Self-compacting concrete (part 2) Optimizing the properties of self compacting concrete (AGB2000/398)

Selbstverdichtender Beton (Teil 2) Optimieren der Eigenschaften des selbstverdichtenden Betons

**Funding:** National (Switzerland)

**Duration:** Jul 2000 - Nov 2004

**Status:** Complete with results

**Background & policy context:**

The quality of reinforced concrete elements depends not only on the average quality of the concrete, but much more on the dispersion of weak areas. In conventional concrete the heterogeneity of the concrete cover is mainly influenced by the compaction process. Among other advantages this fact has first lead Japanese researchers to develop self-compacting concrete. In the meantime this promising material is also applied in Europe and in particular in Sweden and France. In Switzerland so far few tests have been run only. In order to provide a solid basis for the safe application of this new technology the properties of self-compacting concrete are to be optimized.

**Objectives:**

Self-compacting concrete is usually prepared with comparatively high cement content. Therefore, shrinkage cracking is a real risk. This project aims for minimizing shrinkage strain. This aim may be achieved by adding high modulus fibres or by shrinkage reducing agents. The material is to be optimized with respect to workability and shrinkage cracking.

**Parent Programmes:**

ARAMIS - ARAMIS information system

**Institute type:** Public institution

**Institute name:** Swiss Government: State Secretariat for Education and Research

**Funding type:** Public (national/regional/local)

**Partners:**

Switzerland

Swiss Federal Roads Office

Institut für Baustoffe, Werkstoffchemie und Korrosion

**Organisation:** IBWK

**Address:** ETH-Hönggerberg

**Zipcode:** 8093

**City:** Zürich

**Contact country:** Switzerland

**Key Results:**

Findings were used in several construction projects focused on repair work on civil engineering structures of the Swiss road network (e.g. Schöneich tunnel, underpass Stäfa, groundwater wells of the N40, etc.).

**Technical Implications**

In this project, the fracture energy has been found as the decisive property for the surface crack formation of non-ductile materials. This property serves as the starting point for optimizing the fibre
Other results

Published results:

Bäuml, M.F., Importance des fibres de renforcement dans le mortiers de réparation, in Transfer 1 – Vers une construction plus durable, D. Rosignoli et M. Martinola (eds.), Sion (CH), 39-50 (2001)


Bäuml, M.F. and Wittmann, F.H., Application of PVA-Fibre Reinforced Self-Compacting Concrete (ECC) for Repair of Concrete Structures, in Internationale Zeitschrift für Bauinstandsetzen, 8, 591-604 (2002)


Martinola, G., Bäuml, M.F. and Wittmann, F.H., Modified ECC Applied as an Effective Chloride Barrier, Proceedings of the JCCI Int. Workshop on Ductile Fibre Reinforced Cementitious Composites (DFRCC) - Application and Evaluation, Japan Concrete Institut (JCI), 171-180 (2002)

Martinola, G. and Bäuml, M.F., Optimizing ECC in Order to Prevent Shrinkage Cracking, Proceedings of the JCCI Int. Workshop on Ductile Fibre Reinforced Cementitious Composites (DFRCC) - Application and Evaluation, Japan Concrete Institut (JCI), 143-152 (2002)


Documents:

Final report in German (Final report)

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Road transport

Transport sectors: Passenger transport, Freight transport

Geo-spatial type: Other