

EDUCATION

- 1978 **Bachelor of Science (B.S.) in Civil Engineering**
University of Kansas, Lawrence, Kansas
- 1988 **Master of Science (M.S.) in Civil Engineering**
University of Kansas, Lawrence, Kansas
- 1993 **Doctor of Philosophy (Ph.D.) in Civil Engineering**
University of Kansas, Lawrence, Kansas

EXPERIENCE

- 1996/1997
to Present **Engineering Design & Testing Corp.**
Lenexa, Kansas
Forensic and Consulting Engineer
Analysis of buildings and structures with design applications, marine bulkhead movements, foundation settlements, ground subsidence, retaining wall and slope stability failures, analysis and distribution of wind forces, building code compliance, evaluation of construction materials and methods, structural evaluations of framing systems, exterior veneers and building envelopes, evaluation of roof damage, development and implementation of laboratory testing programs, investigation of industrial and commercial incidents as related to causation, segregation, assessment and delineation of damage, cost of repair estimates and expert engineering testimony.
- 1992
to 1997 **University of North Carolina**
Charlotte, North Carolina
Instructor and Assistant Professor
Teaching responsibilities in the Department of Civil Engineering including instruction in structural analysis, civil engineering materials, laboratory testing and procedures, pre-stress and post-tensioned concrete design, fracture and fatigue of metals, design of buildings and quantification of engineering material properties.

Founder and Director of Civil Engineering Materials Program
Direct, supervise, and perform research in the alkali-silica reaction in concrete, utilization of municipal solid waste ash, effectiveness of coal fly ash in reducing alkali-aggregate reaction, strength characteristics of lime-fly ash mixtures, strength characteristics of Type I and III portland cement and high-volumes of fly ash, dimensional stability of portland cement concrete, and influence of aggregate content and gradation on drying shrinkage in concrete.
- 1984
to 1992 **University of Kansas**
Lawrence, Kansas
Graduate Teaching Assistant

Coursework and teaching in the Department of Civil Engineering including instruction in engineering mechanics, structural analysis, and laboratory procedures with respect to the testing of civil engineering materials in accordance with ASTM Standards.

Research Assistant

Research related to the dielectric properties of concrete, chemical and mineral admixtures in concrete, experimental studies on full-scale reinforced concrete building components subjected to earthquake loading, failure analysis, overall project responsibilities including structural analysis, design, and fabrication, mix proportioning and testing high-strength concrete, analysis and design of test assemblies (structural design and post-tensioning operations), electronic data acquisition, computerized data reduction with statistical analysis.

1978
to 1984

Burns & McDonnell Consulting Engineers
Kansas City, Missouri

Design Engineer

Design of pre-fabricated metal building foundations, oil containment structures, ringwall foundations, steel lattice transmission towers, monorails and framing, coal-fired power generation steel buildings including primary framing members, bracing, bolted and welded connections, baseplates and anchor bolts, reinforced concrete water containment structures, spread footings, pile caps, grade beams, drilled shafts, slabs-on-grade, rotary equipment and chimney foundations.

Project Structural Engineer

Administrative responsibilities including specification writing, bid evaluation, contract coordination, construction inspection and supervision, analysis and design of structures, supervision of project design engineers and implementation of quality assurance and quality control procedures.

1976
to 1978

University of Kansas
Lawrence, Kansas

Student – Undergraduate (primary) and Graduate (secondary)

Accredited Baccalaureate Engineering Curriculum (ABET) Coursework in the Department of Civil Engineering.

1973
to 1976

Black & Veatch Consulting Engineers
Kansas City, Missouri

Engineering Technician

Preparation of structural steel and reinforced concrete contract drawings for coal-fired and nuclear power generation facilities, review of compliance submittals and pre-engineering coursework at Johnson County Community College in Overland Park, Kansas.

EXPERIENCE

Design and Construction (partial list)

ENERGY GENERATION AND TRANSMISSION

Sikeston Board of Municipal Utilities — Sikeston, Missouri

235-Megawatt coal-fired generation station

Western Farmers Electric Cooperative — Hugo, Oklahoma

450-Megawatt coal-fired generation station

Deseret Generation & Transmission Cooperative — Sandy, Utah

500-Megawatt coal-fired Bonanza Power Plant Unit No. 1

Basin Electric Power Cooperative — Wheatland, Wyoming

550-Megawatt coal-fired Laramie River Station

Seminole Electric Cooperative — Silver Springs, Florida

230-Kilovolt transmission line and distribution station

Alabama Electric Cooperative — Leroy, Alabama

230-Kilovolt double circuit lattice transmission tower foundations

Platt River Power Authority — Fort Collins, Colorado

230-Kilovolt double circuit tubular pole transmission line foundations

Associated Electric Cooperative — Moberly, Missouri

345-Kilovolt Thomas Hill Power Plant lattice transmission tower and distribution station

