

Hichborn Consulting Group

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CURRICULUM VITAE FOR GEOFFREY HICHBORN, SR, PE

Expertise:

General Civil Design with specialties featuring:

- Forensic Investigations of Concrete Work and Concrete Products
- Concrete, Cement and Related Materials Expertise
- Construction Practices & Materials Evaluation
- Repair Recommendations, Construction Observation
- Public Works / Residential / Commercial / Industrial
- Batch Plant Inspection, Aggregate Suitability Studies
- Specially Designed Tests of Distressed Materials

Experience:

With nearly thirty years of construction materials testing and problem solving, Mr. Hichborn has performed a wide variety of laboratory and field evaluations of structural, architectural and coating materials, specializing in those containing hydraulic cements. He is experienced in all aspects of an investigation, from planning the field investigations to determining sampling and testing protocols and tabulating and analyzing the results. His investigations have included appropriate sampling and sample conditioning for effective and reliable laboratory testing of chemical, physical and optical (microscopic) properties of concrete and its separate ingredients addressing their effect on fresh and hardened concrete properties, with particular interest in durability. Additionally, he has devised and directed specialized tests and evaluations for research and development of new products and for solving complex field problems. Concrete analysis includes residential and public works, and pre-cast, pre-stressed, cast-in-place and post-tensioned structural work. Field investigations encompass exterior portland cement (wall) plaster and swimming pool plaster, concrete pipe, gunite, concrete masonry units ('cmu's or 'block'.) mortar and grout. Other investigations involve concrete flatwork, plain and architectural concrete, debonding of coatings, concrete pumping problems and recommendations for appropriate repair procedures. Mr. Hichborn is experienced in structural inspection and testing for commercial and industrial construction and for quality assurance of civil works, both public and private.

Project Examples:

- * Directed and performed thousands **field condition surveys of** both recently constructed and existing distressed/damaged **concrete structures**. Analyses includes evaluation of design intent, nature of distress, effect of site environment and service use on concrete, properties and type(s) of ingredient materials, and other factors as appropriate. Characterized mechanism(s) of distress and **recommended remediation /repair** as required.

- * Scores of exhaustive investigations of distressed/failed concrete commercial and industrial warehouse **concrete slabs on grade, including making repair recommendation**, cost estimates, review and analysis, estimated in excess of eight million square feet.
- * Investigation of thousands of structures with claims involving construction distress from **sulfate attack, alkali silica reaction, freeze thaw distress and concrete pumping** incidents considering waterproofing and issues of concrete durability and required mix proportioning.
- * Evaluation, consideration and recommendations for **coating and repair materials**, including preparation procedures, application, specification, and general material properties.
- * Performed scores of **post earthquake assessments of concrete and exterior plaster to discern distress age, causation and nature** of damage, and recommend appropriate repairs.
- * Evaluation of **delaminated epoxy terrazzo flooring** in multistory institutional building.
- * Investigation, analysis distressed **concrete construction** and framing **anchorage**, particularly **residential structures** and related ingredient materials. Headed and investigated scores of tracts throughout the southwestern United States for allegations of distress related to **soils, waterproofing and other coatings, concrete foundation and flatwork, plaster, framing, including repair recommendations and cost estimates** Such work often includes claims of flooring damage due to “defective” “porous and permeable” concrete materials and improper installation; often involves various field test methodologies to assess moisture condition of concrete slabs and suitability to receive flooring.
- * Performed comprehensive evaluations of in excess of two million square feet of **parking areas, industrial, and airfield pavements** for **portland cement concrete** and of **asphaltic cement concrete**. Services included analysis of **strength, thickness, drainage slopes and construction tolerances** of pavements and flatwork, and remediation.
- * Directed comprehensive evaluation in 1998-2000 of concrete materials, construction, and proposed waterproofing protocol by use of **Full Scale Installation and Testing Program** with four concrete formulations. Considered the reliability of unconventional methodologies including Scanning Electron Microscopy (**SEM**,) Energy Dispersive X-Rays (**EDX**,) Wavelength Dispersive Spectroscopy (**WDS**,) microprobe, and conventional ones, including Infrared spectroscopy (**IR**, **FTIR**,) X-Ray Diffraction (**XRD**, **QXRD**,) X-Ray Emission (**XRE**,) Differential Thermal Analysis (**DTA**,) Thermogravimetric Analysis (**TGA**,) and conventional testing methods, evaluation controlled all aspects of materials and installation.
- * Evaluation of **packaged repair and specialty products** used in various applications from floor leveling, decorative precast concrete, structural repair and related uses. Projects include faulty cementitious and non-cementitious materials used to manufacture non-structural precast elements, perform floor leveling, fill voids, smooth surfaces (including sacking) or inappropriate application or installation methods.
- * Performed extensive evaluations of numerous **concrete parking structures** throughout Concrete, Arizona, and Nevada. Structures include cast-in-place and precast/pre-stressed, and reinforced with mild deformed reinforcing steel and by use of post-tensioning systems.

