

Minutes kick-off meeting of RILEM TC CCC

APRIL 11-12 2018, Ghent, Belgium

In attendance: S. Keßler, B. Huet, M. Cyr, K.-Ch. Thienel, S. Bernal Lopez, P. Dangla, I. Ignjatović, N. Alderete, K. Sideris, R. Snellings, S. v. Greve-Dierfeld, J. Provis, C. Thiel, X. Ke, E. Gruyaert, H. Vanoutrive, O. Cizer, D. Hooton, F. Avet, V. Ducman, M. Nedeljkovic, T.-C. Ling, L. Black, G. Gluth, N. De Belie, P. Van den Heede, R. Patel, M. Serdar, M. Zajac, S. Kamali-Bernard, C. Medina Martinez, V. Baroghel-Bouny, A. Vollpracht, J. Shiju, F. Moro, L. Valentini

Apologies received: K.-I Imamoto, J. Elsen, T. Visalakshi, B. Walkley, I. Martins, C. Gehlen, O. Kolawole, Y. Villagran, L. Wang, Y. Yan, L. Juan, U. Angst, P. Pipilikaki, K. Scrivener, A. Belda Revert, P. Holthuizen, J.F. Martirena Hernández, Y. Guang, M. Geiker, M. Basheer, A. Camões, B. Lothenbach, J.O. Ikotun, F. Puertas, J. Sánchez.

Agenda

Day 1 – Wednesday 11/4/2018, 8:30 – 17.30, Het Pand, Onderbergen 1, 9000 Gent

08.30-8.50 Welcome and short introduction of TC members
Overview of proposed TC-CCC working groups

1. *Correlation between atmospheric carbonation and carbonation induced by accelerated testing at high CO₂ concentrations*
2. *Effect of SCMs on natural and accelerated carbonation of blended Portland cements*
3. *Modelling of carbonation*
4. *Effects of combined actions: load + carbonation*
5. *Effect of carbonation on corrosion of concrete with SCMs*
6. *Carbonation of alkali activated concrete*

8.50-10.40: WG1 & WG2

08.50-09.10 *keynote on atmospheric carbonation versus accelerated testing / atmospheric carbonation of concretes containing SCMs and interground limestone: Doug Hooton*

09.10-09.30 *keynote on effect of SCMs on natural and accelerated carbonation: François Avet, Karen Scrivener*

09.30-10.20 *Accelerated and natural carbonation of concrete with high volumes of fly ash: chemical, mineralogical and microstructural effects: Philip Van den Heede*
Effect of different CO₂-concentrations on cementitious materials: Charlotte Thiel
Influence of environmental parameters and the type of cement on the durability of concrete structures against carbonation: Kosmas Sideris
Carbonation resistance of high volume fly ash concrete estimated with accelerated and natural tests: Ivan Ignjatovic
A simple gas diffusivity test method to differentiate performance of cementitious materials for XC exposure class: Bruno Huet

10.20-10.40 *discussion*

10.40-11.10 *coffee break*

11.10-12.30: WG3

11.10-11.30 keynote on modelling of carbonation: Patrick Dangla

11.30-12.10 probabilistic modelling on carbonation and influence of the carbonation resistance on the carbonation process: Sylvia Kessler

Towards multi-scale microstructure modelling of carbonation process in cement paste: Ravi Patel

Effects of mix design, curing and moisture conditions in (probabilistic) carbonation progress modelling: Stefanie von Greve-Dierfeld

12.10-12.30 discussion

12.30-13.10 sandwich lunch

13.10-14.30: WG6

13.10-13.30 keynote on effect of carbonation on carbonation of alkali activated concrete: Susan Bernal

13.30-14.10 Accelerated and natural carbonation of alkali-activated fly ash mortars: depths of carbonation and electrochemical measurements on steel reinforcement: Gregor Gluth

Effect of carbonation on the microstructure of binary alkali-activated pastes:

Marija Nedeljkovic

Carbonation test performed on three type of AAM performed within Rilem TC DTA: Vilma Ducman

14.10-14.30 discussion

14.30-15.25: WG5

14.30-14.50 keynote on effect of carbonation on corrosion of concrete with SCMs: Fabrizio Moro

14.50-15.05 Corrosion of steel in carbonated alternative binders, together with evaluation of changes in their microstructure: Marijana Serdar

15.05-15.25 discussion

15.25-15.45 coffee break

15.45-16.25: WG4

15.45-16.05 keynote on effects of combined actions: Ling Wang, Nele De Belie

16.05-16.25 discussion

16.25-17.00 Overall discussion on topics of WGs and selection of WG chairs.

