in Munich in November, 2014						
	09:00 – 12:00, 14:00 – 18:00, Thursday, Nov. 27 th , 2014					
	TUM Main Campus, Faculty of Civil, Geo and Environmental Engineering,					
Time & Venue	Room No. 1713 (Faculty Council)					
	$09.00 - 11.00$ Friday Nov 28^{th} 2014					
	Centre for Building Materials TUM					
	1) Welcome address:					
	2) A preval of the agenda:					
	2) Approval of the agenda, 2) Accountenace of the minutes of the 5th Meeting (Delft Meeting) :					
	4) Brief review on programs of an aging work of DH EM TC 246 TDC often the					
	4) Brief review on progress of ongoing work of RILEW TC 240-TDC after the					
	Theeting in Dent; 5) Departs and discussion of the test mendle of the first test series of 5 leber					
	5) Reports and discussion of the test results of the first test series of 5 labs;					
	6) Discussion on test results, preparation of a preliminary summary report;					
Main Subjects	7) Modifications of the test program;					
	8) Details of the following test series;					
	9) Discussion of the final summary report of the TC;					
	10) Discussion on the preparation of recommendations;					
	11) Tasks of follow-up TCs;					
	12) Next meetings;					
	13) Any other business;					
	14) Closure of the meeting.					
	13 persons all together attended the meeting:					
	Mr. Cao Yin, Prof. Nele De Belie, Prof. Christoph Gehlen, Dr. Eguez Hugo,					
Participants	Mrs. Sylvia Keßler, Dr. Li Juan, Prof. Erik Schlangen, Prof. Max J. Setzer,					
	Mrs. Charlotte Thiel, Prof. Wang Ling, Dr. Wang Zhendi,					
	Prof. F. H. Wittmann, Prof. Yao Yan					

Minutes of the Sixth Meeting of RILEM TC-246 TDC in Munich in November, 2014

1. Opening of the meeting

Moderator

Prof. Yao Yan, the Chairlady of TC 246-TDC, introduced the agenda at the beginning of this meeting. She extended her warm welcome to all the participants and her special thanks to Prof. Christoph Gehlen from TUM for the preparation of the meeting.

All participants accepted the agenda of the meeting.

Dr. Li Juan

All participants accepted the minutes of the fifth meeting of TC 246-TDC (Delft Meeting).

2. Brief overview on the progress of RILEM TC-246 TDC after the meeting in Delft

Prof. Wang Ling, the Secretary of RILEM TC-246-TDC, gave a brief introduction on the progress of ongoing work of TC 246-TDC after the meeting in Delft.

The annotated bibliography was revised according to the document TAC-N109 (Guidelines for TCs Publications); The final version of the annotated bibliography was printed by CBMA (with ISBN

and DOI). Final version hardcopies were sent to each TC member, RILEM TAC Secretary, and the Aedificatio Publishers. An electronic version of the annotated bibliography is available for all RILEM members via the RILEM homepage: www.rilem.org.

After Delft meeting, CBMA prepared a draft for 3 test programs:1) Chloride diffusion, pre-saturated, 0 and 30 % under compression, 2) Chloride diffusion, pre-saturated, 0, 30 and 60 % under compression, and 0, 50 and 80 % under tension and 3) Capillary absorption, 7 days moist curing at 95 % RH and 60 % RH until 28 days, 0, 30 and 60 % under compression, and 0, 50 and 80 % under tension. Prof. Wittmann revised these documents and the secretary finalized these documents by the end of May, 2014. Then the secretary sent the three files to all members in June, 2014. At the same time the first test series started.

The comparison between chemical analysis results and LIBS results was conducted by CBMA and TU Delft in March, 2014. TU Delft measured the chloride content using LIBS method, and CBMA measured the chloride content using chemical analysis method with the same concrete specimens provided by TU Delft.

The first test series were carried out in five labs.

