing low energy products in the market

- **Concrete with low clinker cement**
 - Cement substitution via use of locally available materials (limestone fillers, etc.), alkali activators, synthesized superplasticizers Better understanding of carbonation and steel corrosion to optimize cement substitution up to 65% (allowance as per the new SIA guideline, SIA 2049)



Use phase (65%) Building phase (2%)

Main (industrial) partners:

Source: BFE, 2013



Structures with reduced steel content

Substitution of steel, a high energy imported material, with other tensile resistant materials



Wood concrete hybrid structure

Carbon fiber reinforced high performance concrete

Ultra high performance fiber reinforced concrete

Research focus:

The balance between the benefits of *eliminating* steel and the potential disadvantages of using *alternative materials* needs to be assessed in order to maintain the overall focus of the joint project on sustainable construction.

Structure

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Another challenging question to be answered by this joint project concerns ways in which these radical innovations can be implemented in frame structures.

Subprojects

The project is composed of *five work packages* that looks into improvement potentials in buildings construction, from material up to structural level, and an umbrella project that takes care of the sustainability assessment.

Structure	WP5 Monitoring and simulation of innovative frame structures Lead: Prof. Eleni Chatzi, ETH Zurich Prof. Eugen Brühwiler, EPFL				
al Structural elements	 - 	WP2 Wood concrete hybrid structure Lead: Prof. Andrea Frangi, ETH Zurich Prof. Ingo Burgert, ETH Zurich	WP3 Carbon fiber reinforced high performance concrete Lead: Prof. Pietro Lura, EMPA Dr. Giovanni Terrasi, EMPA	WP4 Ultra high performance fiber reinforced concrete Lead: Dr. Emmanuel Denarié, EPFL Prof. Eugen Brühwiler, EPFL	
Materia		WP1 Low clinker concrete Lead: Prof. Robert Flatt, ETH Zurich Prof. Karen Scrivener, EPFL; Prof. Bernhard Elsener, ETH Zurich; Dr. Marta Palacios, ETH Zurich Sustainability assessment			
	Umbrella Lead: Prof. Guillaume Habert, ETH Zurich				

Energy Turnaround



Contact

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