

RESUME

DAVID DARWIN

Deane E. Ackers Distinguished Professor
Director of the Structural Engineering and Materials Laboratory
Department of Civil, Environmental, and Architectural Engineering
University of Kansas, Lawrence, KS 66045

Licensed Professional Engineer, State of Kansas

Date of Birth: April 17, 1946

Education:

B.S. Cornell University, Ithaca, New York, Civil Engineering, 1967
M.S. Cornell University, Ithaca, New York, Structural Engineering (Major) and
Materials Science (Minor), 1968
Ph.D. University of Illinois at Urbana-Champaign, Civil Engineering, 1974

Work Experience:

Cornell University, Research Assistant, 1967 - 1968.

U. S. Army Corps of Engineers, Civil Engineer, Operations Officer and Unit Commander, including one year in Vietnam. Also, Senior Concrete Instructor, U. S. Army Engineer School, Fort Belvoir, Virginia (20 months) with concurrent appointment as Assistant Professorial Lecturer at George Washington University (11 months), 1968 - 1972.

University of Illinois at Urbana-Champaign, Research Assistant, 1972 - 1974.

University of Kansas, Assistant Professor of Civil Engineering, 1974 - 1977, Associate Professor of Civil Engineering, 1977 - 1982, Professor of Civil Engineering, 1982 - Present, Director of the Structural Engineering and Materials Laboratory, 1982 - Present, Deane E. Ackers Distinguished Professor, 1990 - Present, Director of the Infrastructure Research Institute, 1998 - 2001, 2003 - Present.

Consulting professional engineer involved in the analysis of structural and material failures, advanced analysis of engineering structures, and development of improved construction methods and materials, 1976 - Present.

Professional Organizations and Public Service:

American Association for the Advancement of Science

American Concrete Institute: President, 2007-2008; Vice President, 2005-2007; Executive Committee, 2005-Present; Board of Direction, 1988-91, 2005-Present; Technical Activities Committee, 1985-91; Concrete Research Council, 1985-96, Chairman, 1990-96; Concrete Research and Education Foundation Board of Trustees, 1991-96; ACI Foundation Board of Trustees, 2006-07; Committee 222, Corrosion of Metals in Concrete, 2003-Present; Committee 224, Cracking, 1977-Present, Chairman, 1979-85; Subcommittee 318-B, Reinforcement and Development 2005-Present; Committee 408, Bond and Development of Reinforcement, 1984-Present, Chairman, 2000-06; Committee 445, Shear and Torsion - Joint w/ASCE, 1980-Present; Committee 446, Fracture Mechanics, 1986-Present; Publications Committee, 1988-2003,

Chairman, 1991-96; Fellows Nomination Committee, 1988-1991, 2003-06; Blue Ribbon Membership Recruitment Committee, 1989-91; TAC Technology Transfer Committee, 1992-Present, Chairman, 1997-2003; Financial Advisory Committee, 1995-98, 2001-07, 2008; Strategic Plan Oversight/Overview Committee, 1997-2000; Board Task Group on Publications Issues, 1998; Journal Oversight Team, 1998-2001; Committee on Nominations, 1999, 2008; ASCE-ACI Task Group on Joint Committees, Chairman, 2004-07; Benchmarks Task Group on Sustainable Development, Strategic Development Council, 2007; Examiner, ACI Concrete Field Testing Technician – Grade I, 1988-Present; President, Kansas Chapter, 1976; Director, Kansas Chapter, 1975, 1977-79, 1982-85; Librarian, Kansas Chapter, 1984-Present.

American Institute of Steel Construction: Specification Committee TC107-Composite Design, 1992-1995, Committee on Technical Assistance, 2004-Present.

American Society for Engineering Education

ASTM International: Committee A-1 on Steel, Stainless Steel and Related Alloys, 1989-Present; Subcommittee A01.05 on Steel Reinforcement, 1989-Present. Committee G-1 on Corrosion of Metals, 2005-Present: Subcommittee G01.14, Corrosion of Metals in Construction Materials, 2005-Present.

American Society of Civil Engineers: Structural Engineering Institute Board of Governors, 2000-2004, Treasurer, 2003-2004; *Journal of Structural Engineering*, Editor, 1994-2000; SEI Codes and Standards Division Executive Committee, 1998-2007, Chairman, 2004-07; Publications Secretary, Committee on Concrete and Masonry Structures, and Publications Committee, 1981-84; Committee on Finite Element Analysis of Reinforced Concrete Structures (joint with ACI Committee 447 since 1988), 1977-2004, Secretary, 1977-89; Committee on Composite Construction, 1986-92, 1993-Present, Chairman, 1994-97; Chairman, Task Committee on Design Criteria for Composite Structures in Steel and Concrete, 1988-92; Chairman, Task Committee on Design Guide for Composite Semirigid Connections, 1992-94; Eng. Mech. Div. Properties of Materials Committee, 1980-90, 1992-2001, Vice-Chairman, 1986-87, 1989-90, Chairman, 1987-89; Associate Editor, *Journal of Engineering Mechanics*, 1987-89; Committee on National Concrete Canoe Competitions, 1988-97; Chairman, Committee on Structural Steel Beams with Web Openings Standards, 1993-Present; Book Selection Committee, 1996-97; Organizing Committee for 1999 Structures Congress, New Orleans; Organizing Committee for 2002 Structures Congress, Denver; SEI Structures Congress Committee, 1999-2005; CERF (Civil Engineering Research Foundation) Reengineering Task Committee, 2004-05.

Editorial Boards: Publications Secretary, Committee on Concrete and Masonry Structures, *Journal of Structural Engineering*, 1981-84; Associate Editor, *Journal of Engineering Mechanics*, 1987-89; *Advanced Cement Based Materials*, 1993-98; Editor, *Journal of Structural Engineering*, 1994-2000; *Cement and Concrete Research*, 1998-Present.

Kansas Industry University Government Engineering Education Consortium, 1997-2001.

Phi Kappa Phi: Secretary, University of Kansas Chapter, 1975-76; President, University of Kansas Chapter, 1976-78; Scholarships and Awards Coordinator, 2000-Present.

Post-Tensioning Institute

Prestressed Concrete Institute

Sigma Xi

Uniform Building Code Board of Appeals, Lawrence, Kansas, 1978-84

Wire Reinforcement Institute

Honors and Awards:

Honor Societies: Phi Eta Sigma, 1963, Tau Beta Pi, 1965, Chi Epsilon, 1965, Phi Kappa Phi, 1967, Sigma Xi, 1977

Randolph W. "Cy" Weed Memorial Trophy (Student-Athlete Award), Cornell University, 1967

Fuertes Medal, Cornell University, 1967

Phi Kappa Phi Fellowship, 1967-68

National Science Foundation Graduate Fellowship, 1967-68 and 1972-74

United States Army, Bronze Star Medal (BSM) 1970, BSM with oak leaf cluster 1970, Army Commendation Medal (ARCOM) 1970, ARCOM with oak leaf cluster 1972

Fellow of the American Concrete Institute, 1981

Advisor to Kansas City Times on Pulitzer Prize Winning Series on Hyatt Regency Skywalk Collapse, 1982

ASCE Walter L. Huber Civil Engineering Research Prize, 1985

ACI Delmar L. Bloem Distinguished Service Award, 1986

University of Kansas Miller Award for Distinguished Professional Service, 1986

Fellow of the American Society of Civil Engineers, 1989

Deane E. Ackers Chair in Civil Engineering, University of Kansas, 1990

ASCE Moisseiff Award, 1991, with W. K. Lucas, for the paper "LRFD for Steel and Composite Beams with Web Openings," in the June 1990 issue of the *Journal of Structural Engineering*.

ACI Arthur R. Anderson Award, 1992

University of Kansas Higuchi/Endowment-Irvin Youngberg Research Achievement Award in the Applied Sciences, 1992

ACI Structural Research Award, 1996, with H. Hadje-Ghaffari, O. C. Choi, and S. L. McCabe, for the paper "Bond of Epoxy-Coated Reinforcement: Cover, Casting Position, Slump, and Consolidation," in the January-February 1994 issue of the *ACI Structural Journal*.

ASCE State-of-the-Art of Civil Engineering Award, 1996, as chairman, with the other members of the ASCE Task Committee on Design Criteria for Composite Structures in Steel and Concrete for the paper "Guidelines for Design of Joints between Steel Beams and Reinforced Concrete Columns," in the August 1994 issue of the *Journal of Structural Engineering*.

ASCE Richard R. Torrens Award, 1997, for work as Editor of the ASCE *Journal of Structural Engineering*.

ASCE State-of-the-Art of Civil Engineering Award, 2000, as chairman, with the other members of the ASCE Task Committee on Design Criteria for Composite Structures in Steel and Concrete for the paper "Design Guide for Partially Restrained Composite Connections," in the October 1998 issue of the *Journal of Structural Engineering*.

University of Kansas Bellows Scholar, 2001.

University of Illinois Civil and Environmental Engineering Alumni Association Distinguished Alumnus Award, 2003.

ASTM International, Committee A01 on Steel, Stainless Steel and Related Alloys, Award of Appreciation, 2003.

University of Kansas Miller Scholar, 2004.

ACI Joe W. Kelly Award, 2005

Honorary Member of the Wire Reinforcement Institute, 2005

University of Kansas, Civil, Environmental, and Architectural Engineering Department Outstanding Professor/Instructor, balloted by students, fall semester, 2006

University of Kansas, Center for Teaching Excellence, selected by graduate students to be recognized for Teaching Achievement at the 10th Annual Celebration of Teaching Reception – one of 20 university wide, 2007

Kansas Concrete Ready Mixed Association, Concrete Promotion Group, South Central Cement Promotion Association, Mid-West Concrete Industry Board, Kansas and Missouri Chapters of the American Concrete Institute, and Missouri/Kansas Chapter of the American Concrete Pavement Association, Industry Service Award, 2007

Structural Engineering Institute of ASCE, Dennis L. Tewksbury Award, 2008

Publications:

Books and Chapters in Books:

ASCE Task Committee on Finite Element Analysis of Reinforced Concrete Structures, *Finite Element Analysis of Reinforced Concrete*, A. H. Nilson, Chmn., American Society of Civil Engineers, New York, 1982, 545 pp. (Coauthor of Chapter 2, Constitutive Relations and Failure Theories, and Chapter 4, Concrete Cracking).