3. Reports and discussion of the test results of the first test series of 5 labs, Discussion on test results, preparation of a preliminary summary report

The test procedure and test result in each lab was reported in this meeting.

Prof. Erik Schlangen introduced the results of the first test series at Delft Univ. of Technology (TU Delft). Dr. Eguez Hugo made an introduction of the test results at Ghent University. Mr. Cao Yin introduced the test results at CBMA. Entrust by Pro. Li Weihong, Prof. Wang Ling introduced the test results from Dalian University. And Mrs. Sylvia Keßler made an introduction of the progress of the first test series carried out in TUM.

The participants discussed the results and also the preparation of the preliminary summary report. It was decided that each lab would prepare a preliminary test report according to a given format by Wednesday 10 Dec. 2014. The secretary will compile the preliminary summary reports from 5 labs and send to all members as part of minutes.

4. Modifications of the test program

The participants discussed the test program of the first test series in detail. Experiences and opinions were presented. After discussion, the following decisions were made.

(1) The concentration of the solution in the reservoir must remain constant (3 wt. % NaCl). It is suggested to check regularly (at least once a week) the concentration. Calcium concentration shall be determined at the end of each test series.

(2) Influence of concentration of calcium hydroxide in chloride solution: it is suggested to run parallel tests with concrete under 0 and 30% compressive load, exposed to 3% aqueous chloride solution containing 0 and 2 g/l calcium hydroxide.

(3) Initial chloride content of concrete: determine two chloride profiles at at least three points in two specimens by drilling or milling starting from the surface opposite the exposed surface. Determine the average value as the initial chloride content of concrete.

(4) The period between the end of exposure period and the grinding of the layers should be as short as possible within 24 hours. If needed, the exposure time might be extended.

(5) Do not sieve after milling to avoid the change in concrete composition. If the aggregate powder is larger than 1mm, longer time is needed for chloride extraction.

(6) EN12390-11: 2014 (Annex F.) is used as a reference to calculate the diffusion coefficient from chloride profiles.

(7) The surface concentration as determined by data fitting shall be called model surface concentration. In the table of test results, the model surface concentration and the measured surface concentration shall be given.

(8) Run the tests at least in triplicate, calculate the diffusion coefficient of each specimen, and determine the average value of diffusion coefficient of 3 specimens.

(9) Each of the tension bars shall be equipped with two strain gauges in order to avoid excessive eccentricity and to control relaxation.

(10) To avoid leakage, silicone can be used for sealing the first layer, and aluminum foil be pasted as the second layer.

5. Scope of the second test series

After discussion on the second test series, it is decided that the following tests in the second test series will be run exclusively, i.e. Chloride diffusion, pre-saturated, 0, 30 and 60 % under compression, and 0, 50 and 80 % under tension.

To check the repeatability and reliability of test results, it is decided to start or repeat tests of the first test series with w/c = 0.45. To investigate the influence of w/c ratio, it is suggested to run tests as defined for the first test series but with w/c = 0.55.

The result of the inquiry among the TC members present in Munich on the availability of different laboratories is shown in the following Table I:

No.	Affiliation	w/c:0.45	w/c: 0.55	Compression 0, 30 %, 60 % Exposure period: 2, 6, 18,36 weeks	Tension 0, 50 %, 80% Exposure period: 2, 6, 18,36 weeks	Other tests
1	СВМА	0.45	If extra test rigs available	All	All	
2	Ghent Univ.	0.45	No	All	No	Splitting tensile load, maybe capillary absorption
3	TU Delft	0.45	No	All	Will check	
4	Dalian Univ.	0.45	No	All	No	
5	TUM	0.45 maybe	No			Characterization
6	Shenzhen Univ.	0.45	No	All	All	Porosity of concrete at different positions

Table I: Labs which will participate in the second test series

6. Discussion on the final summary report of the TC

The aim of the final summary report of the TC is 1) to point out the importance of the influence of mechanical load on durability of reinforced concrete structures, 2) to indicate typical cases in which this influence has to be taken into consideration and 3) to enumerate additional relevant load combinations.

