PERSONNEL QUALIFICATIONS

Hugh (Xiaoqiang) Hou | Associate Principal

EDUCATION

- Taiyuan University of Technology
  - Bachelor of Science, Geology, 1986
- China University of Mining and Technology
  - Master of Science, Coal Geology, 1989
- University of Illinois at Urbana-Champaign
  - Doctor of Philosophy, Geology, 2001

PRACTICE AREAS

- Materials Evaluation and Research
- Petrography
- Construction Materials
- Laboratory Evaluations
- Concrete
- Aggregate
- Cement and Clinker Evaluation
- Masonry Assessment
- Stone Evaluation

PROFESSIONAL AFFILIATIONS

- American Concrete Institute (ACI) - Illinois Chapter
- ASTM International (ASTM)
- International Cement Microscopy Association (ICMA)
- Society of Concrete Petrographers (SCP)

CONTACT

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EXPERIENCE

Hugh Hou has extensive experience in the petrographic evaluation of concrete, cement, clinker, aggregate, mortar, stucco, and dimension stone in determining causes of distress, composition, quality, properties, projected performance, or compliance with specifications. He has been involved in troubleshooting concrete problems ranging from fire damage to freeze-thaw deterioration, salt growth distress to deleterious chemical reactions (such as alkali-aggregate reaction, delayed ettringite formation [DEF], and thaumasite sulfate attack), surface distress to bulk low strength, and leaching to efflorescence.

Dr. Hou has performed hundreds of projects related to concrete petrography (ASTM C856), aggregate petrography (ASTM C295), mortal analysis (ASTM C1324), cement/clinker (Ono's Method and reflected light microscopy), dimension stone (ASTM C1721), and rocks used for erosion control (ASTM D4992).

Dr. Hou conducted in-depth research on alkali-silica reactions (ASR) and cement hydration when he served as the manager and postdoctoral research associate at the Center for Advanced Cement-Based Materials at the University of Illinois at Urbana-Champaign. He has broad experience in spectroscopy, scanning electron microscopy, thermal analysis, and X-ray diffraction. Dr. Hou approaches materials issues with problem-solving perspectives from macroscales to atomic or molecular levels. He has published extensively in areas of cement and concrete chemistry/microscopy, mineral-water interactions, and coal geochemistry and petrology.

REPRESENTATIVE PROJECTS

Materials Evaluation and Research

- Various Locations: Composition, texture, and distress of self-leveling underlayment
- Potomac, MD: Evaluation of precast concrete panels and mix designs
- Air Force Base Pavements - Various Locations: Aggregate evaluation in compliance with ASTM C295 and UFGS Section 32 13 11
- San Ramon, CA: Evaluation of Kwik Bond polymer concrete
- Marina Grande Riviera Beach Condominium Association - Fort Lauderdale, FL: Evaluation of stucco and parging materials
- Rhodes Architectural Stone - Various Locations: Assessment and testing of dimension stones to determine the suitability in water features
- Research Projects Funded by the National Science Foundation and the Federal Highway Administration: Composition and structure of ASR gel and role of portlandite in ASR

Concrete

- Santiago, Dominican Republic: Evaluation of efflorescence on concrete columns
- England, Various Locations: Evaluation of burnt dolomite contamination and popouts in concrete elements
- Vance, AL: Evaluation of tire mark buildup on pigmented dry shake concrete topping
- William Tower Parking Bridge - Houston, TX: Identification of DEF as the major cause of distress
- Midwest U.S., Three Locations: Thaumasite sulfate attack in concrete
- Fort Smith, AR: Petrographic evaluation of heat effect on concrete electric arc furnace foundations
- Various Locations: Petrographic assessment of flooring blisters due to ASR and absorptive particles
- Reno, NV: Assessment of ASR in lightweight-aggregate concrete
- Various Locations: Petrographic evaluation of delamination related to trowel finishing of highly air-entrained concrete

Cement and Clinker Evaluation

- Various Locations and Clients: Microscopical evaluation of clinkers and cements using Ono's Method and reflected microscopy

TECHNICAL COMMITTEES

- ASTM C09 - Concrete and Concrete Aggregates
- ICMA - Clinker Sample Exchange Committee, chair