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- * Performed comprehensive evaluations of **retaining walls in residential and public ways** with respect to construction methods and standards.
- * Performed extensive evaluations of several thousand feet of extruded, low slump, portland cement **concrete curb and gutter**.
- * Examination of finish surfaces and repairs and effectiveness of sacking in cast-in-place **mausoleum structure**.
- * Review of concrete, concrete materials, and testing practices for suitability for use in **precast and pre-stressed concrete manufacturing** plants.
- * **Directed** all technical activities for **testing and inspection laboratory** and reported on material properties of concrete, concrete repair materials, specialized coatings, masonry, grout, rebar, prestress strand, high strength aircraft parts and soil.
- * Extensive experience evaluating and repairing **post-tensioned slabs on grade** particularly residential construction, durability and corrosion thereof, and related codes and standards.
- * Proposed, supervised and reported results of various testing programs to **characterize the effects of mix proportions**, ingredients and steam curing on strength development over time, for ready-mix, masonry block, precasting and pre-stressed concrete operations.
- * Evaluation of leaking, cracked and distressed **swimming pools shells** (gunited and cast-in-place) from earthquake, construction defects, soil actions and other causation.
- * Comprehensive evaluation of 30 plus distressed **swimming pools** where the gunite pool shell and white pool plaster was disintegrating due to sulfate reactions, Las Vegas NV.
- * Evaluation and **approval of concrete and concrete repair and coating materials** for use in various sulfated and other aggressive environments.
- * Developed **product criteria, special tests, unique properties, and unusual ingredients** for new cement product for asbestos-cement (A/C or “Transite”) pipe and oil well cement.
- * Evaluation of **Precast Tilt up Boundary Walls Panel Systems** regarding claims of corrosion and poor durability.
- * Extensive experience on **construction permitting, testing and inspection practices**.
- * Consultations for **repair procedures** and **specification writing** for various home builders.
- * Revision, re-implementation and execution of a **comprehensive internal quality assurance program** designed to ensure compliance of laboratory technicians and inspectors, equipment, facilities, procedures, supplies and reports.
- * **Teaches** from time to time on all aspects concerning **concrete and materials** used in making concrete, **investigating concrete claims, construction standards, and standards of care**.

- * Serves as **expert witness** in cases involving all manner (defects, flood, fire, earthquake, etc.) of distressed concrete in public, commercial, industrial and residential construction; including related materials and installation standards of construction. Work includes cases on behalf of plaintiffs and defendants. Extensive experience with multi-disciplined claims.

Education:

B.S. Civil Engineering, University of California, Irvine, 1979. Various ongoing specialized training in engineering and materials with emphasis on portland cement, portland cement concrete, concrete-making materials, cement-containing products, repair and coating products and testing and inspection of structural materials used in construction.

Affiliations & Registrations:

Fellow - American Concrete Institute (**ACI**, Local & National) Committees: RCC-Responsibilities in Concrete; 201-Durability; 225-Selection and Use of Hydraulic Cement; 332-Residential Concrete; 552-Geotechnical Grouting Sub-Committee
American Society of Civil Engineers (**ASCE**) LA Section, Orange County Group, Member - Forensic Engineering Technical Group
International Concrete Repair Institute (**ICRI**, National and Local Member, Geotechnical Grouting Sub-Committee)
American Society for Testing and Materials (**ASTM**, including Committees *C-1 Cement, C-9, Concrete, Various Sub-Committees, and C-27 Precast Concrete*)
Structural Engineers Association of Southern California (**SEAOSC**)
Member, Concrete Sub-Committee Since 1988
Pre-Cast Concrete Manufacturers Association of California (**PCMAC**) Professional Member
Pre-Cast Concrete Institute (**PCI**) Professional Member
Post-Tensioning Institute (**PTI**) Professional Member
Arizona Concrete Contractors Association (**ACCA**) Member
American Society of Concrete Contractors (**ASCC**) Member
Plastering Contractors Association - Southern California (**PCASC**) Member
Forensic Expert Witness Association (**FEWA**) elected Chapter Director 2005, VP 2006, President 2007-8, National Director 2006-8, National Vice President 2007-8
Registered Civil Engineer (CA C-45208 granted 1/1990, next expires 9/30/2010)
Former **Registered Disaster Worker** - Residential Construction

Other Activities:

From 1984 to 1999, taught P.E. (Civil) License Review course at Cal State Long Beach, Dept. of Continuing Education, School of Engineering, and in 1984, on "Concrete-Making Materials" and Principles of Inspection of Concrete and Masonry.

Various speaking engagements on testing, inspection and construction materials and related subjects. Examples: ACI Hot & Cold Weather Concreting Practices, Phoenix & Sacramento 10/91, ACI Residential Concrete Construction, 3/92, Fly Ash Seminar to Arizona Municipal Building Officials through ARPA 6/92, Concrete Durability, entitled "Sulfate Attack of Concrete". Sulfate reactions in Maricopa County AZ; Phoenix 5/93; ACI Concrete Sub-Contractor Liability Identification Seminars 5/94. Presentations include conditions of concrete slabs with respect to flooring standards, significance of vapor emissions testing using the moisture dome test and various instrumental methods for indication of moisture and suitability to receive flooring, evaluation of foundation damage, flatness and levelness and the conditions of concrete and related construction.