

# Minutes of the 8<sup>th</sup> Meeting of RILEM TC-TDC

Beijing, 16 Oct., 2015

<b>Time</b>	8:30 - 12:00 am, Friday, 16 October, 2015
<b>Venue</b>	203A, Beijing International Convention Center, Beijing
<b>Main Subjects</b>	1) Welcome address and opening of the TC meeting by Prof. YAO Yan, Chairlady of RILEM TC 246-TDC; 2) Self-introduction of each participant; 3) Approval of the agenda; 4) Acceptance of the minutes of the 7th Meeting of TC-246 TDC (Ghent Meeting) ; 5) Brief review on progress of ongoing work of RILEM TC 246-TDC during 2015; 6) Compilation report and discussion on the test results from 5 labs; 7) Discussion on the preparation of final summary report of the TC; 8) Discussion on the preparation of the recommendation; 9) Next steps and any other business; 10) Closure of the meeting.
<b>Participants</b>	18 persons all together attended the meeting, including: Prof. Nele De Belie, Dr. Hugo Eguez Alava, Dr. Sylvia Kessler, Dr. Li Juan, Dr. Balqis Md Yunus, Prof. Max Setzer, Prof. Wang Ling, Dr. Wang Zhendi, Prof. F. H. Wittmann, Prof. Yao Yan, Mr. Cao Yin, Prof. Li Weihua, Prof. Wan Xiaomei, Dr. Wang Penggang, Prof. Fang Yuan, Prof. Erika Holt, Prof. Carmen Andrade, Dr. Zheng Haibing.
<b>Moderator</b>	Dr. Li Juan
<p><b>1. Opening of the meeting</b></p> <p>The Chairlady of TC-TDC, Prof. Yao Yan, welcomed at the beginning of the meeting all participants warmly.</p> <p>All participants accepted the agenda of the meeting.</p> <p>All participants accepted the minutes of the 7th meeting of TC 246-TDC (Ghent Meeting). Modifications of the test program discussion in Ghent were approval. (8 items)</p> <p>(1) Chemical titration is recommended. Whether LIBS can be widely applied is to be confirmed.</p> <p>(2) The chloride solution shall be isolated from the atmosphere because there is a risk that the</p>	

pH value is decreased due to carbonation. pH value must be checked regularly.

(3) Comparative evaluation of the chloride diffusion coefficient should be run on the basis of three given chloride profiles.

(4) Use epoxy mortar instead of epoxy to fill the groove for similar elastic modulus when specimens will be used for measurement of chloride content at different ages.

(5) Drilling of sample for chemical analysis cannot control the depth precisely. Milling is recommended for sampling.

(6) If time is enough, pilot tests can be done to investigate the high stress ratio and low stress ratio in some labs.

(7) Those labs with ultrasonic tests facilities will run the tests to compare the change in transit time of unloaded and loaded concrete.

(8) If above two pilot tests are feasible, the comparative tests will be run in follow-up TCs.

## **2. Brief introduction on the progress of ongoing work of RILEM TC 246-TDC after Ghent Meeting**

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

### **(1) Progress of experiment**

The first test series were carried out in five labs. The second test series have been running.

No.	Affiliation	First test series		Second test series	
		Compression	Tension	Compression	Tension
1	CBMA	0, 0.3, 0.6	0, 0.5, 0.8	0, 0.3, 0.6 36w:10.10.2015	0, 0.5, 0.8 36w:23.10.2015
2	Ghent Univ.	0, 0.3, 0.6	No		
3	TU Delft	0, 0.3, 0.6	(incomplete)		
4	Dalian Uni.	0, 0.3, 0.6	No		
5	TUM	0, 0.3, 0.6	No		

### **(2) Compilation of test results**

The collection of the test results of the first test series from 5 labs was carried out by the secretariat of TC after Ghent meeting.

The compilation of the test results was carried out by Dr. Hugo EGUEZ ALAVA from Ghent University. The report contains 5 labs' test results of concrete under compression and only CBMA's test results under tension.

The compilation of results is very helpful and will be used for the summary report and the recommendation.

