

## **KAMRAN M. NEMATI, Ph.D., P.E.**

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### **EDUCATION**

Ph.D. Civil Engineering – Structural Engineering, Mechanics and Materials  
University of California at Berkeley, 1994

### **PROFESSIONAL SUMMARY**

Dr. Kamran M. Nemati is received his Ph.D. in civil engineering from the University of California at Berkeley in December 1994, where he was also a post-doctoral research fellow until August 1998. His Ph.D. thesis entitled: "Generation and Interaction of Compressive Stress-Induced Microcracks in Concrete". His other graduate degrees are: Master of Science in civil engineering (Environmental Engineering); Master of Engineering in civil engineering (Geotechnical and Construction Engineering); and Master of City and Regional Planning (Urban Transportation Planning).

Prior to joining the State University of New York at Buffalo in 2022, Dr. Nemati was a professor and chair of civil engineering at the University of Arizona global campus in Cambodia from 2019 to 2021 and an associate professor in construction management and civil engineering at the University of Washington from 1998 to 2019. He was a visiting research fellow at the Imperial College of Science and Technology in London, England in 1992-93, and at Aalborg University in Denmark in 1996. During 2005-2007 academic years he was a visiting professor at Tokyo Institute of Technology in Japan, followed by a JSPS (Japan Society of the Promotion of Science) fellowship at the Building Material Engineering Laboratory at the University of Tokyo.

Dr. Nemati is a fellow of the American Society of Civil Engineers (ASCE), fellow of the American Concrete institute (ACI), a registered professional engineer (P.E.) in New York, California, Washington, and Hawaii, and has more than fifteen years of consulting engineering experience mostly with AECOM in Oakland California.

### **RESEARCH ACTIVITIES**

- Using Seawater as Mixing Water in Concrete – Fresh water will soon become increasingly scarce and it has been said that in 2025, half of humankind will live in areas where fresh water is insufficient. There are currently some areas where sand containing chloride or seawater are used as mixing water both intentionally and unintentionally. The purpose of this research is to investigate the possibility of using seawater as mixing water in concrete. This paper examines the various possibilities of using seawater as mixing water in reinforced concrete (RC) members.
- Prediction of Concrete Mass Loss due to Fire using Uniaxial Compression Test – Detailed study, dealing with the effect produced by the water/binder ratio and by porosity on the mechanical performances in compression and fire spalling. The aim of this research is to show that prediction of the fire spalling is possible by means of the sole uniaxial compression tests, and the amounts of artificial voids and polypropylene fibers can be optimized to prevent fire spalling.
- Accelerated Construction with Portland Cement Concrete Pavement (PCCP) – PCCP reconstruction for urban highways and intersections is frequently not considered due to perceived constructability problems, especially at locations with high traffic flow. As a solution to chronic asphalt rutting and in order to mitigate the maintenance and rehabilitation costs, fast track construction with PCCP requires further innovations. These innovations may include technologies to increase pavement service life, decrease construction time, lower life cycle and maintenance costs, utilize innovative construction equipment or procedures, and alternate concrete mix designs.
- Fracture Mechanics: Investigating fracture mechanics of concrete – Topics of investigation include using the molten metal alloy injection method to investigate fractures of concrete, application of stereology to analyze compressive stress-induced microcracks in concrete, fracture analysis of concrete using scanning electron microscopy, effect of confinement on the fracture behavior of concrete under compression, and development of micromechanical models to simulate crack growth in concrete.
- Utilization of advanced image analysis techniques in conjunction with scanning electron microscopy (SEM) for investigation of the material behavior under various loading conditions.
- Application of innovative experimental techniques to investigate fracture behavior of materials by preservation and observation of crack propagation under compression, leading to quantification of crack length, density, orientation, and interaction at different stages of loading and examination of the influence of different kinds of pozzolanic materials on the micromechanical behavior of concrete.