Darwin, D., “Behavior and Design of Composite Beams with Web Openings,” Chapter 3, *Developments in the Stability and Strength of Structures, Vol. 7: Steel-Concrete Composite Structures*, R. Narayanan, Ed., Elsevier Applied Science Publishers, London and New York, 1988, pp. 53-78.

Darwin, D., *Design of Steel and Composite Beams with Web Openings*, American Institute of Steel Construction, Chicago, 1990, 63 pp.

Darwin, D., “Reinforced Concrete,” Chapter 4, *Finite Element Analysis of Reinforced Concrete Structures II*, J. Isenberg, Ed., American Society of Civil Engineers, 1993, pp. 203-232.

Nilson, A. H., *Design of Concrete Structures*, 12th Ed., with contributions by D. Darwin, McGraw-Hill, New York, 1997, 780 pp. (author of Chapter 7, Analysis and Design for Torsion; Chapter 9, Slender Columns; and Chapter 20, Seismic Design).

Darwin, D., “Image Analysis,” Chapter 19, *Handbook of Analytical Techniques in Concrete Science and Technology*, V. S. Ramachandran and J. J. Beaudoin, Eds., Noyes Publications, Westwood, NJ, William Andrew Publishing, Norwich, NY, 2001, pp. 800-819.

Mindess, S., Young, J. F., Darwin, D., *Concrete*, 2nd Ed., Prentice-Hall, Upper Saddle River, New Jersey, 2003, 644 pp.

Nilson, A. H., Darwin, D., and Dolan, C. W., *Design of Concrete Structures*, 13th Ed., McGraw-

Hill, New York, 2004, 779 pp.

Papers, Committee Reports, and Standards:

- Darwin, D. and Slate, F. O., "Effect of Paste-Aggregate Bond Strength on Behavior of Concrete," *Journal of Materials*, ASTM, Vol. 5, No. 1, March 1970, pp. 86-98.
- Darwin, D. and Pecknold, D. A., "Analysis of RC Shear Panels Under Cyclic Loading," *Journal of the Structural Division*, ASCE, Vol. 102, No. ST2, February 1976, pp. 355-369.
- Darwin, D., "Building the Concrete Canoe--The University of Kansas," *Journal of the American Concrete Institute*, Vol. 73, No. 10, October 1976, pp. 541-543.
- Darwin, D. and Pecknold, D. A., "Analysis of Cyclic Loading of Plane R/C Structures," *Computers and Structures*, Vol. 7, No. 1, 1977, pp. 137-147.
- Darwin, D., "Shear Component of Prestress by Equivalent Loads," *Journal of the Prestressed Concrete Institute*, Vol. 22, No. 2, March-April 1977, pp. 64-77.
- Darwin, D. and Pecknold, D. A., "Nonlinear Biaxial Stress-Strain Law for Concrete," *Journal of the Engineering Mechanics Division*, ASCE, Vol. 103, No. EM2, April 1977, pp. 229-241.
- Bashur, F. K. and Darwin, D., "Nonlinear Finite Element Analysis of RC Slabs," *Proceedings, Symposium on Applications of Computer Methods in Engineering*, Los Angeles, August 23-26, 1977, Vol. II, pp. 1065-1074.
- Maher, A. and Darwin, D., "Microscopic Finite Element Model of Concrete," *Proceedings, First International Conference on Mathematical Modeling*, St. Louis, August 29-September 1, 1977, Vol. III, pp. 1705-1714.
- Bashur, F. K. and Darwin, D., "Nonlinear Model for Reinforced Concrete Slabs," *Journal of the Structural Division*, ASCE, Vol. 104, ST1, January 1978, pp. 157-170.
- Darwin, D., "A Biaxial Stress-Strain Model of Concrete," *Proceedings, Third Engineering Mechanics Division Specialty Conference*, ASCE, University of Texas at Austin, September 17-19, 1979, pp. 441-444.
- ACI Committee 224, Cracking, "Control of Cracking in Concrete Structures," *Concrete International*, Vol. 2, No. 10, October 1980, pp. 35-76 (Committee chairman and principal author of Chapter 2, Crack Mechanisms).
- Palaskas, M. N., Attiogbe, E. K. and Darwin, D., "Shear Strength of Lightly Reinforced T-Beams," *Journal of the American Concrete Institute*, Vol. 78, No. 6, November-December 1981, pp. 447-455.
- Clawson, W. C. and Darwin, D., "Tests of Composite Beams with Web Openings," *Journal of the Structural Division*, ASCE, Vol. 108, No. ST1, January 1982, pp. 145-162.
- Clawson, W. C. and Darwin, D., "Strength of Composite Beams at Web Openings," *Journal of the Structural Division*, ASCE, Vol. 108, No. ST3, March 1982, pp. 623-641.
- Maher, A. and Darwin, D., "Mortar Constituent of Concrete in Compression," *Journal of the American Concrete Institute*, Vol. 79, No. 2, March-April 1982, pp. 100-109.
- Mockry, E. F. and Darwin, D., "Slender Column Interaction Diagrams," *Concrete International*, Vol. 4, No. 6, June 1982, pp. 44-50.
- Darwin, D. and Donahey, R. C., "Effect of Construction Procedures on Bond Strength in Bridge Decks," *Bond in Concrete*, Applied Science Publishers, London, 1982, pp. 308-317.

- Darwin, D. and Attiogbe, E. K., "Load Induced Cracks in Cement Paste," *Proceedings*, Fourth Engineering Mechanics Division Specialty Conference, ASCE, Purdue University, West Lafayette, Indiana, May 23-25, 1983, Vol. II, pp. 1051-1054.
- Leibengood, L. D., Darwin, D. and Dodds, R. H., "Tension Stiffening and Compression Softening in Concrete," *Proceedings*, Fourth Engineering Mechanics Division Specialty Conference, ASCE, Purdue University, West Lafayette, Indiana, May 23-25, 1983, Vol. II, pp. 1043-1046.
- ACI Committee 224, Cracking, "Causes, Evaluation and Repair of Cracks in Concrete Structures," *Journal of the American Concrete Institute*, Vol. 81, No. 3, May-June 1984, pp. 211-230 (Committee chairman and principal author of Chapter 1, Causes of Cracks).
- Darwin, D., Leibengood, L. D. and Dodds, R. H., "Structural Aspects of Tension Softening in Concrete," *Proceedings*, Fifth Engineering Mechanics Division Specialty Conference, ASCE, University of Wyoming, Laramie, August 1-3, 1984, Vol. 2, pp. 1389-1392.
- Darwin, D. and Attiogbe, E. K., "Crack Analysis for Fractured Surfaces of Cement Paste and Mortar," *Proceedings*, Fifth Engineering Mechanics Division Specialty Conference, ASCE, University of Wyoming, Laramie, August 1-3, 1984, Vol. 2, pp. 1420-1423.
- Dodds, R. H., Darwin, D. and Leibengood, L. D., "Stress Controlled Smeared Cracking in R/C Beams," *Journal of Structural Engineering*, ASCE, Vol. 110, No. 9, September 1984, pp. 1959-1976.
- Darwin, D., "Composite Beams with Web Openings," *Proceedings*, National Engineering Conference, AISC, Tampa, Florida, March 28-30, 1984, 17 pp. Also, *Journal of the Boston Society of Civil Engineers Section*, ASCE, Vol. 71, No. 1 & 2, 1985, pp. 67-83.
- Donahey, R. C. and Darwin, D., "Bond of Top-Cast Bars in Bridge Decks," *Journal of the American Concrete Institute*, Vol. 82, No. 1, January- February 1985, pp. 57-66.
- Darwin, D., moderator and editor, "Debate: Crack Width, Cover, and Corrosion," *Concrete International*, Vol. 7, No. 5, May 1985, pp. 20-32.
- Darwin, D., "Crack Propagation in Concrete - Study of Model Parameters," *Proceedings*, Joint US-Japan Seminar on Finite Element Analysis of Reinforced Concrete Structures, Tokyo, May 21-24, 1985, Vol. 1, pp. 93- 110. Also, "Concrete Crack Propagation - Study of Model Parameters," *Finite Element Analysis of Reinforced Concrete Structures*, American Society of Civil Engineers, New York, 1986, pp. 184-203.
- Maher, A. and Darwin, D., "Analytical Representation of the Cyclic Behavior of Mortar Constituent of Concrete," *Proceedings*, International Colloquium on Concrete in Developing Countries: Materials, Design and Construction, Lahore, Pakistan, December 16-18, 1985, 20 pp.
- Darwin, D. and Attiogbe, E. K., "Effects of Loading Rate on Cracking of Cement Paste in Compression," *Cement-Based Composites: Strain Rate Effects on Fracture*, S. Mindess and S. P. Shah, Eds., Materials Research Society Symposia Proceedings, Vol. 64, 1986, pp. 167-180.
- ACI Committee 224, Cracking "Cracking of Concrete Members in Direct Tension," *Journal of the American Concrete Institute*, Vol. 83, No. 1, January-February 1986, pp. 3-13 (Committee chairman and member of subcommittee that wrote the report).
- Brettmann, B. B., Darwin, D. and Donahey, R. C., "Bond of Reinforcement to Superplasticized Concrete," *Journal of the American Concrete Institute*, Vol. 83, No. 1, January-February 1986, pp. 98-107.