Forensic Investigations (partial list)**INDUSTRIAL****Carlyss Spool Basin Project — Carlyss, Louisiana**

Barge loading/unloading facility – determine cause of damage to reinforced embankment and provide technical opinion pertaining to original design deficiencies

Chemical Plant — Pascagoula, Mississippi

Buildings, structures, warehouses, loading docks and associated civil-site work – determine scope of repairs and establish value of loss for damage to phosphate fertilizer plant from Hurricane Katrina

Ethanol Plant — St. Joseph, Missouri

Foundations – peer review of project drawings, specifications and design calculations, determine cause of excessive tank and building settlements and delineate factors contributing to root cause of damage with respect to original project participants

Hydrogen Production Facility — St. Charles, Louisiana

Steam methane reformer – review incident reports, project drawings and related project documentation and assess available information related to the cause of damage and scope of repairs to catalyst tubes and outlet headers

Havana Power Station — Havana, Illinois

Cooling tower – conduct site investigation, evaluate partial collapse of cooling tower and establish candidate cause(s) of damage

Ethanol Plant — Atkinson, Nebraska

Fermentation tank – determine scope of wind-related damage during erection, review original tank design calculations, evaluate design and erection methodology with respect to ASME Boiler and Pressure Vessel Code requirements and prepare cost of repair estimate

Fertilizer Plant — Pasadena, Texas

Runoff retention system – site investigation, evaluate cause of involuntary discharge from gypsum stack into navigable waterway, determine scope of damage and review repair procedures and associated costs

James River Power Station — Springfield, Missouri

Cooling tower – segregate wind damage versus long-term deterioration, review options for repair-replacement and evaluate incident-related costs

Marine Bulkheads — Larose, Louisiana

Dry dock repair facility – determine scope of damage to bulkheads from Hurricanes Gustav and Ike, evaluate bulkhead repair methodology and delineate-segregate repair costs

K2 Potash Plant — Esterhazy, Saskatchewan

Potash storage silo – review original design and construction of coarse ore storage silo, site examination and evaluate factors contributing to cause of collapse and incidental structural damage

Oil Refinery — Pasadena, Texas

Coker unit – evaluate and determine scope of structural damage due to explosion and resulting fire-related damage to structural steel frame and elevated concrete platforms and develop cost of repair estimate

Wastewater Treatment Plant — Shawnee, Kansas

Clarifier basin – determine scope of damage to a 2.0 million gallon reinforced concrete clarifier, coordinate ground penetration radar (GPR) investigation and evaluate options for flood-related repairs

University of Missouri Power Plant — Columbia, Missouri

Lime injection storage silo – determine cause of silo collapse, evaluate options for repair-replacement and develop cost estimate

Railroad Derailment — Tyrone, Oklahoma

Cargo container – post-incident train derailment investigation and evaluation of circumstances associated with packaging, loading and transport of metal injection molds in a double-stacked “well” rail car

Chemical Packaging and Distribution Facility — Kansas City, Missouri

Buildings, structures, storage tanks and piping – site investigation due to an explosion at a solvent packaging and distribution facility, determine scope of structural damage, develop value of loss with code upgrades and review replacement cost invoices (claim analysis)

Ethanol Plant — Wentworth, South Dakota

Truss assemblies, platforms, catwalks and grain conveying equipment – site examination and documentation, determine scope of wind-related damage to equipment and structural components and prepare cost estimate for demolition and reconstruction

Coke Calcining Plant — Gramercy, Louisiana

Dome storage structure – site investigation of a 225-ft diameter reinforced concrete coke storage structure, determine scope of fire-related damage, peer review of petrographic analysis and evaluate options for repair

Chemical Plant — Lake Charles, Louisiana

Cooling tower – site investigation of a collapsed, wood-framed, cross-flow cooling tower, determine cause and scope of structural damage to tower (and basin) and evaluate cost of repair estimates

Ottumwa Generating Station — Ottumwa, Iowa

Lime/Fly ash recycle silo – site investigation of an inoperable 48-ft diameter steel silo, peer review of silo design parameters including material constituencies and chemistry, discharge rates, and operational characteristics at time of incident

COMMERCIAL**University of North Carolina at Charlotte — Charlotte, North Carolina**