## PUBLICATIONS

- K.L. Scrivener and K.M. Nemati "The Percolation of Pore Space in the Cement Paste/Aggregate Interfacial Zone of Concrete," *Cement and Concrete Research*, Volume 26, Number 1, pp. 35-40, January 1996.
- C.T. Chang, P. Monteiro, K. Nemati, and K. Shyu "Behavior of Marble Under Compression," *American Society of Civil Engineers, Journal of Materials in Civil Engineering*, Volume 8, Number 3, pp. 157-170, August 1996.
- Carpinteri, B. Chiaia, and K.M. Nemati "Complex Fracture Energy Dissipation in Concrete under Different Loading Conditions," *Mechanics of Materials*, Volume 26, Number 2, pp. 93-108, September 1997.
- K.M. Nemati and P.J.M. Monteiro "A New Method to Observe Three- Dimensional Fractures In Concrete Using Liquid Metal Porosimetry Technique," *Cement and Concrete Research*, Vol. 27, No. 9, pp. 1333- 1341, September 1997.
- K.M. Nemati "Fracture Analysis of Concrete Using Scanning Electron Microscopy," *Scanning, The Journal of Scanning Microscopies*, Volume 19, Number 6, pp. 426-430, September 1997.
- K.M. Nemati, P.J.M. Monteiro, and N.G.W. Cook "A New Method for Studying Stress-Induced Microcracks in Concrete," *American Society of Civil Engineers, Journal of Materials in Civil Engineering*, Volume 10, Number 3, pp. 128-134, August 1998.
- K.M. Nemati, P.J.M. Monteiro, and K.L. Scrivener "Analysis of Compressive Stress-Induced Cracks in Concrete," *American Concrete Institute Materials Journal*, Volume 95, Number 5, pp. 617-631, September-October 1998.
- K.M. Nemati "Preserving Microstructure of Concrete Under Load Using the Wood's Metal Technique," *International Journal of Rock Mechanics and Mining Sciences*, Volume 37, Number 1-2, pp. 133-142, January-February 2000.
- K.M. Nemati and P. Stroeven "Stereological Analysis of Micromechanical Behavior of Concrete," *Materials and Structures /Matériaux et Constructions, RILEM*, Volume 34, Number 242, pp. 486-494, October 2001.
- Z.P. Bazant et al. (K.M. Nemati) "RILEM TC QFS Quasibrittle fracture scaling and size effect- Final report" *Materials and Structures /Matériaux et Constructions*, Volume 37, Number 272, pp. 547-568, October 2004.
- K.M. Nemati and P. Gardoni "Microstructural and Statistical Evaluation of Interfacial Zone Percolation in Concrete," *Strength, Fracture and Complexity*, Volume 3, Number 2-4, pp. 191–197, 2005.
- P. Gardoni, K.M. Nemati, and T. Noguchi "A Bayesian Statistical Framework to Construct Probabilistic Models for the Elastic Modulus of Concrete," *American Society of Civil Engineers, Journal of Materials in Civil Engineering*, Volume 19, Number 10, pp. 898-905, October 2007.
- T. Noguchi, F. Tomosawa, K.M. Nemati, B.M. Chiaia, and A.P. Fantilli "A Practical Equation for Elastic Modulus of Concrete," *American Concrete Institute, ACI Structural Journal*, Volume 106, Number 5, Sept.-Oct. 2009.
- A.P. Fantilli, K.M. Nemati, and B.M. Chiaia "Efficiency Index for Fiber- Reinforced Concrete Lining at Ultimate Limit State," *Sustainable and Resilient Infrastructure Journal*, Volume 1, Number 1-2, pp. 84-91, October 2016.
- K.M. Nemati and J.S. Uhlmeier "Accelerated Construction of Urban Intersections with Portland Cement Concrete Pavement (PCCP)," *Case Studies in Construction Materials Journal – Elsevier*, Volume 14, e00499, June 2021.
- K.M. Nemati, T. Saito, Y. Tadokoro, and N. Otsuki "Using Seawater as Mixing Water in Concrete, Cement and Concrete Composites (Submitted).
- K.M. Nemati and A.P. Fantilli "Mass Loss in Concrete with Different Water- to-Binder Ratios and Air Voids Exposed to Fire," *American Society of Civil Engineers, Journal of Materials in Civil Engineering* (Submitted).

### Selected Refereed Conference Proceedings:

- K.M. Nemati and P.J.M. Monteiro "Effect of Confinement on the Fracture Behavior of Concrete Under Compression," *Proceedings of the Second International Conference on Fracture Mechanics of Concrete and Concrete Structures, FraMCoS*, Vol. III, pp. 1843-52, Zurich, Switzerland, 1995.
- K.M. Nemati, F. Christensen, and R. Brincker "Influence of Fibers on Fracture Behavior of Reinforced Concrete Beams," *Proceedings of XVI Symposium on Nordic Concrete Research*, Helsinki University of Technology HUT, Espoo, Finland, pp. 101-102, 1996.
- Carpinteri, B. Chiaia, and K.M. Nemati "Multifractality of Fracture Patterns Under Compressive and Tensile Stress Fields in Cement-Based Materials," *Proceedings of the 4th Int'l Conference on Computer-Aided Assessment and Control – Localized Damage IV*, Fukuoka, Japan, pp. 21-36, 1996.
- K.M. Nemati and P.J.M. Monteiro "Fracture of High-Strength Concrete under Triaxial Loading," *Proceedings of the 1st International Engineering Foundation Conference on High Strength Concrete*, Kona, Hawaii, July 1997.
- K.M. Nemati "Stereology and Cement-Based Materials" *Acta Stereologica– The Proceedings of the Seventh European Congress for Stereology*, Amsterdam, The Netherlands, April 1998.