- Leibengood, L. D., Darwin, D. and Dodds, R. H., "Parameters Affecting FE Analysis of Concrete Structures," *Journal of Structural Engineering*, ASCE, Vol. 112, No. 2, February 1986, pp. 326-341.
- Harsh, S. and Darwin, D., "Traffic Induced Vibrations and Bridge Deck Repairs," *Concrete International*, Vol. 8, No. 5, May 1986, pp. 36-42.
- Darwin, D. and Nmai, C. K., "Energy Dissipation in R/C Beams under Cyclic Load," *Journal of Structural Engineering*, ASCE, Vol. 112, No. 8, August, 1986, pp. 1829-1846.
- Nmai, C. K. and Darwin, D., "Lightly Reinforced R/C Beams under Cyclic Load," *Journal of the American Concrete Institute*, Vol. 83, No. 5, September- October 1986, pp. 777-783.
- Attiogbe, E. K. and Darwin, D., "Correction of Window Size Distortion of Crack Distributions on Plane Sections," *Journal of Microscopy*, Vol. 144, Pt. 1, October 1986, pp. 71-82.
- Altowaiji, W. A. K., Darwin, D. and Donahey, R. C., "Bond of Reinforcement to Revibrated Concrete," *Journal of the American Concrete Institute*, Vol. 83, No. 6, November-December 1986, pp. 1035-1042.
- Rodrigues, C. P. and Darwin, D., "Shear Strength of Lightly Reinforced T-Beams in Negative Bending," *ACI Structural Journal*, Vol. 84, No. 1, January-February 1987, pp. 77-85.
- Attiogbe, E. K. and Darwin, D., "Self-Consistent Model for a Transversely Isotropic Cracked Solid," *Journal of Engineering Mechanics*, ASCE, Vol. 113, No. 7, July 1987, pp. 984-999.
- Darwin, D., "Composite Elements Using Steel and Concrete," *Composite Construction*, BSCE/ASCE Structural Group Lecture Series, Fall 1987, pp. 65-109.
- Darwin, D., "Effects of Construction Practice on Concrete-Steel Bond Strength," *Lewis H. Tuthill International Symposium on Concrete and Concrete Construction*, SP-104, G. T. Halvorsen, Ed., American Concrete Institute, Detroit, 1987, pp. 27-56.
- Attiogbe, E. K. and Darwin, D., "Submicrocracking in Cement Paste and Mortar," *ACI Materials Journal*, Vol. 84, No. 6, November-December 1987, pp. 491-500.
- Attiogbe, E. K. and Darwin, D., "Strain Due to Submicrocracking in Cement Paste and Mortar," *ACI Materials Journal*, Vol. 85, No. 1, January- February 1988, pp. 3-11.
- Donahey, R. C. and Darwin, D., "Web Openings in Composite Beams with Ribbed Slabs," *Journal of Structural Engineering*, ASCE, Vol. 114, No. 3, March 1988, pp. 518-534.
- Darwin, D. and Donahey, R. C., "LRFD for Composite Beams with Unreinforced Web Openings," *Journal of Structural Engineering*, ASCE, Vol. 114, No. 3, March 1988, pp. 535-552.
- Darwin, D., "Web Openings in Composite Beams," *Composite Construction in Steel and Concrete*, C. D. Buckner and I. M. Viest, Eds., ASCE, New York, 1988, pp. 270-285.
- Darwin, D., Shen, Z., and Harsh, S., "Silica Fume, Bond Strength, and the Compressive Strength of Mortar," *Bonding in Cementitious Composites*, S. Mindess and S. P. Shah, Eds., Materials Research Society Symposium Proceedings, Vol. 114, 1988, pp. 105-110.
- Darwin, D. and Dewey, G. R., "Image Analysis of Microcracks," *Proceedings*, France-U.S. CNRS-NSF Workshop on Strain Localization and Size Effects Due to Cracking and Damage," Cachan, France, September 6-9, 1988. Also, *Cracking and Damage - Strain Localization and Size Effect*, J. Mazars and Z. P. Bazant, Eds., Elsevier Applied Science Publishers, Ltd., London and New York, 1989, pp. 65-75.

- Darwin, D., "Micromechanics and Micro-Macro Relationships, Part 2," *Cracking and Damage - Strain Localization and Size Effect*, J. Mazars and Z. P. Bazant, Eds., Elsevier Applied Science Publishers, Ltd., London and New York, 1989, pp. 514-518.
- Hanks, D. L., McCabe, S. L., and Darwin, D., "Cyclic Behavior of High Strength Concrete Beams," *Proceedings of the Fourth U.S. National Earthquake Engineering Conference*, Palm Springs, CA, May 1990, Vol. 2, pp. 697-706, Earthquake Engineering Research Institute, El Cerito, CA.
- Darwin, D. and Lucas, W. K., "LRFD for Steel and Composite Beams with Web Openings," *Journal of Structural Engineering*, ASCE, Vol. 116, No. 6, June 1990, pp. 1579-1593.
- Darwin, D., Zhao, H., Dewey, G. R., and Martin, J. L., "Microfracture of Cement-Based Materials in Compression," *Micromechanics of Failure of Quasi-Brittle Materials*, S. P. Shah, S. E. Swartz and M. L. Wang, Eds., Elsevier Applied Science Publishers, Ltd., New York and London, 1990, pp. 62-71.
- Darwin, D., McCabe, S. L., Hadje-Ghaffari, H., and Choi, O. C., "Bond Strength of Epoxy-Coated Reinforcement to Concrete - An Update," *Proceedings*, First ASCE Materials Engineering Congress, Denver, Colorado, August 1990, Vol. 1, pp. 115-124.
- Darwin, D., McCabe, S. L., and Choi, O. C., "Evaluation of Bond Performance of Epoxy-Coated Reinforcing Steel Using Nonlinear Finite Element Analysis," *Proceedings*, First ASCE Materials Engineering Congress, Denver, Colorado, August 1990, Vol. 1, pp. 135-144.
- Harsh S., Shen, Z., and Darwin, D., "Strain-Rate Sensitive Behavior of Cement Paste and Mortar in Compression," *ACI Materials Journal*, Vol. 87, No. 5, September-October 1990, pp. 508-516.
- Choi, O. C., Hadje-Ghaffari, H., Darwin, D., and McCabe, S. L., "Bond of Epoxy-Coated Reinforcement: Bar Parameters," *ACI Materials Journal*, Vol. 88, No. 2, March-April 1991, pp. 207-217.
- McCabe, S. L., Darwin, D., Choi, O. C., and Hadje-Ghaffari, H., "Design Considerations Based on Application of Nonlinear Finite Element Techniques to Bond Analysis," *Proceedings*, ASCE Structures Congress '91, Indianapolis, Indiana, April-May 1991, pp. 612-615.
- Darwin, D., Ketcham, K. W., Romero, F. A., and Gong, S., "Experimental Techniques to Study the Microstructure of Cement-Based Materials," *Proceedings*, ASCE Engineering Mechanics Specialty Conference, Columbus, Ohio, May 1991, Vol. 2, pp. 1082-1086.
- Hanks, D. L., McCabe, S. L., and Darwin, D., "Effects of Beam Width on the Cyclic Behavior of Reinforced Concrete," *Proceedings*, Sixth Canadian Conference on Earthquake Engineering, Toronto, June 1991, pp. 583-590.
- Darwin, D., "Proposed Specification for Structural Steel Beams with Web Openings," *Proceedings*, ASCE Structures Congress, San Antonio, Texas, April 1992, pp. 737-740.
- Darwin, D., "Role of Paste-Aggregate Interface in Compressive Strength of Concrete," *Proceedings*, ASCE Structures Congress, San Antonio, Texas, April 1992, pp. 266-269.
- Darwin, D. and Morita, S., "Reinforced Concrete Models," *Proceedings*, ASCE Structures Congress, San Antonio, Texas, April 1992, pp. 868-871.
- Darwin, D., Ketcham, K. W., Romero, F. A., and Martin, J. L., "Automated Identification of Compression-Induced Cracking in Cement Paste," *Proceedings*, ASCE Engineering Mechanics Conference, College Station, Texas, May 24-27, 1992, pp. 494-497.
- Zhao, H. and Darwin, D., "Quantitative Backscattered Electron Analysis of Cement Paste," *Cement and Concrete Research*, Vol. 22, No. 4, July 1992, pp. 695-706.

- Cong, X., Gong, S., Darwin, D., and McCabe, S. L., "Role of Silica Fume in Compressive Strength of Cement Paste, Mortar and Concrete," *ACI Materials Journal*, Vol. 89, No. 4, July-August 1992, pp. 375-387.
- McCabe, S. L., Darwin D., Choi O. C., and Hadje-Ghaffari, H., "Application of Fracture Mechanics to Steel-Concrete Bond Analysis," *Concrete Design Based on Fracture Mechanics*, SP-134, W. Gerstle and Z. P. Bazant, Eds., American Concrete Institute, Detroit, 1992, pp. 101-114.
- ACI Committee 408, Bond and Development of Reinforcement, *Bond under Repeated Loading* (ACI 408.2R-92), American Concrete Institute, Detroit, MI, 1992, 32 pp (Member of the subcommittee that wrote the report).
- ASCE Task Committee on Design Criteria for Composite Structures in Steel and Concrete, "Proposed Specification for Structural Steel Beams with Web Openings," D. Darwin, Chmn., *Journal of Structural Engineering*, ASCE, Vol. 118, No. 12, Dec. 1992, pp. 3315-3324.
- ASCE Task Committee on Design Criteria for Composite Structures in Steel and Concrete, "Commentary on Proposed Specification for Structural Steel Beams with Web Openings," D. Darwin, Chmn., *Journal of Structural Engineering*, ASCE, Vol. 118, No. 12, Dec. 1992, pp. 3325-3350.
- Darwin, D., McCabe, S. L., Idun, E. K., and Schoenekase, S. P., "Development Length Criteria: Bars Not Confined by Transverse Reinforcement," *ACI Structural Journal*, Vol. 89, No. 6, Nov.-Dec. 1992, pp. 709-720.
- Hester, C. J., Salamizavaregh, S., Darwin, D., and McCabe, S. L., "Bond of Epoxy-Coated Reinforcement: Splices," *ACI Structural Journal*, Vol. 90, No. 1, Jan.-Feb. 1993, pp. 89-102.
- Darwin, D. and Graham, E. K. "Effect of Deformation Height and Spacing on Bond Strength of Reinforcing Bars," *ACI Structural Journal*, Vol. 90, No. 6, Nov.-Dec. 1993, pp. 646-657.
- Hadje-Ghaffari, H., Choi, O. C., Darwin, D., and McCabe, S. L., "Bond of Epoxy-Coated Reinforcement: Cover, Casting Position, Slump, and Consolidation," *ACI Structural Journal*, Vol. 90, No. 1, Jan.-Feb. 1994, pp. 59-68.
- Darwin, D., Abou-Zeid, M. N., and Ketcham, K. W., "Cracks and Voids in Cement Paste with Silica Fume," *Proceedings*, 16th International Conference on Cement Microscopy, Richmond, Virginia, April 12-14, 1994, pp. 52-68. Also published as "Automatic Cracks – Cracks and Voids in Cement Paste with Silica Fume," *International Cement Review*, Jan. 1995, pp. 33-39
- ASCE Task Committee on Design Criteria for Composite Structures in Steel and Concrete, "Guidelines for Design of Joints between Steel Beams and Reinforced Concrete Columns," D. Darwin, Chmn., *Journal of Structural Engineering*, ASCE, Vol. 120, No. 8, Aug. 1994, pp. 2330-2357.
- Darwin, D., McCabe, S.L., Brown, C.J., and Tholen, M.L., "Fracture Analysis of Steel-Concrete Bond," *Fracture and Damage in Quasibrittle Structures: Experiment, Modelling, and Computer Analysis*, Z.P. Bazant, Z. Bittnar, M. Jirasek and J. Mazars, Eds., E & FN Spon, London, 1994, pp. 549-556.
- Darwin, D. and Abou-Zeid, M. N., "Application of Automated Image Analysis to the Study of Cement Paste Microstructure," *Microstructure of Cement-Based Systems/Bonding and Interfaces in Cementitious Materials*, S. Diamond et al., Eds., Materials Research Society Symposium Proceedings, Vol. 370, 1995, pp. 3-12.