Post-tensioned parking structure – analyze concrete formwork and provide technical assistance to North Carolina Department of Labor Safety as related to formwork failure

Parque del Retiro II — Morovis, Puerto Rico

Multistory apartment complex – conduct site investigation, identify and evaluate deficiencies in construction and provide technical opinion with respect to overall quality of construction

Commercial Office Building — Wilmington, North Carolina

Steel-framed structure – analyze building for wind damage due to Hurricane Fran and provide technical opinion with regards to deficiencies in original structure design

Tchoupitoulas Warehouse Corporation — New Orleans, Louisiana

Pre-Civil War era warehouse – conduct site investigation of collapsed masonry and wood-framed structure and provide technical opinion as to cause(s) of collapse

Roman Catholic Diocese of Boise — Pocatello, Idaho

Gymnasium floor – determine cause of intermittent buckling in wood floor including coordination of activities associated with video examination of underground sanitary sewer lines

High-Rise Office Building — Dallas, Texas

Column shortening in a 33-story building – investigate distress in a 480-volt, 4,000-amp Square D I-Line bus for the adverse effects of compression in concrete shearwalls and steel columns

Metal Building — Columbia, Missouri

Storm damage to metal roof – determine scope of storm-related damage to 127,000 square feet of Galvalume roof panels including segregation and delineation of pre-incident damage

Kingman Community Hospital — Kingman, Kansas

Roof construction – determine cause of moisture intrusion during re-roofing operations and evaluate extent of contractor's compliance/noncompliance with contract documents and industry standards

Airport Hanger — Kearney, Nebraska

Roof support system – determine scope of wind-related damage to steel trusses utilized in construction of a World War II aircraft hangar

Methodist Episcopal Church — Chester, Nebraska

Wood-framed structure with brick veneer – determine cause of damage to primary roof trusses of church constructed in 1909, including segregation and delineation of tornado-related structural distress

Aircraft Hangers — Bentonville, Arkansas

Steel-framed structure – determine scope of wind-related structural damage, including segregation of pre-incident damage, to commercial aircraft hangers with retractable doors

South Plains Mall — Lubbock, Texas

Modified bituminous and built-up roof covering – determine scope of storm-related damage to 800,000 square feet of roof covering utilizing infrared thermography and electrical impedance measurements

Fertilizer Loading and Unloading Facility — Grand Forks, North Dakota

Precast concrete structure – site investigation, review structural design, evaluate structural components for excessive movements/displacements and determine cause(s) of damage

Food Processing Facility — Carthage, Missouri

Building envelope and interior finishes – conduct site investigation, determine scope of fire-related damage and prepare cost of repair estimate

Omaha Park Eight — Omaha, Nebraska

Eight-story parking garage – evaluate circumstances involving a construction site injury as related to the design, fabrication and installation of precast concrete wall panels

Moody Gardens — Galveston, Texas

Buildings, structures, warehouses, roadways, docks and site topography – determine scope of hurricane damage, segregate and delineate wind versus flood damage and develop cost of repair estimates

Lea County Event Center — Hobbs, New Mexico

Veneer distress – determine scope and cause of damage to synthetic (EIFS) and hard coat stucco veneer, review original veneer installation methodology and evaluate cost of repair

Apartment Complex — Austin, Texas

Adhered manufactured stone veneer distress – conduct field investigation, evaluate stone veneer installation methodology, coordinate laboratory testing of veneer samples and determine cause(s) of distress

Public Housing Project — Moore, Oklahoma

Building damage – peer review of engineering reports as related to the cause and scope of damage attributable to seismic/earthquake induced loads and displacements, development of damage assessment protocol with segregation of long-term versus earthquake-related building damage

Office Building Complex — Irving, Texas

Roof examinations – evaluate roof coverings (built-up-roof, single-ply membrane and metal panels – 220,000 square feet) for extent of hail-related damage and long-term weathering via infrared thermography, moisture testing, sample acquisition and laboratory investigation

Steel-Framed Building — Woodward, Oklahoma

Structural assessment – determine scope of tornado-related damage, review and evaluate design and installation of brick veneer, steel roof joists, metal deck, structural steel and wall assemblies for compliance with building codes and industry standards

River Valley Marina — Little Rock, Arkansas

Structural assessment – document and determine scope of flood-related damage to boat docks, evaluate and segregate incident versus non-incident cost of repairs

Hospital — Elgin, North Dakota

Building assessment – review project documents, evaluate subsurface conditions and original building design and determine cause of damage to structure associated with foundation movement

