

Minutes of the 9th Meeting of RILEM TC 246-TDC

Shenzhen, June 29th-30th, 2016

Time	Wednesday, June 29, 2016, 15:00-18:00, Thursday, June 30, 2016, 9:00-13:00,
Venue	Meeting room of Grand View Hotel, 16th floor Address: No.10 Taoyuan East Road, Shenzhen, Guangdong
Main Subjects	1) Opening address; 2) Approval of the minutes of the 8 th meeting of TC-246 TDC (Beijing Meeting); 3) Brief review on progress of ongoing work of RILEM TC 246-TDC after the 8 th TC meeting; 4) Discussion of final version of the recommendation; 5) Next meeting and presentation of results to RILEM members; 6) Next steps; 7) Introduction of Shenzhen University and visit of laboratories.
Participants	15 persons all together attended the meeting in Shenzhen: Dr. Li Juan, Prof. Wang Ling, Dr. Wang Zhendi, Prof. F. H. Wittmann, Prof. Yao Yan, Dr. Cao Yin, Prof. Wan Xiaomei, Dr. Wang Licheng, Dr. Wang Yaocheng, Prof. Xing Feng, Prof. Han Ningxu, Prof. Christoph Gehlen, Prof. Erik Schlangen, Mr.WANG Shaohua, Miss. Zhang Shuwen
Moderator	Dr. Li Juan

1. Opening of the meeting

Prof. Yao Yan, the Chairlady of TC 246-TDC, welcomed all participants at the beginning of the meeting.

All participants accepted the agenda of the meeting.

Minutes of the 8th meeting of TC 246-TDC (Beijing Meeting) were approved by all participants. Agreement on the following topics was reached. (4 items)

(1) The main task of the TC 246-TDC during the last year will be to finalize two documents: (a) the final summary report and (b) the recommendation on how to run the test.

(2) Originally it was expected that the final report of the TC would be published in the RILEM Journal *Materials and Structures* in June 2016. However, because the publisher changes the publication system, publication will be delayed. The final report shall be focused on test results obtained by different research groups of the TC. Test methods will be described in detail in a RILEM recommendation.

(3) For chloride penetration under compression the recommendation shall refer to the RILEM test method of TC 107. (RILEM TC 107-CSP: Creep and shrinkage prediction models: principles of their formation, measurement of time-dependent strains of concrete, prepared by subcommittee 4: Standardized Test Methods for Creep and Shrinkage)

(4) As RILEM TC 246-TDC was the first to deal with the effect of combined actions on durability and service life of reinforced concrete structures the wide field could not be covered totally. Follow-up TCs will be necessary and they shall focus on most frequent combinations, such as for example:

- Influence of the type of concrete (high strength and low strength, composite binders, aerated concrete) on the stress sensitivity of chloride penetration and carbonation;
- Influence of combined actions on service life prediction;
- Influence of hindered frost shrinkage on chloride penetration and service life;
- Influence of damaging processes such as carbonation and freeze-thaw cycles on chloride penetration;
- Influence of freeze-thaw cycles on carbonation.

2. Brief review on progress of ongoing work of RILEM TC 246-TDC after the Beijing Meeting

Prof. Li Juan gave a brief introduction on the progress of ongoing work of TC 246-TDC after the Beijing meeting.

(1) Progress of the final report

Writing and submission process:

Tab.1 Writing process of the final report

DRAFT	TASKS	TIME
First draft	The secretary compiled all parts written by different TC members; The draft was send to TC members for comments; Comments were received from Ghent Uni., TUM, TU Delft, and Folker Wittmann	Feb. 29,2016
Second draft	Figures and Tables were revised; The draft was sent again to TC members for comments; Comments received from Nele, Hugo, Folker and Erika Erika finished the English corrections within two weeks;	March 10, 2016
Third draft	Revision of some parts according to comments from TC members; Final language corrections; Distribution among TC members for comments;	March 20, 2016

Tab.2 Submission process of the final report

STEP	TIME
First submission	April 5, 2016
Rejected Reasons: The manuscript did not comply with the manuscript standards of the journal, for instance, length and umber of Figures and Tables; (1) maximum number of words: 8000; (2) maximum number of tables and figures: 15;	April 8, 2016
Revised by CBMA, Ghent Univ., and Prof. Wittmann, 4th draft; Revised by Hugo, 5th draft;	April 15, 2016
Second submission	April 28, 2016
Manuscript accepted	June 7, 2016

The final report of RILEM TC 246-TDC “Chloride diffusion under the influence of applied compressive and tensile stress” has been accepted. We sincerely appreciate all the co-authors’ work, especially Prof. Nele De Belie and Dr. Hugo Eguez Alava for their contributions to the final report. At the same time, we gratefully acknowledge Prof. Erika Holt’s efforts for the language corrections.

A complementary paper "Evaluation of non-destructive testing techniques to characterize loading-induced concrete deterioration in accordance to RILEM TC 246 TDC" has been submitted to M & S by Dr. Sylvia Kessler from TUM. Until now, the complementary paper was resubmitted after revision according to comments of the reviewers. We hope the two papers could be published in the same issue of M & S.

Prof. Wittmann suggested revising the title of the final report and adding a paragraph to introduce the background of the test and the mechanism of chloride transport in concrete. He will finish the revision before July 20.

(2) Progress of the recommendation

Members of TC 246-TDC started with the preparation of a recommendation in 2015. The 2nd draft was discussed during the Shenzhen Meeting.