- Darwin, D., "The Interfacial Transition Zone: 'Direct' Evidence on Compressive Strength," *Microstructure of Cement-Based Systems/Bonding and Interfaces in Cementitious Materials*, S. Diamond et al., Eds., Materials Research Society Symposium Proceedings, Vol. 370, 1995, pp. 419-427.
- Darwin, D., Abou-Zeid, M. N., and Ketcham, K. W., "Automated Crack Identification for Cement Paste," *Cement and Concrete Research*, Vol. 25, No. 3, Apr. 1995, pp. 605-616.
- ACI Committee 224, *Cracking, Joints in Concrete Structures* (ACI 224.3R-95), American Concrete Institute, Detroit, Michigan, 1995, 44 pp. (Co-author of Chapter 3, Buildings).
- ASTM A 944-95, "Standard Test Method for Comparing Bond Strength of Steel Reinforcing Bars to Concrete Using Beam-End Specimens," American Society for Testing and Materials, West Conshohocken, Pennsylvania, 1996, 4 pp.
- Darwin, D., Tholen, M. L., Idun, E. K., and Zuo, J., "Splice Strength of High Relative Rib Area Reinforcing Bars," *ACI Structural Journal*, Vol. 93, No. 1, Jan.-Feb. 1996, pp. 95-107.
- ASCE Task Committee on Design Criteria for Composite Structures in Steel and Concrete, "Proposed Specification and Commentary for Composite Joists and Composite Trusses," D. Darwin, Chmn., *Journal of Structural Engineering*, ASCE, Vol. 122, No. 4, Apr. 1996, pp. 350-358.
- Darwin, D., Zuo, J., Tholen, M. L., and Idun, E. K., "Development Length Criteria for Conventional and High Relative Rib Area Reinforcing Bars," *ACI Structural Journal*, Vol. 93, No. 3, May-June 1996, pp. 347-359.
- Darwin, D. and Zavaregh, Shahin S., "Bond Strength of Grouted Reinforcing Bars," *ACI Structural Journal*, Vol. 93, No. 4, July-Aug. 1996, pp. 486-495.
- Darwin, D., Locke, C. E., Senecal, M. R., Schwensen, S. M., Smith, J. L., "Corrosion-Resistant Steel Reinforcing Bars," *Materials for the New Millennium*, K. P. Chong, Ed., ASCE, Reston, Virginia, 1996, pp. 482-491.
- ACI Committee 446, *Finite Element Analysis of Fracture in Concrete Structures* (ACI 446.3R-97), American Concrete Institute, Farmington Hills, MI, 1998, 44 pp. (Principal author and co-chairman of the subcommittee that wrote the report).
- Tholen, M. L. and Darwin, D., "Effect of Reinforcing Bar Deformation Pattern on Flexural Ductility," *ACI Structural Journal*, Vol. 95, No. 1, Jan.-Feb. 1998, pp. 37-42.
- Darwin, D., Idun, E. K., Zuo, J., and Tholen, M. L., "Reliability-Based Strength Reduction Factor for Bond," *ACI Structural Journal*, Vol. 95, No. 4, July-Aug. 1998, pp. 434-443.
- Darwin, D., Zuo, J., and Tholen, M.L., "Overview of Research to Improve the Development Characteristics of Reinforcing Bars," *Bond and Development of Reinforcement: A Tribute to Peter Gergely*, SP-180, R. Leon, Ed., American Concrete Institute, Farmington Hills, MI, 1998, pp. 299-318.
- ASCE Task Committee on Design Criteria for Composite Structures in Steel and Concrete, "Design Guide for Partially Restrained Composite Connections," D. Darwin, Chmn., *Journal of Structural Engineering*, ASCE, Vol. 124, No. 10, Oct. 1998, pp. 1099-1114.
- Benitez, M. A., Darwin, D., and Donahey, R. C., "Deflections of Composite Beams with Web Openings," *Journal of Structural Engineering*, ASCE, Vol. 124, No. 10, Oct. 1998, pp. 1139-1147.
- Schmitt, T. R. and Darwin, D., "Effect of Material Properties on Cracking in Bridge Decks," *Journal of Bridge Engineering*, ASCE, Vol. 4, No. 1, Feb. 1999, pp. 8-13.

- ASCE Standards Committee on Structural Steel Beams with Web Openings, *Specification for Structural Steel Beams with Web Openings* (SEI/ASCE 23-97), American Society of Civil Engineers, Reston, Virginia, 1999, 20 pp. (Principal author and committee chairman).
- Idun, E. K. and Darwin, D., "Epoxy-Coated Reinforcement: Coefficient of Friction and Rib Face Angle," *ACI Structural Journal*, Vol. 96, No. 4, July-Aug., 1999, pp. 609-615.
- Darwin, D., "Concrete in Compression," *Concrete International*, Vol. 21, No.8, Aug., 1999, pp. 82-85.
- Azizinamini, A., Darwin, D., Eligehausen, R., Pavel, R., and Ghosh, S. K., "Proposed Modifications to ACI 318-95 Tension Development and Lap Splice for High-Strength Concrete," *ACI Structural Journal*, Vol. 96, No. 6, Nov.-Dec., 1999, pp. 922-926.
- Zuo, J. and Darwin, D., "Bond Slip of High Relative Rib Area Bars under Cyclic Loading," *ACI Structural Journal*, Vol. 97, No. 2, Mar. - Apr. 2000, pp. 331-334.
- Darwin, D., "Design of Composite Beams with Web Openings," *Progress in Structural Engineering and Materials*, Vol. 2, No. 2, Apr.-June, 2000, 157-163. Invited.
- Zuo, J. and Darwin, D., "Splice Strength of Conventional and High Relative Rib Area Bars in Normal and High Strength Concrete," *ACI Structural Journal*, Vol. 97, No.4, July-Aug., 2000, pp. 630-641.
- Darwin, D., "Recent Technology for Concrete-Steel Composite Design," *International Seminar on Recent Technology for Concrete-Steel Composite Systems*, Seoul, Korea, 2000, pp. 1-45 (in English and Korean). Invited.
- Darwin, D., "Fracture of High-Strength Concrete: Implications for Structural Applications," *Proceedings*, Korea Concrete Institute, Vol. 12, No. 2, 2000, pp. 11-30. Invited.
- Darwin, D., Balma, J., Locke, C. E., and Nguyen, T. V., "Accelerated Testing for Concrete Reinforcing Bar Corrosion Protection Systems," *Durability 2000*, P. J. M. Monteiro, K. P. Chong, J. Larsen-Basse, and K. Komvopoulos, eds., Proc. of Durability Workshop, Berkeley, CA, Elsevier Science Ltd., Oxford, 2001, pp. 97 - 108.
- Detwiler, R. and Darwin, D. "How to Write a Good Technical Paper," *Concrete International*, Vol. 23, No. 9, Sep. 2001, pp. 52-55.
- Darwin, D., Barham, S., Kozul, R., and Luan, S., "Fracture Energy of High-Strength Concrete," *ACI Materials Journal*, Vol. 98, No. 5, Sep.-Oct., 2001, pp. 410-417.
- ACI Committee 224, Cracking, *Control of Cracking in Concrete Structures*(ACI 224R-01), American Concrete Institute, Farmington Hills, Michigan, 2001, 46 pp. (Principal author with Wimal Suaris of Chapter 2, Crack Mechanisms).
- ASCE Subcommittee on Composite Floor Systems, "Construction Considerations for Composite Steel-and-Concrete Floor Systems," *Journal of Structural Engineering*, ASCE, Vol. 128, No. 9, Sep. 2002, pp. 1099-1110. (Member of the subcommittee.)
- Darwin, D., Browning, J. P., Balma, J., Ji, J., Gong, L., Nguyen, T. V., and Locke, C. E., "Corrosion-Resistant Reinforcing Steels," *Proceedings*, National Bridge Conference, Nashville, 2002, 17 pp.
- Darwin, D., Zuo, J., and McCabe, S. L. "Descriptive Equations for Development and Splice Strength of Straight Reinforcing Bars," *Proceedings: Bond in Concrete - From Research*