Southwest Electric Cooperative — Maryville, Illinois

Site assessment – review Illinois Department of Natural Resources survey information and evaluate structural integrity of office building, warehouse and miscellaneous structures for movements/displacements associated with ground subsidence due to coal mine collapse

Reinforced Concrete Retaining Wall — Eau Claire, Wisconsin

Structural collapse – peer review of original counterfort retaining wall design, quantification of soil/backfill pressures for active and at-rest loading conditions and determine cause of retaining wall displacement/movement

Aviation Training Center — Wichita, Kansas

Construction assessment – review of constructed project documentation, site examination, evaluation of insulated metal panel installation methodology and determination of moisture entry into steel-framed building

Retirement Community Complex — Norman, Oklahoma

Building assessment – examination and documentation of magnitude 5.8 earthquake damage to three-story steel-framed building, evaluate associated seismicity data published by the United States Geological Society (USGS) and segregate earthquake versus long-term building distress

Warehouse Floor — Edgerton, Kansas

Concrete floor assessment – site examination of warehouse floor, evaluate results from petrographic examinations of concrete cores, peer review of report by others and determination of floor distress associated with applicability of cold-weather concreting placement procedures

Food Processing Facility — Archbold, Ohio

Building and roof assessment – site examination and documentation of storm damage to metal-framed structures and associated roof coverings (built-up roof system, single-ply membranes and standing seam metal panels – 260,000 square feet), determination of scope of damage, and review of repair/replacement costs including labor rates, materials and equipment

Manufacturing Plant — Jonesboro, Arkansas

Precast concrete structure – peer review of collapsed roof support system, evaluate computer input/output (structural analysis using LEAP and ADAPT software programs) in accordance with building code requirements for roof loads and allowable concrete stresses

Manufacturing Plant — Dodge Center, Minnesota

Building assessment – site examination and documentation of collapsed office building and adjacent production area, determination of scope of structural damage, coordination of demolition activities, and cost of repair estimate

PAVEMENTS, ROADWAYS AND BRIDGES**Commercial Warehouse — Berwick, Pennsylvania**

Asphalt pavement – review pavement design in accordance with industry standards, evaluation of laboratory test results and determination of flood-related damage to 750,000 square feet of asphalt pavement

Highway Construction — Ashland, Wisconsin

Concrete pavement – peer review of evaluation report by Wisconsin Concrete Pavement Association and Wisconsin Department of Transportation, review of construction documents, evaluate and proportion cause(s) of roadway distress

Road Construction — Rockport, Texas

Road drainage – review of project drawings and Texas Department of Transportation design requirements and evaluation of flood-related damage associated with the means and methods of temporary road construction

Concrete Bridge — Pottawattamie County, Iowa

Four-span prestressed concrete bridge (Bridge No. 7805.5S362 over I-29) – determine scope of damage due to bridge impact, review Iowa Department of Transportation Bridge Construction Specifications and evaluate repair methods and associated costs

Maumee River Project — Toledo, Ohio

Bridge collapse during construction (I-280) – provide consultation with respect to the collapse of a segmental precast concrete bridge and associated launching truss including initial scope of damage and estimated value of loss

7th Street Bridge — Kansas City, Kansas

Bridge impact (Bridge No. 169-105-175.38 over I-70) – coordinate lane closure of interstate highway, field investigation, determine scope of damage to steel support girders and bracing and review Kansas Department of Transportation repair costs

Amelia Earhart Bridge — Atchison, Kansas

Cofferdam collapse during construction (Bridge 15-16.38 Pier No. 7 over Missouri River) – field investigation, peer review of cofferdam design and erection methodology, laboratory testing of steel components and engineering opinion as to the cause of collapse

Indian Nation Turnpike Bridge — McIntosh County, Oklahoma.

Bridge impact (Oklahoma Turnpike Authority Bridge No. 19.46) – provide consultation with respect to precast concrete bridge impact, review of emergency repair procedures and design and evaluate cost of repairs

St. Paul Downtown Airport — Minneapolis, Minnesota

Pavement/manhole collapse – field investigation, evaluate means and method of pavement/utility vault construction including eccentric configuration of manhole components as related to aircraft damage

Highway Construction — Olathe, Kansas

Reinforced concrete pavement demolition (I-35 KDOT Project No. 35-46 K-4088-02 Sta. 197+00) – site examination, evaluation of seismograph measurements and opinion as to cause of structure damage adjacent to interstate right-of-way

State Park Bridge — Broken Bow, Oklahoma

Bridge replacement (Cold Hole Bridge over Mountain Fork River) – field investigation at Beaver's Bend State Park for scope of flood-related bridge/road damage, preliminary cofferdam and bridge design and cost estimate for bridge and highway removal and replacement

