



#### EDUCATION

- Central South University
  - Bachelor of Science, Geology, 1982
  - Master of Science, Petrology, 1985
- University of Illinois at Urbana-Champaign
  - Doctor of Philosophy, Geology/Materials Science, 1994

#### PRACTICE AREAS

- Aggregate Evaluation
- Petrographic Examination
- Distress Investigation
- Cement Hydration
- Mortar Evaluation
- Construction Materials Investigation
- Litigation Consulting
- Research and Testing

#### PROFESSIONAL AFFILIATIONS

- American Concrete Institute (ACI), Central Texas chapter
- International Cement ASTM International
- Microscopy Association (ICMA)
- Society of Concrete Petrographers (SCP)

#### CONTACT

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#### EXPERIENCE

Derek Cong has significant practical and theoretical experience with concrete and concrete materials. Since joining WJE in 2001, he has been involved in the petrographic examination of concrete, masonry, aggregate, and other building materials for a variety of structures. He has conducted thousands of investigations involving such material problems as alkali-silica reaction (ASR), low strength, retardation, cement-admixture interaction, efflorescence and other surface defects, fire-damaged concrete, cracking, sulfate attack, and delayed ettringite formation (DEF). Dr. Cong is often consulted on concrete mix designs to avoid concrete material problems.

During his doctoral studies at the University of Illinois at Urbana-Champaign, Dr. Cong conducted extensive research on cement hydration, structure of calcium silicate hydrate (C-S-H), and ASR using solid state Nuclear Magnetic Resonance (NMR) Spectroscopy. As a post-doctoral research associate for Lawrence Livermore National Laboratory, Dr. Cong performed hydrothermal synthesis of various model compounds for C-S-H for the Yucca Mountain nuclear waste repository project. Prior to joining WJE, Dr. Cong held positions with W. R. Grace and the Erlin Company. He also taught optical mineralogy and petrography at Central South University in China.

#### REPRESENTATIVE PROJECTS

##### Petrographic Examination

- MPR Associates - Alexandria, VA: Petrographic examination and Damage Rating Index (DRI) assessment of ASR in laboratory-prepared concrete anchors for investigation of structural effects of ASR for Seabrook Nuclear Power Plant
- Palo Verde Nuclear Power Plant and Water Reclamation Facility - Tonopah, AZ: Petrographic examination of concrete cores for general characterization and distress assessment, including ASR-related distress
- California Department of Transportation (Caltrans) - CA: Petrographic examination of concrete and aggregate samples for Caltrans' ASR Correlation Studies

- Sixth Street Bridge - Los Angeles, CA: Petrographic examination of ASR-deteriorated concrete cores
- I-5 Undercrossing - Santa Clarita, CA: Assessment of fire-damaged concrete
- Charlotte International Airport Taxiway - Charlotte, NC: Petrographic examination of concrete cores to determine the cause of pavement cracking
- Moreton Building - Austin, TX: Petrographic and laboratory evaluation of concrete cores to assess the cause of cracking and predict the potential for DEF

##### Materials Investigation

- LBJ Library - Austin, TX: Laboratory evaluations of granite panels
- Randolph Air Force Base - San Antonio, TX: Petrographic examination of aggregate samples for suitability of concrete aggregate
- Camp Mabry - Austin, TX: Historical mortar evaluation and mix proportions

##### Litigation Consulting

- GB Biosciences Corporation et al. vs. Occidental Chemical Corporation, et al - Houston, TX: Provided testimony on private arbitration regarding CFB ash samples
- Trinity Drywall Systems, LLC vs. TOKA General Contractors, Ltd., et al. - Fort Worth, TX: Provided testimony regarding stucco problems
- Maisel Brothers, Inc. vs. Holcim (US), Inc. et al. - Severna Park, MD: Provided technical and litigation support on the cause of CMU block staining and popout problems

##### Research and Testing

- Investigation of cementitious materials content in hardened concrete
- Investigation of mortar mix proportions
- Potential alkali-silica reactivity of aggregate

##### TECHNICAL COMMITTEES

- ASTM C09 - Concrete and Concrete Aggregates
- ASTM C09.20 - Normal Weight Aggregates
- ASTM C09.26 - Chemical Reactions
- ASTM C09.65 - Petrography, Task Group Chair on C856
- Society of Concrete Petrographers, founding member and past president