Many thanks to Dr. Hugo for 2 months hard work by cooperating with 5 labs including checking results and detailed test methods and data processing.

### (3) Meetings

The international seminar on “Durability of Concrete under Combined Mechanical and Environmental Actions” has been hold on Tuesday, 13 October in Beijing in conjunction with ICCI 2015. 32 participants from 8 countries attended the seminar. Entrusted by Prof. Yao Yan, Prof. Wittmann chaired the International conference.

Main points of the international seminar are as following

① The main achievements of RILEM TC 246-TDC were introduced to the public for the first time.

Introductory Remarks were given by Prof. F. H. Wittmann from Aedificat Institute Freiburg, Germany; Test methods were introduced by Dr. Balqis Md Yunus from Delft University of Technology, the Netherlands. Test results of compression were presented by Prof. Nele De Belie from Ghent University, Belgium; Test results of tension were presented by Prof. Ling Wang from China Building Materials Academy, China; Modeling and prediction were introduced by Dr. Sylvia Kessler from Technical University of Munich, Germany.

② Two invited presentations related to the TC topic were given to widen the range of combination actions;

— The influence of freeze-thaw loading on chloride ingress into concrete ( Erika Holt, VTT, Finland)

— Influence of cracks on the transport properties of structural concretes (Kefei Li, Tsinghua Univ., China )

③ Guidance and suggestions from the participants during discussion are very important for the next steps and the next TCs.

### **3. Discussion of the test results**

Test results of the first comparative test series were discussed further during the TC meeting.

(1) Dr. Hugo introduced the compilation of results from 5 labs. He said that the convection and capillary suction near the surface are not stable diffusion, it must be taken into consideration. Research on the relationship between the surface concentration and depth should be further

focused.

(2) Dr. Sylvia introduced the preliminary test result of modeling and damage characterization in TUM. She concluded that the modal analysis seems to be unreliable due to the small data base. The ultrasonic measurement and the thin section method are expected to gain more valuable results.

#### **4. Discussion of the preparation of final summary report of the TC**

##### **(1) Aim**

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

##### **(2) Publications**

It is expected that the summary report of the TC will be published in Materials and Structures before June in 201. The summary report will be focused on the test results, and the test methods will be describe in detail in a RILEM recommendations.

##### **(3) Content and tasks**

The length of the summary report should be not more than 15 pages (including 15 figures and tables). It is suggest that one has to read the Instructions for Authors on the following website before writing.

[http://www.springer.com/engineering/mechanics/journal/11527?detailsPage=pltc1\\_1888893](http://www.springer.com/engineering/mechanics/journal/11527?detailsPage=pltc1_1888893)

The content and the tasks are list in the following .

<b>No.</b>	<b>Content</b>	<b>Persons in charge</b>	<b>Pages</b>
1	Introduction	Prof. Wittmann	1
2	Proposed test methods	TU Delft	3
3	Test results		
3.1	Compression	Ghent Univ.	3
3.2	Tension	CBMA	2
4	Model calculations	TUM	2
5	Further studies and outlook	Prof. Wittmann & Prof. Setzer	1.5
6	References		1
Total			13.5

(4) Time table

Prof. Nicolas Roussel, deputy Editor-in-Chief of M&S, suggest the submitting shall before the end of March, 2016 in order to publish on Materials & Structure in June at least in line vision.

The deadline for each step are as following:

- Send each part to secretary, before Nov.16, 2015;
- Compile, lay out, send back the authors by the secretary, before Nov.30, 2015;
- Final comments on draft by TC members, Dec. 31, 2015;
- Draft sent to Prof.Erika Holt for English modification, Feb. 28, 2016
- Draft back to TC secretary, March 15, 2016
- Final report submitted to M&S, March 31, 2016

## 5. Discussion of the preparation of the recommendation

CBMA prepared a initial draft recommendation for the discussion of the 8<sup>th</sup> TC meeting. It consists of 9 Parts and 3 appendixes. It is determined at the meeting that:

(1) Test method for compression shall use 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