Manufacturing Complex — West Plains, Missouri

Roadways, culverts and bridges – field investigation, scope of flood-related damage with quantity take-offs of crushed rock/gravel surfaced parking lots, heavy equipment asphalt test track, paved roadways, reinforced concrete culverts and bridge abutments

AGRICULTURE**Grain Elevator — Abilene, Kansas**

Grain bin foundation – field investigation of a 90-foot diameter 328,000-bushel capacity grain bin and provide technical opinion regarding cause of foundation damage

Grain Storage Bins — Liberal, Kansas

Metal structure – site examination, scope of wind-related damage to two 105-foot diameter 600,000-bushel capacity grain bins, review grain bin design parameters and evaluate cost of repair estimates

Grain Storage Facility — Blair, Wisconsin

Metal structure – field investigation of a 105-foot diameter 500,000-bushel capacity grain bin, provide opinion as to cause of roof collapse and evaluate installation of supplemental roof support system

Grain Storage Facility — Worden, Montana

Metal structure – site examination, scope of wind-related damage to 500,000-bushel capacity grain bin, review grain bin design parameters, evaluate cost of bin repair and coordinate repair activities/schedule with contractor

Grain Storage Bins — Watson, Missouri

Metal structure – peer review of engineering reports, field investigation with analysis and delineation of flood versus wind damage in accordance with FEMA P-55 and ASCE 7 technical documents

Grain Storage Bin — Garnett, Kansas

Metal structure – field investigation of a 90-foot diameter 500,000-bushel capacity grain bin, scope of wind-related damage and evaluate cost of repairs

Grain Storage Building — Tisch Mills, Wisconsin

Retaining wall and foundation – field investigation of end wall collapse for a 45,000 square feet grain storage building including structural analysis of a combined reinforced concrete wall/slab/footing system

Grain Storage Addition — Groveland, Kansas

Elevated steel truss – site documentation of collapsed bunker wall grain storage system, review of project design information, wind analysis in accordance with ASCE 7-05 and ASCE 37-02 and root cause determination of truss collapse

Grain Storage Bins — Culbertson, Montana

Metal structure and concrete foundations – field investigation of two side-by-side 450,000-bushel grain bins and adjacent structures, determination of cause and scope of damage associated with excessive foundation settlements and cost of repair estimate

Grain Storage Bin — Seneca, Kansas

Metal structure – field investigation of a 48-foot diameter 55,000-bushel capacity grain bin, root cause determination of bin collapse

Grain Storage Bin — LaGrange, Missouri

Welded metal structure – field investigation of a 117-foot diameter 850,000-bushel capacity grain bin, scope of damage to grain-handling equipment, evaluate repair estimates and replacement costs for structures and equipment

Legal Consultation – Peer Reviews (partial list)**Scaffolding Collapse — Kansas City, Missouri**

Examination of scaffolding, review of scaffolding manufacturer's operating and maintenance requirements, peer review of OSHA report and provide engineering opinion regarding issues related to erection of scaffolding and cause of collapse

Handicap Curb Ramp — Oskaloosa, Kansas

Examination of curb ramp, review of industry and government construction standards and provide technical opinion regarding as-built condition of ramp

Masonry Building Damage — St. Louis, Missouri

Site examination and documentation of building condition, review construction documents of adjacent Federal courthouse, subsurface reports, slurry wall construction and seismograph readings and evaluation of preceding as related to building damage

Warehouse Roof Collapse — Lenexa, Kansas

Site examination, review construction documents, undertake a peer review of the roof design and the roof drainage system and evaluate compliance with prevailing building codes in effect at time of original construction

Veneer Degradation — Overland Park, Kansas

Coordinate physical and chemical testing of liquid polyvinyl chloride coating, review and evaluate laboratory results and provide engineering opinion as to cause of veneer deterioration and separation

Standard of Care for Professional Engineering Services — Manhattan, Kansas

Review issues related to the construction and bracing of an existing masonry wall and the subsequent collapse of a two-story building during erection

Subdivision Site Drainage, Curb Inlets and Roadway Construction — Fremont, Nebraska

Site examination, review of project documents, peer review of engineering opinions and evaluation of road construction with preparation of repair cost estimate

Steel Frame Collapse — Columbia, Missouri

Review industry standards for temporary bracing, review column anchor bolt design, develop failure mechanism sequence and provide engineering opinion regarding cause of collapse

Concrete Bridge (Bridge No. 15.2-H.1) Damage — Cottonwood Falls, Kansas

Field investigation of fire-damaged bridge, quantification of bridge distortion, scope of damage to concrete deck and steel girders and preparation of repair cost estimate