- to Standards*, eds. G. L. Balázs, P. J. M. Bartos, J. Cairns, A. Borosnyói, Budapest, 2002, pp. 501-508.
- Darwin, D., McCabe, S. L., Browning, J., Matamoros, A., and Zuo. J., “Evaluation of Development Length Design Expressions,” *Proceedings: Bond in Concrete - From Research to Standards*, eds. G. L. Balázs, P. J. M. Bartos, J. Cairns, A. Borosnyói, Budapest, 2002, pp. 747-754.
- Miller, G. G., Kepler, J. L., and Darwin, D., “Effect of Epoxy Coating Thickness on Bond Strength of Reinforcing Bars,” *ACI Structural Journal*, Vol. 100, No. 3, May-June, 2003, pp. 314-320.
- ACI Committee 408, Bond and Development of Reinforcement, *Bond and Development of Straight Reinforcing Bars in Tension* (ACI 408R-03), American Concrete Institute, Farmington Hills, Michigan, 2003, 49 pp. (Committee chair and principal author.)
- Darwin, D. and Carino, N. J., “Rapid Development of ACI Documents through the Innovation Task Group Process,” *Concrete International*, Vol. 26, No. 11, Nov. 2004, pp. 50-51.
- Darwin, D., Browning, J., and Lindquist, W. D., “Control of Cracking in Bridge Decks: Observations from the Field,” *Cement, Concrete and Aggregates*, ASTM International, Vol. 26, No. 2, Dec. 2004, pp. 148-154.
- Darwin, D., “Tension Development Length and Lap Splice Design for Reinforced Concrete Members,” *Progress in Structural Engineering and Materials*, Vol. 7, No. 4, Oct.-Dec. 2005, pp. 210-225.
- Darwin, D., Lutz, L. A., and Zuo, J., “Recommended Provisions and Commentary on Development and Lap Splice Lengths for Deformed Reinforcing Bars in Tension,” *ACI Structural Journal*, Vol. 102, No. 6, Nov.-Dec. 2005, pp. 892-900.
- Darwin, D. and Detwiler, R. J., “How to Give a Good Technical Presentation,” *Concrete International*, Vol. 28, No. 2, Feb. 2006, pp. 53-56.
- Lindquist, W. D., Darwin, D., Browning, J., and Miller, G. G., “Effect of Cracking on Chloride Content in Concrete Bridge Decks,” *ACI Materials Journal*, Vol. 103, No. 6, Nov.-Dec. 2006, pp. 467-473.
- ACI Committee 224, Cracking, *Causes, Evaluation, and Repair of Cracks in Concrete Structures* (ACI 224.1R-07), American Concrete Institute, Farmington Hills, Michigan, 2007, 22 pp. (Author and chair of task group that prepared the revised report.)
- Darwin, D., President’s Memos, *Concrete International*, American Concrete Institute, Farmington Hills, MI, p.7, “Looking Forward,” May 2007; “ACI’s Website – A Great Resource!”, June 2007; “ACI Certification – A Boon to the Industry”, July 2007; “ACI Technical Publications – A Gold Mine of Information”, August 2007; “Get Involved”, September 2007; “It’s Time to Invest”, October 2007; “It’s About Working Together”, November 2007; “Success in Sustainable Development”, December 2007; “We’re Still ACI International”, January 2008; “The Journey of ACI Committee Membership”, February, 2008; “A Fine Year”, March, 2008.
- Darwin, D., Lindquist, W. D., McLeod, H. A. K., and Browning, J., “Mineral Admixtures, Curing, and Concrete Shrinkage,” *Terence C. Holland Symposium on Advances in Concrete Technology*, G. C. Hoff, Ed., Warsaw, Poland, ACI, 2007, pp. 1-15. Invited.
- ASTM A 955/A 955M-07, “Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement,” ASTM International, West Conshohocken, Pennsylvania, 2007, 11 pp. (Author of new test method for qualifying stainless steel reinforcement.)

- Browning, J., Darwin, D., and Hurst, K., "Specifications to Reduce Bridge Deck Cracking," *HPC Bridge Views*, Issue No. 46, September/October 2007, pp. 1-2. Invited.
- Darwin, D., Lindquist, W. D., McLeod, H. A. K., and Browning, J., "Mineral Admixtures, Curing, and Concrete Shrinkage – An Update," *Concrete Technology*, Taiwan Concrete Institute, Vol. 1, No. 1, October 2007, pp. 56-65. Also, *Proceedings of the TCI 2007 Concrete Technology Conference and Exhibition*, November 2-3, 2007, pp. 25-36.
- ACI Committee 318, Structural Building Code, *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary (ACI 318R-08)*, American Concrete Institute, Farmington Hills, Michigan, 2008, 465 pp. (Member of Subcommittee B, Reinforcement and Development. Authored newly introduced provisions on development of headed reinforcement, simplification of reinforcement confinement term used to calculate development length, splice requirements for integrity reinforcement, and limitations on use of the largest size of deformed wire.)

Research Reports:

- Maher, A. and Darwin, D., "A Finite Element Model to Study the Microscopic Behavior of Plain Concrete," *CRINC Report SL-76-02*, University of Kansas Center for Research, Inc., Lawrence, Kansas, November 1976, 83 pp.
- Bashur, F. K. and Darwin, D., "Nonlinear Model for Reinforced Concrete Slabs," *CRINC Report SL-76-03*, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 1976, 128 pp.
- Attigobe, E. K., Palaskas, M. N. and Darwin, D., "Shear Cracking and Stirrup Effectiveness of Lightly Reinforced Concrete Beams," *SM Report No. 1*, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1980, 138 pp.
- Mockry, E. F. and Darwin, D., "Simplified Design of Slender Reinforced Concrete Columns," *SM Report No. 2*, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1980, 321 pp.
- Palaskas, M. N. and Darwin, D., "Shear Strength of Lightly Reinforced Concrete Beams," *SM Report No. 3*, University of Kansas Center for Research, Inc., Lawrence, Kansas, September 1980, 198 pp.
- Clawson, W. C. and Darwin, D., "Composite Beams with Web Openings," *SM Report No. 4*, University of Kansas Center for Research, Inc., Lawrence, Kansas, October 1980, 209 pp.
- Maher, A. and Darwin, D., "Mortar Constituent of Concrete Under Cyclic Compression," *SM Report No. 5*, University of Kansas Center for Research, Inc., Lawrence, Kansas, October 1980, 165 pp.
- Dodds, R. H., Darwin, D., Smith, J. L. and Leibengood, L. D. "Grid Size Effects with Smeared Cracking in Finite Element Analysis of Reinforced Concrete," *SM Report No. 6*, University of Kansas for Research, Inc., Lawrence, Kansas, August 1982, 118 pp.
- Donahey, R. C. and Darwin, D., "Effects of Construction Procedures on Bond in Bridge Decks," *SM Report No. 7*, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 1983, 129 pp.
- Donahey, R. C. and Darwin, D., "Effects of Innovative Construction Procedures on Concrete Bridge Decks, Final Report: Part I, Effects of Construction Procedures on Bond in Bridge Decks," *SL Report 83-1*, University of Kansas Center for Research, Inc.,

- Lawrence, Kansas, June 1983, 28 pp.
- Harsh, S. and Darwin, D., "Effects of Innovative Construction Procedures on Concrete Bridge Decks, Final Report: Part II, Effects of Traffic Induced Vibrations on Bridge Deck Repairs," *SL Report* 83-2, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 1983, 22 pp.
- Harsh, S. and Darwin, D., "Effects of Traffic Induced Vibrations on Bridge Deck Repairs," *SM Report* No. 9, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 1984, 60 pp.
- Brettmann, B. B., Darwin, D. and Donahey, R. C., "Effects of Superplasticizers on Concrete-Steel Bond Strength," *SL Report* 84-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1984, 32 pp.
- Leibengood, L. D., Darwin, D. and Dodds, R. H., "Finite Element Analysis of Concrete Fracture Specimens," *SM Report* No. 11, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 1984, 120 pp.
- Nmai, C. K. and Darwin, D., "Cyclic Behavior of Lightly Reinforced Concrete Beams," *SM Report* No. 12, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 1984, 139 pp.
- Rodrigues, C. P. and Darwin, D., "Negative Moment Region Shear Strength of Lightly Reinforced T-Beams," *SM Report* No. 13, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 1984, 111 pp.
- Altowaiji, W. A. K., Darwin, D. and Donahey, R. C., "Preliminary Study of the Effect of Revibration on Concrete-Steel Bond Strength," *SL Report* 84-2, University of Kansas Center for Research, Inc., Lawrence, Kansas, November 1984, 29 pp.
- Gray, D. C. and Darwin, D., "Expansion And Contraction Joints In Reinforced Concrete Buildings: An Annotated Bibliography 1907-1984," *SM Report* No. 13, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 1984, 43 pp.
- Attigobe, E. K. and Darwin, D., "Submicroscopic Cracking of Cement Paste and Mortar in Compression," *SM Report* No. 16, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1985, 439 pp.
- Ulaby, F. T., Darwin, D., Tavakoli, A. and Hanks, D. L., "Dielectric and Transmission Properties of Concrete, Polymer Concrete, Fiberglass and Glass-Fiber Reinforced Concrete," *Technical Report* 670-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1986, 267 pp.
- Donahey, R. C. and Darwin, D. "Performance Design of Composite Beams with Web Openings," *SM Report* No. 18, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1986, 267 pp.
- Pfeiffer, M. J. and Darwin, D., "Joint Design for Reinforced Concrete Buildings," *SM Report* No. 20, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 1987, 73 pp.
- Darwin, D., Attigobe, E. K., Harsh, S., Shen, Z., and Dewey, G. R., "Submicroscopic Deformation in Cement Paste and Mortar at High Load Rates," *SL Report* 88-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, August 1988, 95 pp.
- Hanks, D. L. and Darwin, D., "Cyclic Behavior of High Strength Concrete Beams," *SM Report* No. 21, University of Kansas Center for Research, Inc., Lawrence, Kansas, August 1988, 120 pp.