- K.M. Nemati and P.J.M. Monteiro "Observation of Microcracking in Quasi- Brittle Materials," Proceedings of the 12th Engineering Mechanics Conf., American Society of Civil Engineers, San Diego, California, May, 1998.
- K.M. Nemati and P.J.M. Monteiro "Micromechanical Behavior of High- Strength Concrete under Compression," Proceedings of the Structural Engineering World Congress (SEWC), San Francisco, California, Paper Reference: T168-7, July 1998.
- K.M. Nemati and P. Stroeven "Fracture Analysis of Concrete: A Stereological Approach," Proceedings of the 3rd Int'l Conference on Fracture Mechanics of Concrete and Concrete Structures, FraMCoS-3, Gifu, Japan, October 1998.
- K.M. Nemati "Accelerated Concrete Pavement Construction," Session organized by ACI Committee 325 on Concrete Pavements, American Concrete Institute, Fall Convention, Phoenix, Arizona, November 2002.
- K.M. Nemati "Predicting Elastic Moduli of Concrete Using Molten Metal Injection Method," Proc. of the 5th Int'l Conference on Fracture Mechanics of Concrete and Concrete Structures, FraMCoS-5, Vail, Colorado, April 2004.
- K.M. Nemati "Accelerated Construction of Urban Intersections with Portland Cement Concrete Pavement (PCCP)," Proceedings of the 1st International Conference on Construction Engineering and Management, ICCEM 2005, Seoul, Korea, October 16-19, 2005.
- T. Noguchi and K.M. Nemati "Relationship between Compressive Strength and Modulus of Elasticity of High-Strength Concrete," 6th International Conference on Fracture Mechanics of Concrete and Concrete Structures, FraMCoS-6, Catania, Italy, June 2007.
- K.M. Nemati, P. Gardoni, and T. Noguchi "On Modulus of Elasticity of High- Strength Concrete," International Conference on Construction and Building Technology, ICCBT2008, Kuala Lumpur, Malaysia, June 16-20, 2008.
- K.M. Nemati and J. Kemeny "Crack Growth in Concrete Under Uniaxial and Confined Conditions," Proceedings of the 9th International Conference on Fracture Mechanics of Concrete and Concrete Structures, FraMCoS-9, Berkeley, California, May 2016.

#### **HONOR AND AWARDS**

- Fellow, American Society of Civil Engineers (ASCE)
- Fellow, American Concrete Institute (ACI)
- Fellow, Japan Society for the Promotion of Science (JSPS)
- Member of Editorial Board for Sustainable and Resilient Infrastructure Journal
- Delegation Leader, Civil Engineering Delegation to the People's Republic of China to visit the construction of the Three Gorges Dam
- National Science Foundation (NSF) delegate to the USA-Brazil Workshop on Applied Mechanics, Aug. 2002
- Dean's Faculty Development Award, University of Washington
- Excellence in Teaching Award, University of Washington
- Invited Professor, Tokyo Institute of Technology, Japan; June 2005 – March 2006
- Japan Society for the Promotion of Science (JSPS), Overseas Fellow, The University of Tokyo, Japan, 2006
- Faculty Award for Excellence in Research and Scholarly Work, University of Washington

#### **PROFESSIONAL AFFILIATIONS**

- American Concrete Institute (ACI)
- American Society of Civil Engineers (ASCE)
- Japan Society for the Promotion of Science (JSPS)
- Materials Research Society (MRS)
- International Association for Fracture Mechanics of Concrete and Concrete Structures (FraMCoS)
- International Union of Testing and Research Laboratories for Materials and Structures (RILEM)
- RILEM's Committee on Size-Scale Effects in the Failure Mechanisms of Materials
- Associate Editor for the American Society of Civil Engineers Materials Journal
- Reviewer for the American Concrete Institute materials Journal
- Reviewer for the Transportation Research Board (TRB)
- National Science Foundation (NSF), Arlington, Virginia, Review Panel Member
- Voting member of the following committees at the American Concrete Institute
  - ACI Committee 216 - Fire Resistance
  - ACI Committee 224 - Cracking
  - ACI Committee 231 - Properties of Concrete at Early Ages
  - ACI Committee 236 - Materials Science of Concrete
  - ACI Committee 325 - Concrete Pavements
  - ACI Committee 446 - Fracture Mechanics of Concrete