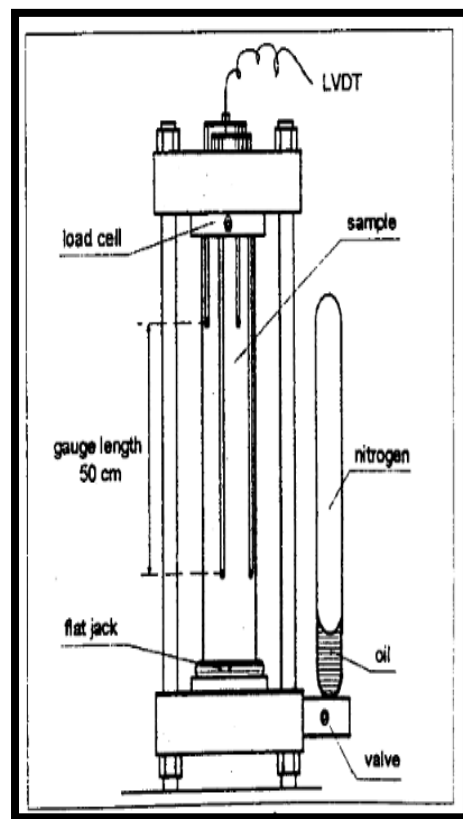


Fig. The hydropneumatic accumulator in TC 107

(2) Comments to the initial draft are welcome from each TC member.

(3) Revise the relevant parts listed in the following table.

The content and the tasks of recommendation are list after discussion in the following .

	Comments /revise by
<b>1. Foreword</b>	Prof. Wittmann
<b>2. Scope and Applications</b>	Prof. Wittmann
<b>3. Equipment</b>	TU Delft
<b>4. Consumable Materials</b>	TU Delft
<b>5. Preparation of Concrete Specimens</b>	TU Delft
<b>6. Test Procedure</b>	TU Delft
<b>7. Expression of Test Results</b>	Ghent Univ.
<b>8. Evaluation of Test Results</b>	Ghent Univ.
<b>9. Report</b>	Ghent Univ.

The timetable of the recommendation are as following:

- Draft of different parts to secretariat, Nov.30, 2015;
- First draft of recommendation, January 31, 2016;
- Second draft of recommendation, March 31, 2016;
- Third Draft from Erika Holt, Apr.30, 2016;
- Final draft of recommendation for Shenzhen meeting, 28-29 June, 2016.

## **6. Next steps and any other business**

(1) In the final year of TC 246-TDC , the main task are working on the two potential outcomes: Summary report submitted to RILEM and published on Materials & Structure, Recommendations. Prof. Yao Yan wishes the further support from all Tc members.

(2) The 9th TC Meeting will be held on 29 June, 2016 in Shenzhen Univ., China.

(3) Follow-up TCs shall focus on the most urgent combination, such as the following topics:

- Influence of the quality of concrete (high strength and low strength, composite binders) on the stress sensitivity of chloride penetration;
- Influences of damaging parameters on service life;
- Influences of hindered frost shrinkage on chloride penetration and service life.
- Influences of processes such as carbonation and freeze-thaw cycles on the chloride penetration;
- Influences of frozen on carbonation.

(4) The following dates and places for the next 2 meetings have been fixed.

NO.	Meeting	Date	Venue
1	9th meeting	<b>The 9<sup>th</sup> TC Meeting</b> , on 29 June, 2016, Shenzhen Univ., China  One day before the 5th <i>ICDCS</i> (International Conference on the Durability of Concrete Structures (June. 30-July 1, 2016 Shenzhen, <a href="http://docs.lib.purdue.edu/icdcs/2016/">http://docs.lib.purdue.edu/icdcs/2016/</a> )	Shenzhen, China
2	10th meeting	<b>The 10<sup>th</sup> TC Meeting</b> , 21-24 August, 2016  In conjunction with the 70th RILEM Week (August 21-24, 2016)	Lyngby, Denmark

## 7. Closure of the meeting.

The meeting was closed at 12:00 on Oct. 16, 2015.