Tab.3 Preparation of the recommendation

TASKS	TIME
Comments on the 1 st draft, finished by CBMA	Oct. 16, 2015 the 8 th TC meeting
CBMA revised the document according to the comments; Distribution to all members for more comments.	Nov., 2015
TU Delft, Ghent Uni. and Prof. Wittmann send their comments of different parts to the secretariat	Jan.31, 2016
2 nd draft of the recommendation Send to all members for additional comments.	Feb. 20, 2016
3 rd draft of the recommendation Send to all members for more comments.	Mar. 31, 2016
Discussion of the 3 rd draft of the recommendation.	June 29, 2016, the 9 th TC meeting

3. Detailed discussion of the 3rd draft of the recommendation

The structure of the recommendation, its context and many details are further discussed by the participants of the TC meeting in Shenzhen. Most important points of the comments are summarized in what follows:

- Combine Chapter 3 (Experiment equipment), Chapter 4 (Experiment consumables) and Chapter 5 (Test procedure) into one new chapter named *MATERIALS AND TESTING*, rewrite the new Chapter 3 (Prof. Erik Schlangen)
- Combine Chapter 6 and Chapter 7 into one chapter *PRESENTATION AND EVALUATION OF TEST RESULTS*; briefly point out the different migration processes such as convection and diffusion of

chloride ions in concrete in the new chapter (Prof. Wittmann)

- Add one more paragraph in the new Chapter 3 *MATERIALS AND TESTING* (Prof. Erik Schlangen)
- Add one more item to the *REPORT*: h) Evaluation of test results with respect to specific applications.

Participants agreed to do their best that the recommendation can be submitted for publication in M & S in September 2016. The planned schedule for the preparation of the recommendation was fixed as follows:

Tab.4 Planed schedule for the preparation and submission of the recommendation to M & S

TASKS	DEADLINE
Erik Schlangen revises the existing draft according to the comments made during the Shenzhen meeting	10th of July
Folker Wittmann will have a last look into the revised draft and if necessary will communicate with Erik Schlangen	20th of July
The revised version will be distributed among all TC members for final comments. Erik Schlangen und Folker Wittmann will take the final comments into consideration and prepare the final version.	The end of July
The final version will be sent to Robin Beddoe from TUM for correction of the English language	10th August
First submission	September. 2016

4. Next meeting

The next TC meeting will be in conjunction with the 70th RILEM Week 2016, Lyngby, Denmark. The date and the main events are listed in Table 5.

Tab.5 Information for the next TC meeting

DATE	EVENTS	MAIN CONTENT	TIME & VENUE
Tuesday August 23, 2016	10th TC 246- TDC meeting	Discussion of the 5th draft of the recommendation	8:00-12:00 B101 Rs 12- s13
Wednesday August 24, 2016	RILEM Technical Day (8:30-15:00)	TC 246-TDC presentation	14:00-14:30 B116 Raud 81 presented by Dr. Juan Li

Dr. Li Juan will present a report on highlights of the work of TC 246-TDC during the RILEM Technical Day (August 24, 2016) on behalf of all the members. An outline of the report on the activities of TC 246-TDC was presented and discussed during the TC meeting in Shenzhen.

- Opening
- Introduction: basic facts

- Need for this TC: durability design and service life of reinforced concrete structures
- First achievement of the TC: an annotated bibliography: number of papers referred; photo of cover;
- Brief presentation of two test methods: compression and tension;
- Major results
 - Influence of stress on chloride penetration
 - Implementation of results in service life design
- Outlook: further work is needed, possible future TCs;
- Index of compiled papers

5. Next steps

Prof. Wittmann suggested five follow-up steps:

- 1) All TC members who have run experiments on chloride diffusion in concrete without and with applied load should publish their results in full length together with a critical discussion in peer reviewed journals, making reference to the RILEM TC.
- 2) Dr. Sylvia Kessler should publish her approach, which takes the influence of applied load into consideration in service life prediction. This approach will be necessary to apply results of the TC in more realistic service life design.
- 3) A detailed recommendation on how to run the test to study the influence of an applied load on chloride diffusion should be published in the RILEM Journal M&S.
- 4) Finally we may prepare a special volume containing four to five papers on experimental results, one paper on the prediction of service life, and the final recommendation. For obvious reasons we have to ask permission from the publishing companies to include published papers in this compendium. The compendium may possibly be made available in electronic version from the RILEM homepage.
- 5) We could suggest at least two to three tasks for future RILEM TCs in final conclusions.

TC participants discussed 5 suggestions for follow-up TCs in Shenzhen, and they supported this planed procedure. The secretariat will send a formal invitation to all TC members concerned.

6. About the follow-up TCs

After discussion, the participants come up with the following list of follow-up TCs:

- Influence of Freeze-thaw cycles on Chloride Diffusion
- Influence of Applied stress on Carbonation
- Fatigue loading and chloride penetration
- Frost shrinkage and chloride penetration

Candidates to chair one of the follow-up TCs are welcome!

7. Introduction of Shenzhen University and visit of Laboratories

Prof. Han Ningxu, the director of College of Civil Engineering of Shenzhen University, gave a detailed introduction of the Guangdong Provincial Key Laboratory for Marine Civil Engineering and Shenzhen Durability Center for Civil Engineering. All the participants visited the Concrete Material Lab and Concrete Structure Lab in Shenzhen University. All the participants were impressed by the well-structured strategy of the college and the achievements in the field of concrete durability and concrete structures in Shenzhen University.

8. Closure of the meeting.

The meeting closed at 13:00 on June 30, 2016.



Group Photo of the 9th Meeting of RILEM TC 246-TDC