



Monitoring Microstructural Changes in Concrete by Acoustic (Sonic and Ultrasonic) Measurements

Parisa Shokouhi, Ph.D., P.E.

BAM – Federal Institute for Material Research and Testing, Berlin, Germany

Monday, July 29th, 2013, 11:00 AM

Sackett, 213 Conference Room

Abstract:

Coherent sonic surface wave and diffuse ultrasonic measurements were used to monitor progressive stress-induced damage in concrete in a series of laboratory experiments. The specimens were subjected to uniaxial compression, applied in small steps over single or multiple load cycles. At each step, the loading (or deformation) was held constant and a series of surface wave and ultrasonic measurements along different directions were obtained. Surface wave velocities at every load step were calculated using TOF (time of flight) method. Acoustic emission and optical deformation measurements were used to monitor the development of microcracks during some of the experiments. The measurements were taken during both the loading and unloading phases. The time scale of the ultrasonic signals was chosen such that the diffuse ultrasonic regime could be recorded. The parameters governing the diffusion of ultrasonic waves in concrete at each loading step were calculated and their evolution with the increasing load/damage was investigated. Using Coda Wave Interferometry (CWI), the corresponding changes in the velocity of diffuse ultrasonic waves were also monitored. The evolution of the slope of the CWI velocity-stress curve is demonstrated.



Parisa Shokouhi's Biographical Information

EDUCATION

- Ph.D. in Civil Engineering** Jan. **2006**
Rutgers University, Piscataway, NJ, U.S.A.
- M.Sc. in Civil Engineering** May **2003**
Rutgers University, Piscataway, NJ, U.S.A.
- B.Sc. in Civil Engineering** Feb. **2000**
Sharif University of Technology, Tehran, Iran

ACADEMIC APPOINTMENTS

- Senior Research Scientist / Junior Professor** Mar. **2011** – present
Department 8.0 – Nondestructive Testing
BAM – Federal Institute for Material Research
and Testing,
Berlin, Germany
- Alexander von Humboldt (AvH) Research Fellow** Jul. **2008** – **2010**
Host: BAM – Federal Institute for Material
Research and Testing
- Assistant Professor of Civil Engineering** Jan. **2006** – Aug. **2009**
UTEP - The University of Texas at El Paso, El Paso, TX, U.S.A. (on leave Acad. Yr. 2008-09)
- Invited Guest Scientist** Jun. **2007** - Aug. **2007**
BAM – Federal Institute for Material Research
and Testing,
Berlin, Germany
- Graduate Research Fellow** Jan. **2005** - Dec. **2005**
Center for Advanced Infrastructure and
Transportation (CAIT)
Rutgers University, Piscataway, NJ, U.S.A.
- Graduate Research/Teaching Assistant** Jun. **2001** - Dec. **2004**
Department of Civil Engineering,
Rutgers University, Piscataway, NJ, U.S.A.