Buried Natural Gas Pipeline — Lawrence, Kansas

Review construction details related to right-of-way, pipeline installation and site grading, evaluate soil bridge and culvert damage and prepare repair cost estimate

Standard of Care for Professional Engineering and Construction Services — Kansas City, Missouri

Review project documents concerning the design and construction of a modified final clarifier at a wastewater treatment plant, determine cause of continued clarifier leakage and delineate causation

Portland Cement Stucco Veneer — Denver, Colorado

Peer review of project specifications and industry standards and provide technical opinion regarding the means and method of stucco installation at wall penetrations

Portland Cement Stucco Veneer — Castle Rock, Colorado

Review of contract documents, assessment of industry standards as related to the design and installation of stucco veneer and provide technical opinion regarding preceding

Standard of Care for Contract Documents — Towanda, Kansas

Site examination, review of remodeling contract documents, industry standards and OSHA regulations and provide technical opinion regarding cause(s) of masonry wall collapse during demolition activities

Transmission Line Structure — Osage/Newcastle, Wyoming

Field investigation, review of industry standards, peer review of engineering investigations as related to a 69kV transmission line, sag-tension calculations and provide technical opinion regarding failure of a transmission line support structure

Foundation Movement and Building Distress — San Antonio, Texas

Site examination, review of historical floor survey documentation, review of expert opinions regarding differential foundation movement and provide opinion regarding cause(s) of building distress and segregation of building damage

Structural Collapse — Catoosa, Oklahoma

Site examination, testing of construction materials, review of industry standards, determination of loads, analysis of columns, peer review of design methodology and provide opinion regarding cause of collapse

Standard of Care for Construction — Eagle Pass, Texas

Site examination, review of federal, state and local requirements for ADA accessibility and provide opinion regarding as-built construction of accessible route, curb, ramp and associated means of egress

Building Veneer — Corpus Christi, Texas

Site examination of exterior balconies for coastal townhome complex, observe balcony demolition, peer review of project drawings including materials used in original construction and determine cause of wood rot for balcony framing

Building Construction — Round Rock, Texas

Consultation regarding original window construction and code analysis as related to the following: building occupancy classification, window openings, control devices and applicability of ASTM Standards

Building Construction — Kearney, Missouri

Consultation regarding foundation and wood-framed construction of office/warehouse building as related to the following: project organization, resident project representative, functions and responsibilities of owner, owner's resident project representative, design professional and general contractor, and preparation of cost of repair estimate

Code Compliance — Springfield, Missouri

Site examination, review of federal, state and local requirements for ADA accessibility, and provide opinion regarding as-built construction of circulation path, accessible route, curb, and ramp

Exterior Illumination — Kansas City, Missouri

Exterior deck construction, illumination measurements during civil and nautical twilight, review of city ordinances, residential building and life safety codes, and provide opinion regarding applicable requirement(s) for adequate illumination

REGISTRATIONS and CERTIFICATIONS

Registered Professional Engineer in Colorado (22357)

Registered Professional Engineer in Illinois (062.060998)

Registered Professional Engineer in Iowa (14555)

Registered Professional Engineer in Kansas (9422)

Registered Professional Engineer in Louisiana (33793)

Registered Professional Engineer in Missouri (E-28809)

Registered Professional Engineer in Nebraska (E-9246)

Registered Professional Engineer in Oklahoma (19007)

Registered Professional Engineer in South Dakota (9976)

National Council of Examiners for Engineering and Surveying (NCEES) and the National Council of Examiners for Engineering and Surveying (NCEES) International Registry Registration Number 15415

PROFESSIONAL ORGANIZATIONS

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- 2006-Present American Institute of Steel Construction, Affiliate Member
- 2003-Present International Code Council, Member
- 1978-2020 American Society of Civil Engineers (ASCE), Member
- 1977-2020 American Concrete Institute, Member
- 1997-2003 International Conference of Building Officials, Member
- 1995-2001 American Concrete Institute Committee 232 (Fly Ash & Natural Pozzolans in Concrete), Associate Member, and American Concrete Institute Committee 201 (Durability of Concrete), Associate Member
- 1995-1997 Carolinas Chapter of the American Concrete Institute, Member Board of Directors
- 1994-2002 American Concrete Institute, Manuscript Reviewer
- 1993-1994 ASCE Journal of Structural Engineering Structures – Committee on Concrete and Masonry, Manuscript Reviewer