- Harsh, S., Shen, Z., and Darwin, D., "Rate Sensitive Behavior of Cement Paste and Mortar in Compression," *SM Report* No. 22, University of Kansas Center for Research, Inc., Lawrence, Kansas, March 1989, 290 pp.
- Choi, O. C., Hadje-Ghaffari, H., Darwin, D., and McCabe, S. L., "Bond of Epoxy-Coated Reinforcement to Concrete: Bar Parameters," *SL Report* 90-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 1990, 43 pp.
- Cong, X., Gong, S., Darwin, D., McCabe, S. L., "Role of Silica Fume in Compressive Strength of Cement Paste, Mortar, and Concrete," *SL Report* 90-2, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1990, 38 pp.
- Lucas, W. K. and Darwin, D., "Steel and Composite Beams with Web Openings," *SM Report* No. 23, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 1990, 188 pp.
- Zhao, H. and Darwin, D., "Quantitative Backscattered Electron Analysis Techniques for Cement-Based Materials," *SM Report* No. 24, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 1990, 56 pp.
- Benitez, M. A., Darwin, D., and Donahey, R. C., "Deflections of Composite Beams with Web Openings," *SL Report* No. 90-3, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 1990, 62 pp.
- Choi, O. C., Darwin, D., and McCabe, S. L., "Bond Strength of Epoxy-Coated Reinforcement to Concrete," *SM Report* No. 25, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1990, 217 pp.
- Martinez, S. L., Darwin, D., McCabe, S. L., and Locke, C. E., "Rapid Test for Corrosion Effects of Deicing Chemicals in Reinforced Concrete," *SL Report* 90-4, University of Kansas Center for Research, Inc., Lawrence, Kansas, Aug. 1990, 61 pp.
- Pasley, G. P., Gogoi, S., Darwin, D., and McCabe, S. L., "Shear Strength of Continuous Lightly Reinforced T-Beams," *SM Report* No. 26, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 1990, 151 pp.
- Hester, C. J., Salamizavaregh, S., Darwin, D., and McCabe, S. L., "Bond of Epoxy-Coated Reinforcement to Concrete: Splices," *SL Report* 91-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 1991, 66 pp.
- Hadje-Ghaffari, H., Darwin, D., and McCabe, S. L., "Effects of Epoxy-Coating on the Bond of Reinforcing Steel to Concrete," *SM Report* No. 28, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1991, 288 pp.
- Dewey, G. R. and Darwin, D., "Image Analysis of Air Voids in Air-Entrained Concrete," *SM Report* No. 29, University of Kansas Center for Research, Inc., Lawrence, Kansas, August 1991, 332 pp.
- Martin, J. L., Darwin, D., and Terry, R. E., "Cement Paste, Mortar and Concrete under Monotonic, Sustained and Cyclic Loading," *SM Report* No. 31, University of Kansas Center for Research, Inc., Lawrence, Kansas, October 1991, 161 pp.
- Darwin, D., McCabe, S. L., Idun, E. K., and Schoenekase, S. P., "Development Length Criteria: Bars without Transverse Reinforcement," *SL Report* 92-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1992, 62 pp.
- Hadje-Ghaffari, H., Choi, O. C., Darwin, D., and McCabe, S. L., "Bond of Epoxy-Coated Reinforcement to Concrete: Cover, Casting Position, Slump, and Consolidation," *SL Report* 92-3, University of Kansas Center for Research, Inc., Lawrence, Kansas, June

1992, 42 pp.

- Chappelow, C. C., McElroy, A. D., Blackburn, R. R., Darwin, D., De Noyelles, F. G., Locke, C. E., *Handbook of Test Methods for Evaluating Chemical Deicers*, SHRP-H-332, Strategic Highway Research Program, National Research Council, Washington, D.C., 1992, 283 pp.
- Schmitt, T. R. and Darwin, D., "Bond of Epoxy-Coated Wire to Concrete," *SL Report 92-5*, University of Kansas Center for Research, Inc., Lawrence, Kansas, November 1992, 14 pp.
- Darwin, D. and Graham, E. K. "Effect of Deformation Height and Spacing on Bond Strength of Reinforcing Bars," *SL Report 93-1*, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 1993, 68 pp.
- Hanks, D. L., Darwin, D., and McCabe, S. L., "Predicting the Cyclic Behavior of Reinforced Concrete Beams," *SM Report No. 33*, University of Kansas Center for Research, Inc., Lawrence, Kansas, March 1993, 232 pp.
- Darwin, D. and Salamizavaregh, S., "Bond Strength of Grouted Reinforcing Bars," *SM Report No. 32*, University of Kansas Center for Research, Inc., Lawrence, Kansas, October 1993, 139 pp.
- Ketcham, K. W., Romero, F. A., Darwin, D., Gong, S.-L., Abou-Zeid, M. N., and Martin, J. L., "Automated Crack Identification for Cement Paste," *SM Report No. 34*, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1993, 75 pp.
- Brown, C. J., Darwin, D., and McCabe, S. L., "Finite Element Fracture Analysis of Steel-Concrete Bond," *SM Report No. 36*, University of Kansas Center for Research, Inc., Lawrence, Kansas, November 1993, 100 pp.
- Ravikumar, S., Darwin, D., McCabe, S. L., and Pasley, G. P., "Shear Strength of Continuous Lightly Reinforced Concrete Joist Systems," *SM Report No. 37*, University of Kansas Center for Research, Inc., Lawrence, Kansas, March 1994, 125 pp.
- Darwin, D., "Corrosion-Resistant Steel Reinforcing Bars," Progress Report (Stage 1) for the Period June 1994-September 1994, *SL Report 94-3*, University of Kansas Center for Research, Inc., Lawrence, Kansas, September 1994, 10s pp.
- Zuo, J. and Darwin, D., "Permanent Concrete Pavement Markings," *SM Report No. 38*, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 1994, 60 pp.
- Schmitt, T. R. and Darwin, D., "Cracking in Concrete Bridge Decks," *SM Report No. 39*, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1995, 151 pp.
- Smith, J. L., Darwin, D., and Locke, C. E., Jr., "Corrosion-Resistant Steel Reinforcing Bars Initial Tests," *SL Report 95-1*, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 1995, 43 pp.
- Darwin, D., "Corrosion-Resistant Steel Reinforcing Bars, Summary Report," *SL Report 95-2*, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 1995, 22 pp.
- Darwin, D., Tholen, M. L., Idun, E. K., and Zuo, J., "Splice Strength of High Relative Rib Area Reinforcing Bars," *SL Report 95-3*, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 1995, 58 pp.
- Darwin, D., Zuo, J., Tholen, M. L., and Idun, E. K., "Development Length Criteria for Conventional and High Relative Rib Area Reinforcing Bars," *SL Report 95-4*, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 1995, 70 pp.

- Darwin, D., Idun, E. K., Zuo, J., Tholen, M. L. "Reliability-Based Strength Reduction Factor for Bond," *SL Report 95-5*, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 1995, 47 pp.
- Schwensen, S. M., Darwin, D., and Locke, C. E., Jr., "Rapid Evaluation of Corrosion-Resistant Concrete Reinforcing Steel in the Presence of Deicers," *SL Report 95-6*, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1995, 90 pp.
- Senecal, M. R., Darwin, D., and Locke, C. E., Jr., "Evaluation of Corrosion-Resistant Steel Reinforcing Bars," *SM Report No. 40*, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1995, 142 pp.
- Idun, E. K. and Darwin, D., "Improving the Development Characteristics of Steel Reinforcing Bars," *SM Report No. 41*, University of Kansas Center for Research, Inc., Lawrence, Kansas, August 1995, 267 pp.
- Tan, C., Darwin, D., Tholen, M. L., and Zuo, J., "Splice Strength of Epoxy-Coated High Relative Rib Area Bars," *SL Report 96-2*, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 1996, 69 pp.
- Tholen, M. L. and Darwin, D., "Effects of Deformation Properties on the Bond of Reinforcing Bars," *SM Report No. 42*, University of Kansas Center for Research, Inc., Lawrence, Kansas, October 1996, 370 pp.
- Kozul, R. and Darwin, D., "Effects of Aggregate Type, Size, and Content on Concrete Strength and Fracture Energy," *SM Report No. 43*, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 1997, 85 pp.
- Shiple, R. W., Darwin, D., and Locke, C. E., "Stray Current Corrosion due to Utility Cathodic Protection," *SM Report No. 45*, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 1997, 44 pp.
- Zuo, J. and Darwin, D., "Bond Strength of High Relative Rib Area Reinforcing Bars," *SM Report No. 46*, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 1998, 350 pp.
- Miller, G. G., Kepler, J. L., and Darwin, D., "Effect of Epoxy Coating Thickness on Bond Strength of No. 19 [No. 6] Reinforcing Bars," *SL Report 98-1*, University of Kansas Center for Research, Inc., Lawrence, Kansas, January, 1998, 26 pp.
- Darwin, D., Locke, C. E., Jr., Balma, J., Kahrs, J. T., "Evaluation of Stainless Steel Clad Reinforcing Bars," *SL Report 99-3*, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1999, 17 pp.
- Axelsson, H., Darwin, D., and Locke, C. E., Jr., "Influence of Adhesion at Steel/Mortar Interface on Corrosion Characteristics of Reinforcing Steel," *SL Report 99-4*, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1999, 55 pp.
- Fei, J. and Darwin, D., "Fatigue of High Relative Rib Area Reinforcing Bars," *SM Report No. 54*, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 1999, 76 pp.
- Barham, S. and Darwin, D., "Effects of Aggregate Type, Water-to-Cementitious Material Ratio, and Age on Mechanical and Fracture Properties of Concrete," *SM Report No. 56*, University of Kansas Center for Research, Inc., Lawrence, Kansas, August 1999, 95 pp.
- Miller, G. G. and Darwin, D., "Performance and Constructability of Silica Fume Bridge Deck Overlays," *SM Report No. 57*, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 2000, 423 pp.
- Kepler, J. L., Darwin, D., and Locke, C. E., "Evaluation of Corrosion Protection Methods for