The preliminary content of final summary report of the TC as well as the editorial person in charge was decided as follows.

1) Introduction (Ghent Univ.)

2) Proposed test method (TU Delft)

3) Summary of the most important results (Ghent Univ. and CBMA)

4) Model calculation to point out the influence of combined actions on service life (TUM)

5) Further studies and outlook (Prof. Wittmann and Prof. Setzer)

A preliminary timetable of the final summary report was decided after discussion.

1) Outline, April 2015,

2) Draft, September 2015,

3) Final report, June 2016.

7. Discussion on the preparation of recommendations

The structure of recommendation will be decided after the comparative tests. The following structure is given as reference.

1) Scope and applications

2) Equipment

3) Consumable materials

4) Preparation of test samples

5) Test methods and test procedure

6) Analysis of results and evaluation

7) Report

8) Additional comments

The draft timetable for the preparation of recommendations was made as follows.

1) Outline, April 2015,

2) Draft, September 2015,

3) Final recommendation, June 2016.

8. Tasks of follow-up TCs

Follow-up TCs can focus on the following alternative combinations of actions:

1) Load and carbonation;

2) Freeze-thaw cycles and chloride penetration;

3) Freeze-thaw cycles under restrained conditions.

9. Next meetings

The following dates and places for the four meetings have been fixed (Table II).

		Table II. Next meetings	
NO.	Meeting	Date	Venue
1	7th meeting	23-24 April, 2015	Ghent Uni.
2	8th meeting	In conjunction with <u>ICCC 2015</u> (Oct. 13-16, 2015 Beijing) (1) International Seminar on "Durability of concrete under combined mechanical and environmental actions" Tuesday, 13 October, 2015, 1:30-3:30 pm (2) TC Meeting Friday, 16 October, 2015, 8:30-12:00 am	Beijing
3	9th meeting	In conjunction with the 5th International Conference on the Durability of Concrete Structures (June. 16-17, 2016 Shenzhen) TC Meeting 14-15 June, 2016	Shenzhen
4	10th meeting	In conjunction with the 70th RILEM Week (August 21-24, 2016) TC Meeting 21-24 August, 2016	Lyngby, Denmark

10. Any other business

1) Expected outcome: One international conference "Prediction of Service Life of Reinforced Concrete Structures, Relevant Material Properties, and Most Severe Load Combinations".

2) Scientific Program of ICCC2015 Beijing

13-15 October, 2015

- Morning (8:30-12:30) Keynote speech and short presentations
- Afternoon(13:30-18:00) Parallel Sessions (3 Sessions)

16 October, 2015

- Morning (8:30-12:30) Parallel Sessions (3 Sessions)
- Afternoon(13:30-18:00) Keynote speech /Short presentations/Concluding

3) International Seminar on "Durability of concrete under combined mechanical and environmental actions"

Time: Tuesday, 13 October, 2015, 1:30-3:30 pm

Speakers: I. Introduction /Prof. F. H. Wittmannn;

- I. Test methods /Prof. Eric Schlangen;
- II. Test results /Prof. Nele De Belie and Prof. Wang Ling;
- III. Modeling and prediction /Prof. Christoph Gehlen;
- IV. 2 more potential speakers outside of TC.

11. Closing remarks

The meeting was closed at noon on Nov. 28th, 2014. In the wrap-up presentation, Prof. Yao Yan, summarized the main points briefly and expressed her sincere thanks to all the experts present for their input and support for the TC to make this meeting meaningful and successful. She offered her special thanks to Professor Gehlen for hosting and providing all the excellent arrangement for this meeting. She also expressed her special thanks to all the participants for their hard work and support for the RILEM TC 246-TDC. The next TC meeting is scheduled in Ghent next April. She looked forward to meeting all the TC members there.