THESIS SUPERVISION

- “Dimensional Stability of Portland Cement Concrete: Influence of the Alkali-Silica Reaction and Drying Shrinkage”*, Viktor J. Stegmeir, M.S.C.E. Thesis, The University of North Carolina at Charlotte, College of Engineering, 1997.
- “Strength Characteristics of Concrete Made with Type I Portland Cement and High Volumes of Class F Fly Ash”*, Joseph K. Harrold, M.S.C.E. Thesis, The University of North Carolina at Charlotte, College of Engineering, 1997.
- “The Influence of Aggregate Content and Gradation on Drying Shrinkage in Portland Cement Concrete”*, Ashley R. Avery, M.S.C.E. Thesis, The University of North Carolina at Charlotte, College of Engineering, 1997.
- “Strength Characteristics of Concrete Made with Type III Portland Cement and High Volumes of Class F Fly Ash”*, Curtis L. Ensley, M.S.C.E. Thesis, The University of North Carolina at Charlotte, College of Engineering, 1996.
- “Strength Characteristics of Lime-Fly Ash Mixtures”*, Eileen R. Torres, M.S.C.E. Thesis, The University of North Carolina at Charlotte, College of Engineering, 1996.
- “Evaluation of ASR Using Carolinas Aggregates in Accordance with ASTM P 214”*, Sunjay R. Patel, M.S.C.E. Thesis, The University of North Carolina at Charlotte, College of Engineering, 1994.

INVITED LECTURES, WORKSHOPS, AND PRESENTATIONS

- “Effects of Beam Width on the Cyclic Behavior of Reinforced Concrete”*, 6th Canadian Conference on Earthquake Engineering, Toronto, Canada, June 1994.
- “Evaluation of ASR Using Carolinas Aggregates in Accordance with ASTM P 214”*, Carolinas Chapter of the American Concrete Institute, Charlotte, NC, October 1994.
- “Large Loss Cost Estimating for Civil Works Projects”*, Presentation – EDT, EDT Meeting, Albuquerque, New Mexico, February 2017.
- “Municipal Solid Waste Ash Utilization”*, Environmental Engineering Program, The University of North Carolina at Charlotte, Charlotte, NC, November 1995.

“*Property Hail Damage*”, Conference – Iowa-Nebraska Chapter of International Association of Special Investigation Units, Des Moines, Iowa, April 2002.

“*Selecting Materials for Mix Designs*”, Conference – Carolinas Chapter of the American Concrete Institute, Charlotte, NC, March 1996.

“*Structural Assessment of Tornado-Related Building Damage*”, Presentation – Caruthersville, Missouri School Board and Missouri Department of Insurance, Consumer Affairs Division, Caruthersville, Missouri, February 2007.

PUBLICATIONS

Avery, A. R., and Hanks, D. L., “The Influence of Aggregate Content and Gradation on Drying Shrinkage in Portland Cement Concrete”, *Technical Report CE-S 9702*, University of North Carolina at Charlotte, Charlotte, North Carolina, April 1997, 138 pp.

Ensley, C. L., and Hanks, D. L., “Effectiveness of Fly Ash in Reducing Expansions Due to the Alkali Aggregate Reaction”, *Technical Report CE-S 9502*, University of North Carolina at Charlotte, Charlotte, North Carolina, July 1995, 101 pp.

Ensley, C. L., and Hanks, D. L., “Strength Characteristics of Concrete Made with Type III Portland Cement and High Volumes of Class F Fly Ash”, *Technical Report CE-S 9602*, University of North Carolina at Charlotte, Charlotte, North Carolina, November 1996, 141 pp.

Hanks, D. L. “Snow, Buildings, Roofs and the Snow Drift Surcharge”, *The Stress Point*, Volume 23, Number 4, EDT, Columbia, South Carolina, December 2010.

Hanks, D. L., Brown, S. L., Stegmeir, V. J., Osborne, R. R., Stout, R. D., “Municipal Solid Waste Ash as a Replacement for Fine Aggregate in Concrete”, *Technical Report CE-S 9501*, University of North Carolina at Charlotte, Charlotte, North Carolina, February 1995, 96 pp.

Hanks, D. L., Darwin, D., “Cyclic Behavior of High Strength Concrete Beams”, The University of Kansas Center for Research, Inc., *SM Report No. 21*, University of Kansas Center for Research, Lawrence, Kansas, August 1988, 120 pp.

Hanks, D. L., McCabe, S. L., Darwin, D., “Cyclic Behavior of High Strength Concrete Beams”, *Proceedings*, 4th U.S. National Conference on Earthquake Engineering, May 1990.

