

Report

Please prepare a report in English.

This report will be posted on the website of Hiroshima University.

(1) Name of Lecturer: Roberto Torrent

(2) Title of Lecturer: Civil Eng., PhD.

(3) Affiliation: Quali-TI-Mat Ltd., Switzerland

(4) Short Biography:

Roberto Torrent is a specialist in the field of Technology of Concrete and Concrete Construction. He has been active as researcher, consultant and lecturer, developing half of his professional career in his native land, Argentina, and half in Switzerland, most of it at the Technical Center of Holcim (one of the world's largest cement, aggregate and concrete producers. Roberto Torrent has developed a test method to measure the air-permeability of concrete on site, standardized in Switzerland and widely used worldwide, particularly in Japan. He has also developed a software package for concrete mix design optimization, which is in use by his former employer, Holcim. His current research interests are in durability testing and service life assessment of concrete structures and in the application of shrinkage compensating concrete. He has been involved in Editorial activities for prestigious international journals, such as Materials and Structures and Cement and Concrete Research (currently Associate Editor). He is a RILEM Fellow.

(5) Subject and Schedule of the Lectures:

As a part of the course “Advanced Structural Concrete” in Department of Civil and Environmental Engineering, Graduate School of Engineering

Monday 8th of April, 12:50-17:50

- Lecture 1: Fundamentals of Hardened Concrete
- Lecture 2: Quality of Concrete in the Structure
- Lecture 3: Durability of Concrete: General Aspects

Tuesday 9th of April, 10:30-12:00

- Lecture 4: Durability Standards: From Prescriptive to Performance
*Joint lecture with “Reinforced Concrete Structures” for B3 by Associate Prof. Nakarai

Thursday 11th of April 12:50-16:05

- Lecture 5: Concretes of XXI Century
- Lecture 6: Special Projects in Switzerland and Argentina



Lecture on “Advanced Structural Concrete”



Joint lecture on “Advanced Structural Concrete” and “Reinforced Concrete Structures”

(6) Comments:

(6-1) Other scientific activities (seminar in Hiroshima University on Wednesday 10th April)

- Dr. Roberto Torrent: Durability: Measurement of Air Permeability on Site (with Demo)
- Mr. Mwangi Macharia: Fracture energy and mechanical properties of concrete cured internally with porous ceramic coarse aggregate
- Assistant Prof. Yuko Ogawa: Influence of curing temperature change to performance of fly ash as cementitious material



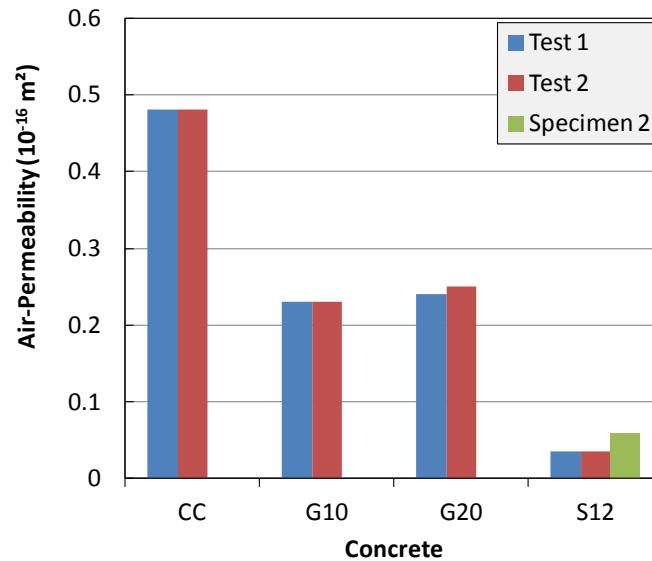
Seminar with members of Structural Materials and Concrete Structure Laboratory and demonstration

(6-2) Permeability tests of internally cured concretes (Hiroshima University, Wednesday 10th and Thursday 11th April)

As a cooperation to Mr. Macharia's research project, Dr. Torrent conducted air-permeability tests on 5 specimens of :

- a conventional concrete (CC)
- a concrete containing 10% of porous gravel (G10)
- a concrete containing 20% of porous gravel (G20)
- a concrete containing 12% of porous sand (S12), two specimens

all seal-cured during 7 days and then exposed to laboratory environment. The Fig. below summarizes the results obtained, showing clearly the beneficial effect of internal curing by means of porous aggregates, especially porous sand on permeability.



(6-3) Other scientific activities (seminar in Tokyo)

A joint seminar supported by JCI was held in Tokyo on 4th of April.

<List of presentation>

- Dr. Roberto Torrent: PermeaTORR Air Permeability Tester: Improvements, Applications and R&D
- Prof. Keiichi Imamoto: Evaluation of Carbonation Progress of Existing Concrete Buildings based on Air permeability of Concrete Cover
- Associate Prof. Akira Hosoda: Evaluation of covercrete quality by Surface Water Absorption Test
- Associate Prof. Kenichiro Nakarai: Activities of Technical Committee on Post-Construction Quality Verification of In-Place Reinforced Concrete under Japan Society of Civil Engineers (JSCE335)



Seminar in Tokyo

(6-4) Impression and comments

The lectures with technical lessons in English were intended to give complementary topics of Concrete Technology, useful for Structural and Civil Engineers. The lectures were of a conceptual character going from the Fundamental Nature of Hardened Concrete to Innovative Concrete Types and Special Applications for tunnels and industrial floors.

Special attention was given to durability issues and to the changing environment of Codes and Standards, moving from Prescriptive to Performance approaches.

Demonstrations of non-destructive tests to measure the moisture content and the permeability to air of concrete were made on specimens and a cracked column, the latter showing high permeability, as expected.

The lectures and demo were followed with interest and attention by the students, despite the intensive schedule, particularly that of Monday and possible language problems. At intervals, Prof. Nakarai was translating into Japanese

the key concepts expressed by the lecturer, which certainly helped to reinforce the understanding of the students: his help is greatly appreciated. The questions put forward by the students were in general of very good level, revealing a good assimilation of the concepts presented and a critical mindset.