- Reinforced Concrete Highway Structures,” *SM Report* No. 58, University of Kansas Center for Research, Inc., Lawrence, Kansas, May 2000, 221 pp.
- Grandin, J. R. and Darwin, D., “Presentation of Experiments for High School Students with Civil Engineering Related Interests,” *SM Report* No. 63, University of Kansas Center for Research, Inc., Lawrence, Kansas, July 2001, 90 pp.
- Kahrs, J. T., Darwin, D., and Locke, C. E., “Evaluation of Corrosion Resistance of Type 304 Stainless Steel Clad Reinforcing Bars,” *SM Report* No. 65, University of Kansas Center for Research, Inc., Lawrence, Kansas, August 2001, 76 pp.
- Darwin, D., Browning, J., Nguyen, T. V., and Locke, C. E., “Mechanical and Corrosion Properties of a High-Strength, High Chromium Reinforcing Steel for Concrete,” *SM Report* No. 66, University of Kansas Center for Research, Inc., Lawrence, Kansas, March 2002, pp. 142; also *South Dakota Department of Transportation Report*, SD2001-05-F.
- Gong, L., Darwin, D., Browning, J., and Locke, C. E., “Evaluation of Mechanical And Corrosion Properties of MMFX Reinforcing Steel for Concrete,” *SM Report* No. 70, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 2002, 113 pp.
- Balma, J., Darwin, D., Browning, J., and Locke, C. E., “Evaluation of Corrosion Resistance of Microalloyed Reinforcing Steel,” *SM Report* No. 71, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 2002, 171 pp.
- Ge, B., Darwin, D., Locke, C. E., and Browning, J. P., “Evaluation of Corrosion Protection Systems and Testing Methods for Conventional Reinforcing Steel,” *SM Report* No. 73, University of Kansas Center for Research, Inc., Lawrence, Kansas, April 2004, 213 pp.
- Bournonville, M., Dahnke, J., Darwin, D. “Statistical Analysis of the Mechanical Properties and Weight of Reinforcing Bars,” *SL Report* 04-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 2004, 194 pp.
- Balma, J., Darwin, D., Browning, J., and Locke, C. E., “Evaluation of Corrosion Protection Systems and Corrosion Testing Methods for Reinforcing Steel in Concrete,” *SM Report* No. 76, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 2005, 517 pp.
- Hudson, J. L. and Darwin, D. “Evaluation and Repair of Blast Damaged Reinforced Concrete Beams,” *SL Report* 05-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 2005, 111 pp.
- Tritsch, N., Darwin, D., and Browning, J., “Evaluating Shrinkage and Cracking Behavior of Concrete Using Restrained Ring and Free Shrinkage Tests,” *SM Report* No. 77, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 2005, 178 pp.
- Lindquist, W. D., Darwin, D., and Browning, J., “Cracking and Chloride Contents in Reinforced Concrete Bridge Decks,” *SM Report* No. 78, University of Kansas Center for Research, Inc., Lawrence, Kansas, February 2005, 453 pp.
- Ji, J., Darwin, D., and Browning, J., “Corrosion Resistance of Duplex Stainless Steels and MMFX Microcomposite Steel for Reinforced Concrete Bridge Decks,” *SM Report* No. 80, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 2005, 453 pp.
- Gong, L., Darwin, D., Browning, J., and Locke, C. E., “Evaluation of Multiple Corrosion Protection Systems and Stainless Steel Clad Reinforcement for Reinforced Concrete,” *SM Report* No. 82, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 2006, 540 pp.

- Guo, G., Darwin, D., Browning, J., and Locke, C. E., "Laboratory and Field Tests of Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components and 2205 Pickled Stainless Steel," *SM Report* No. 85, University of Kansas Center for Research, Inc., Lawrence, Kansas, June 2006, 776 pp.
- Deshpande, S, Darwin, D., and Browning, J., "Evaluating Free Shrinkage of Concrete for Control of Cracking in Bridge Decks," *SM Report* No. 89, University of Kansas Center for Research, Inc., Lawrence, Kansas, January 2007, 266 pp.
- Darwin, D., Browning, J., Nguyen, T. V., and Locke, C. E., "Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components," *Publication* No. FHWA-HRT-07-043, Federal Highway Administration, July 2007, 116 pp., also *SM Report* No. 84, University of Kansas Center for Research, Inc., Lawrence, Kansas
- Darwin, D., Browning, J., Nguyen, T. V., and Locke, C. E., "Evaluation of Metallized Stainless Steel Clad Reinforcement," *South Dakota Department of Transportation Report*, SD2002-16-F, July 2007, 156 pp., also *SM Report* No. 90, University of Kansas Center for Research, Inc., Lawrence, Kansas
- Briggs, M., Miller, S., Darwin, D., and Browning, J., "Bond Behavior of Grade 100 ASTM A 1035 Reinforcing Steel in Beam-Splice Specimens," *SL Report* 07-01, The University of Kansas Center for Research Inc., Lawrence, KS, Aug. 2007 (Revised Oct. 2007), 83 pp.
- Darwin, D., Browning, J., O'Reilly, M., and Xing, L., "Critical Chloride Corrosion Threshold for Galvanized Reinforcing Bars," *SL Report* 07-2, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 2007, 28 pp.
- Darwin, D., Browning, J., Gong, L., and Hughes, S. R., "Effects of Deicers on Concrete Deterioration," *SL Report* 07-3, University of Kansas Center for Research, Inc., Lawrence, Kansas, December 2007, 22 pp.
- Darwin, D., Browning, J., O'Reilly, M., and Xing, L., "Bond Strength of Reinforcing Bars with Deformation Spacings that Exceed Maximum Specified in ASTM A615," *SL Report* 08-1, University of Kansas Center for Research, Inc., Lawrence, Kansas, March 2008, 17 pp.

Oral Presentations since 1996:

- "Overview of Research to Improve the Development Characteristics of Reinforcing Bars," ACI Convention, Seattle, Washington, April 5-10, 1997.
- "Fracture Model for Steel-Concrete Bond," McNu '97 Conference, Northwestern University, Evanston, Illinois, June 29-July 2, 1997. Invited.
- "Splice Strength of Conventional and High Relative Rib Area Bars in High Strength Concrete," International Conference on High Strength Concrete," Kona, Hawaii, July 13-18, 1997.
- "Concrete in Compression," ACI Convention, Houston, Texas, March 22-27, 1998.
- "Concrete Fracture: It's Not Always Intuitive," Engineering Foundation Conference on Advances in Cement and Concrete, Banff, Canada, July 5-10, 1998. Invited.
- "Concrete Fracture: Implications for High-Strength Concrete," ASCE Structural Group, Topeka, Kansas, August 13, 1998. Invited.
- "High Strength Concrete," Professional Development Series, University of Kansas Department of Civil and Environmental Engineering, Kansas City, Missouri, February 22, 1999. Invited.
- "Concrete Shrinkage," Structural Engineering Conference, University of Kansas, Lawrence, Kansas, March 16, 2000. Invited.

“Fracture of High-Strength Concrete: Where We’ve Been and Where We’re Going,” Materials Science of Concrete Workshop in honor of J. Francis Young, Lake Shelbyville, Illinois, April 27-29, 2000.

“Bridge Deck Cracking and Durability,” Workshop on Concrete in Transportation Infrastructure, National Bridge Research Organization, Lincoln, Nebraska, October 10, 2000. Invited.

“Recent Technology for Concrete-Steel Composite Design,” International Seminar on Recent Technology for Concrete-Steel Composite Systems, Seoul, Korea, November 15, 2000. Invited.

“Fracture of High-Strength Concrete: Implications for Structural Applications,” Keynote Speech, Fall 2000 Convention, Korea Concrete Institute, Kung Ju, Korea, November 17, 2000. Invited.

“Concrete Durability,” Professional Development Series, University of Kansas Department of Civil and Environmental Engineering, Kansas City, Missouri, April 16, 2001. Invited.

“Overview of SEI/ASCE 23-97 Specification for Structural Steel Beams with Web Openings” ASCE Structures Congress, Washington, DC, May 21-23, 2001. Invited.

Lectures on “High-Strength Concrete,” “Fracture of High-Strength Concrete,” and “Concrete Durability” at Chongqing Jiaotong University, Chongqing, Peoples Republic of China, September 24-28, 2001. Invited.

“Concrete Durability,” National Concrete Paving Association Seminar, Overland Park, Kansas, October 25, 2001. Invited.

“The Structural Engineering Institute and ASCE’s Response to September 11,” Joint Meeting of the Kansas Section and the Wichita Branch of ASCE, Emporia, Kansas, January 10, 2002. Invited.

“Evaluation of Corrosion Resistant Reinforcing Steel,” South Dakota Department of Transportation Research Review Board, Pierre, South Dakota, February 20, 2002. Invited.

“Corrosion Resistance of High-Strength, High Chromium Reinforcing Steel,” ACI Convention, Detroit, Michigan, April 21-24, 2002.

“Research on Corrosion Resistant Reinforcing Steel,” ASCE Structural Group, Topeka, Kansas, July 11, 2002. Invited.

“Corrosion Resistant Reinforcing Steels,” Concrete Bridge Conference, Nashville, Tennessee, October 8-9, 2002.

“Durable Concrete Structures: What Practicing Engineers Need to Know,” Anna Maria Workshop 2002, Designing Concrete for Durability, Anna Maria Island, Florida, November 13-15, 2002. Invited.

“ASCE’s Institutes: Structures, Water Resources and a Whole Lot More!,” Joint Meeting of the Kansas Section and the University of Kansas and Kansas State University Student Chapters of ASCE, Manhattan, Kansas, November 21, 2002. Invited.

“The Performance of MMFX, 2101, 2205 Stainless and Epoxy Coated Rebar,” Gerdau AmeriSteel Corrosion 2002, Atlanta, Georgia, December 9, 2002. Invited.

“Status Report on Reinforcing Bar Corrosion Protection Systems,” Structural Engineering Conference, University of Kansas, Lawrence, Kansas, March 4, 2003. Invited.

“Corrosion Performance of MMFX (and other) Reinforcing Steel,” AASHTO Technical Committee for Corrosion T-9, Albuquerque, New Mexico, June 2, 2003. Invited.