Hanks, D. L., McCabe, S. L., Darwin, D., “Effects of Beam Width on the Cyclic Behavior of Reinforced Concrete”, *Proceedings*, 6th Canadian Conference on Earthquake Engineering, June 1991.

Hanks, D. L., McCabe, S. L., Darwin, D., “Predicting the Cyclic Behavior of Reinforced Concrete Beams”, The University of Kansas Center for Research, Inc., *SM Report No. 33*, University of Kansas Center for Research, Lawrence, Kansas, May 1993, 232 pp.

Harrold, J. K., and Hanks, D. L., “Strength Characteristics of Concrete Made with Type I Portland Cement and High Volumes of Class F Fly Ash”, *Technical Report CE-S 9703*, University of North Carolina at Charlotte, Charlotte, North Carolina, June 1997, 140 pp.

Jur, T.A., Windham, R. L., and Hanks, D. L. “A Fracture of a Material from the Past”, ASME International Mechanical Engineering Congress & Exhibition, Orlando, Florida, November 2000.

Minden, K.T., and Hanks, D. L. “Infrared Cameras”, *The Stress Point*, Volume 17, Number 4, Engineering Design & Testing Corporation, Columbia, South Carolina, December 2004.

Patel, S. R., Stegmeir, V. J., Hanks, D. L., Young, D. T., “Evaluation of ASR Using Carolinas Aggregates in Accordance with ASTM P 214”, *Technical Report CE-S 9401*, University of North Carolina at Charlotte, Charlotte, North Carolina, October 1994, 107 pp.

Stegmeir, V. J., and Hanks, D. L., “Dimensional Stability of Portland Cement Concrete: Influence of the Alkali-Silica Reaction and Drying Shrinkage”, *Technical Report CE-S 9701*, University of North Carolina at Charlotte, Charlotte, North Carolina, March 1997, 144 pp.

Torres, E. R., and Hanks, D. L., "Strength Characteristics of Lime-Fly Ash Mixtures", *Technical Report CE-S 9601*, University of North Carolina at Charlotte, March 1996, 118 pp.

Ulaby, F. T., Darwin, D., Tavakoli, A., and Hanks, D., "Dielectric and Transmission Properties of Concrete, Polymer Concrete, Fiberglass and Glass-Fiber Reinforced Concrete", *Technical Report 670-1*, University of Kansas Center for Research, Lawrence, Kansas, September 1984, 120 pp.

MANUSCRIPT REVIEW

"Cracking in Concrete Due to Delayed Ettringite Formation" by Fu, Grattan-Bellew and Beaudoin, Manuscript Review Committee, American Concrete Institute, January 1996.

"Long-Term Performance of High Strength Concrete Incorporating Supplementary Cementing Compounds" by Malhotra, Zhang, Read and Ryell, Manuscript Review Committee, American Concrete Institute, June 1999.

"Sulfate Resistance and Carbonation of Cement Blended with Pozzolanic Materials" by Sideris, Saava and Papayianni, Manuscript Review Committee, American Concrete Institute, May 2001.

"Substitution of Fly Ash, Slag, and Admixtures in FDOT Concrete Mix Designs" by Yazdani and Jin, Manuscript Review Committee, American Concrete Institute, March 2002.

CONTINUING EDUCATION

Professional Development (*Accredited*):

ADA Standards for Accessible Design.

Changes to the 2016 Edition of ASCE 7.

Curtain Wall Damage: Investigations & Analysis.

Design Loads on Structures During Construction.

Design of Buckling-Restrained Braced Frames.

Forensic Investigations of Structural Damages and Failures.

Ground Movement Involving Geologic Losses.

Heat, Air, and Moisture Components of Building Envelopes.

Induced Seismicity in Kansas: Events and Responses.

Integrated Subsurface Characterization with In-Situ Testing for Geotechnical Analysis and Design.

Masonry Design and Detailing.

Minimum Design Loads for Buildings and Other Structures.

Practical Steel Design: 2 to 20 Stories.

Seismic Response of Nonstructural Components.

Soil Mechanics for Building Professionals.

Special Inspections under the International Building Code – Chapter 17.

Structural Provisions of the International Building Code.

Structural Steel Inspection and Erection.

Structural Vibrations Due to Human Activity.

Subsurface Utility Engineering, Vibration Monitoring and Structure Scan.

Vibrations of Steel-Framed Structural Systems.

Wind and Snow Load Provisions of the International Building Code.

Wind Load Management Design and Construction.

Wind Turbine Foundation Behavior and Design Considerations.

Wood Structures I & II and Design Solutions with Engineered Wood.