19.00 Diner: het Monasterium, Oude Houtlei 56, Gent

Day 2 – Thursday 12/4/2018, 9:00 – 13.00, iGent tower 1st floor, Technologiepark Zwijnaarde 15, 9052 Ghent (Zwijnaarde)

9.00-9.30 Discussion on possible outcomes of the TC

Expected outcomes are:

- improve the knowledge related to durability of concrete made with SCMs and alkali-activated binders, more specifically the carbonation resistance
- connect researchers working in the field of SCMs in concrete (including alkali-activated materials based on those SCMs) and agree on good practices for testing
- best practice sheets and recommendations for researchers and/or practitioners
- summary of TC findings in one or more journal publications and/or state-of-the-art report

- *an international conference and conference proceedings for further dissemination of information*

09.30-10.00 *Decision on dates for next meetings / workshops*

10.00-12.00 *Decision on WG membership of the TC members*

Discussion within working groups, planning of first activities

12.00-13.00 *Reporting of WG discussions in a plenary session, any other items and closure of the meeting*

13.00-13.30 *Sandwich lunch*

13.30-14.30 *Possibility to visit the Magnel Laboratory for Concrete Research*

April 11 2018 - Meeting opened: 8:35 am.

Welcome and introduction of participants:

N. De Belie (TC Chair) opened the meeting, presented the objectives of the TC (also described in the TC webpage - <https://www.rilem.net/groupe/ccs-carbonation-of-concrete-with-supplementary-cementitious-materials-373>) emphasizing that objective 3 is derived from the activities carried out by the RILEM TC 246-TDC. This was followed by a description of the different WGs, and introduction (name and affiliation) of the TC participants of this meeting.

Finally the expected outcomes of the TC were discussed (i.e. improve knowledge, connect researchers, best practice sheets and recommendations, journal publications, conference), and overview of the goals and achievements of the TC 238-SCM were presented.

Presentations by WG speakers

All invited speakers delivered their presentations, followed by questions from the meeting participants. PDF versions of the slides presented during the TC kick-off meeting are available in the RILEM website in the TC CCC folder. Instruction of how members can access this information can be found in the '*Guidelines TC Documents for TC members*', which has been shared to all TC members, along with this minutes.

Notes taken during the presentations by the TC participants E. Gruyaert, S. Bernal & N. De Belie are also available in the TC CCC folder in the RILEM website.

Main remarks

- Invitation from **B. Huet (Lafarge-Holcim)** to include a round robin on gas diffusion as part of the scope of the TC, following a similar approach to that described in *Boumaaza M. et al. Materials and Structure, 2018, 51:51*
- For WG4 the complexity of evaluating the combined effect of carbonation and loading was discussed, and the need to develop a laboratory set up to achieve this. D. Hooton (U. Toronto) proposed that WG4 was a 'combined effects' WG, not just dedicated to evaluate 'carbonation vs. loading' but other combined effects such as 'freeze-thaw vs. carbonation' and/or 'chloride permeability vs. carbonation'.

- The place and date for the following TC-CCC meetings was discussed and agreed by the meeting participants:
 - Delft, Netherlands – August 30 2018 – following 72nd RILEM week (<https://www.eventilo.com/93870>)
 - Rovinj, Croatia, March 18-22 2019 – as part of the RILEM Spring meeting (<http://grad.hr/rilem.smss/>). A dedicated session for the TC CCC members will be organised, and the final date of this session will be confirmed once a full programme of this event is available. **TC CCC members can submit their abstract until May 15 (special extension granted by organising committee). Please indicate during the abstract submission that you intend to present in the TC CCC session.**
- It was also discussed the possibility of running a second TC CCC meeting in 2019 as part of RILEM week in Nanjing, China (27-29 August 2019) (<https://www.rilem.net/agenda/1207>); or as part of the International Congress on Chemistry of Cement (16-20 September 2019) (<https://www.iccc2019.org/>). A final decision will be made during the meeting in Delft.
- N. De Belie (TC-Chair) invited volunteers to chair and co-chair the WGs. Chairs and co-Chairs for each WG was defined, and the names were circulated to TC CCC members via email by N. De Belie.

Meeting closed: 5:00 pm

April 12 2018 - Meeting opened: 9:15 am

Welcome

N. De Belie (TC Chair) opened the meeting and indicated that the main objective of the day was for WG participants to have the opportunity to identify expertise and laboratory facilities available in different institutions within the scope of the TC activities. Also, it was suggested to identify the initial activities to be carried out by the different WG members. After this welcome, members of the different WGs meet up to discuss.

Plenary session

Each WG chair summarized the main topics discussed and the initial activities proposed. Separated minutes of these discussions were prepared for each WG, and are available in the TC CCC folder in the RILEM website.

All the TC CCC members were invited to contact WG chairs and co-chairs letting them know about what activities they would like to actively participate in. A follow-up on the progress of the proposed activities will be reported in the next TC CCC meeting in Delft.

N. De Belie (TC-Chair) thanked all attendees for their active participation in two days meeting, and closed session.

Meeting closure: 12:00