“Bond Provisions in ACI 318 versus Test Results – Recommended Changes in the Code,” ACI Convention, Boston, Massachusetts, September 27 – October 1, 2003. Invited.

“Cracks in Concrete,” Joint Meeting of the Kansas and Missouri Chapters of ACI and the Mid-West Concrete Industry Board, Kansas City, Missouri, November 11, 2003. Invited.

“Corrosion Performance of Reinforcing Steels,” 53rd Annual Concrete Conference, University of Minnesota, St. Paul, Minnesota, December 4, 2003. Invited.

“Control of Cracking in Bridge Decks: Observations from the Field,” Symposium on Assessing Early-Age Cracking of Concrete, ASTM International, Tampa, Florida, December 7, 2003. Invited.

“ACI Committee 408 Design Recommendations for Development and Splice Lengths,” ACI Convention, Washington, D.C., March 14-18, 2004. Invited.

“Effects of Cracks on Chloride Content and Corrosion in Bridge Decks,” ACI Convention, Washington, D.C., March 14-18, 2004. Invited.

“Stainless Steel Reinforcement for Bridge Deck Construction,” 86th Annual Kansas Transportation Engineering Conference, Manhattan, Kansas, April 13-14, 2004. Invited.

“Cracking and Chlorides in Concrete Bridge Decks,” ASCE Structural Group, Topeka, Kansas, June 14, 2004. Invited.

“Reinforcing Bar Corrosion Research,” ASTM International, Subcommittee G01.14 on Corrosion of Rebar, Kansas City, Missouri, June 14, 2004. Invited.

“Multiple Corrosion Protection for Reinforced Concrete Bridge Components,” AASHTO Technical Committee for Corrosion T-9, Orlando, Florida, June 21, 2004. Invited.

“Reinforced Concrete Design,” Civil Engineering PE Exam Review Course, University of Kansas Continuing Education, Overland Park, Kansas, October 11, 2004 and semiannually to October 2007. Invited.

“Improving Development and Splice Design: What We Know and How To Use It,” 54th Annual Concrete Conference, University of Minnesota, St. Paul, Minnesota, December 2, 2004. Invited.

“Analysis of Development and Splice Provisions for Straight Reinforcing Bars in Tension,” AASHTO Technical Committee for Concrete Design T-10, Chicago, Illinois, April 8, 2005. Invited.

“Specifications for Low Cracking High Performance (LC-HPC) Concrete Bridge Decks,” 87th Annual Kansas Transportation Engineering Conference, Manhattan, Kansas, April 12-13, 2005. Invited.

“Improving Development and Splice Design: What We Know and How To Use It,” SEI Chapter of the Kansas Section of ASCE, Topeka, Kansas, August 16, 2005. Invited.

“Corrosion and Corrosion Protection of Reinforcing Steel in Concrete,” Wire Reinforcement Institute, Boca Raton, Florida, October 3, 2005. Invited.

Workshop on “Use of Epoxy-Coated Rebar in Concrete Bridge Components: Pros and Cons,” Transportation Research Board, Washington, D.C., January 23, 2006. Invited.

“Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components,” Transportation Research Board, Washington, D.C., January 23, 2006. Invited.

“Concrete Construction: What Designers Should Know,” Professional Development Series, University of Kansas Department of Civil and Environmental Engineering, Kansas City, Missouri, February 27, 2006. Invited.

“Low Cracking-High Performance Concrete Bridge Decks Pooled Fund Study Status,” Midwest Concrete Consortium St. Louis, Missouri, April 19, 2006. Invited.

“Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components,” 2006 Concrete Bridge Conference, Reno, Nevada, May 7-10, 2006.

“Low Cracking-High Performance Concrete (LC-HPC) Bridge Decks,” 2006 Concrete Bridge Conference, Reno, Nevada, May 7-10, 2006.

Workshop on Crack-Free Bridge Decks, Minnesota DOT, Oakdale, Minnesota, December 6, 2006.

“Low Cracking-High Performance Concrete (LC-HPC) Bridge Decks,” 56th Annual Concrete Conference, University of Minnesota, Minneapolis, December 7, 2006. Invited.

“Low Cracking-High Performance Concrete (LC-HPC) Bridge Decks,” 52nd Annual Structural Engineering Conference, University of Kansas, March 1, 2007. Invited.

“Mineral Admixtures, Curing, and Concrete Shrinkage,” Terence C. Holland Symposium on Advances in Concrete Technology, Warsaw, Poland, May 22-23, 2007. Invited.

“Experiences with Bridge Construction and Other Stuff,” Kansas Chapter of American Concrete Institute, September 20, 2007. Invited.

“Mineral Admixtures, Curing, and Concrete Shrinkage – An Update,” Taiwan Concrete Institute Technology Conference, Taipei, Taiwan, November 2-3, 2007. Invited.

Workshop on Crack-Free Bridge Decks, Texas DOT, Austin, Texas, March 26, 2007; South Dakota DOT, May 15, 2007; Idaho Transportation Department, August 29, 2007; Montana DOT, September 19, 2007; Missouri DOT, September 27, 2007; Indiana DOT, October 4, 2007; Michigan DOT, October 5, 2007; New Hampshire DOT, January 10, 2008. Invited.

“Concrete in Sustainable Development: The ongoing challenge,” 53rd Annual Structural Engineering Conference, University of Kansas, March 6, 2008. Invited.

“Multiple Corrosion Protection Systems for R/C Bridges,” ACI Convention, Los Angeles, California, March 30 – April 2, 2008. Invited.

“Alkali Content Recommendations,” Kansas City Metro Materials Board, Lenexa, Kansas, April 10, 2008. Invited.

Grants: (Principal Investigator unless noted otherwise)

“Model for Deformation and Cracking of Plain Concrete,” April 1976-September 1977, National Science Foundation Research Initiation Grant, \$20,000.

“Composite Beams with Web Openings,” March 1977-August 1980, National Science Foundation, \$62,554.

“Role of Cement Paste in Deformation and Cracking of Plain Concrete,” February 1980-January 1982, National Science Foundation, \$83,043.

“Effects of Innovative Construction Procedures on Concrete Bridge Decks,” June 1980-August 1982, Kansas Department of Transportation, \$60,000.

“Cyclic Behavior of Concrete Beams with Low Values of Flexural Reinforcement,” December 1980-November 1982, National Science Foundation, \$192,971.

“Role of Cement Paste in Deformation and Cracking of Plain Concrete,” January 1982-December 1984, National Science Foundation, \$101,399.

“Composite Beams with Web Openings,” May 1982-November 1985, American Institute of Steel Construction, \$120,049.

“Microwave Losses in Concrete,” June-September 1984, E-Systems, Inc., \$35,000 (Co-investigator with F. T. Ulaby, PI).

“Submicroscopic Deformation in Cement Paste and Mortar at High Load Rates,” April 1985-March 1988, Air Force Office of Scientific Research, \$343,195.

“Analysis of Pipeline Girth Welds Containing Long, Shallow Surface Flaws,” December 1985-November 1986, American Petroleum Institute, \$75,000 (Co-investigator with R. H. Dodds, PI, and S. T. Rolfe).

“Scanning Electron Microscope and Energy Dispersive X-Ray Analysis System,” August 1986-July 1987, Air Force Office of Scientific Research, \$71,807 (Total funding: \$268,615).

“Bond of Epoxy-Coated Reinforcing Steel to Concrete,” February 1987-January 1990, National Science Foundation, \$223,444.

“Concrete Air-Void Characteristics for a New Air-Entraining Agent,” May-December 1988, Solvay Construction Materials, Inc., \$17,997.

“Shear Strength of Continuous Lightly Reinforced Concrete Joist Systems,” January 1989-December 1991, National Science Foundation, \$168,914 (with S. L. McCabe).

“Submicroscopic Deformation of Cement Paste and Mortar,” April 1989-March 1992, Air Force Office of Scientific Research, \$232,691.

“Evaluation Procedures for Deicing Chemicals and Improved Sodium Chloride-Reinforcement Corrosion Test,” June 1989-June 1990, Strategic Highway Research Program, \$54,136 (with C. E. Locke).

“Bond of Confined Epoxy-Coated Reinforcement to Concrete,” January 1990-January 1991, Kansas Department of Transportation, \$38,446 (with S. L. McCabe).

“Effects of PolyTECT on Steel-Concrete Bond Strength,” July-September 1990, Master Builders, Inc., \$3,625.

“Drilling and Grouting of Epoxy-Coated Reinforcement,” January 1991-September 1992, Kansas Department of Transportation, \$105,581.

“Improving Development Characteristics of Reinforcing Bars,” March 1991-August 1994, Civil Engineering Research Foundation and National Science Foundation, \$483,503 (Total funding: \$565,803) (with S. L. McCabe).

“Effects of Rheocrete 222 on Bond of Epoxy-Coated Bars to Concrete,” October-December 1991, Master Builders, Inc., \$4,225.

“Bridge Deck Cracking in Steel-Concrete Composite Bridges,” June 1993-March 1995, Kansas Department of Transportation, \$40,000.

“Permanent Concrete Pavement Markings,” June 1993-August 1994, Kansas Department of Transportation, \$26,500.

“Corrosion-Resistant Steel Reinforcing Bars,” January 1994-May 1995, Florida Steel Corporation and National Cooperative Highway Research Program, \$116,288 (Total Funding: \$173,691) (with C. E. Locke).

“DesignLab” (instrumentation to support design of software and hardware development tools), August 1994-July 1999, National Science Foundation, \$1,251,818 (total funding: \$1,733,918)(one of 10 co-investigators with Allen Ambler, PI).

“Improving Development Characteristics of Reinforcing Bars,” December 1994-November 1998, National Science Foundation and Federal Highway Administration, \$235,321 (Total Funding: \$380,321) (with S. L. McCabe).

“Corrosion of Bridge Components Caused by Utility Cathodic Protection,” January 1997-February 1998, Kansas Department of Transportation, \$33,000 (with C. E. Locke).

“Performance and Constructability of Silica Fume Overlays on Bridge Decks,” January 1998-August 1999, Kansas Department of Transportation, \$50,000.

“Corrosion-Resistant Steel Reinforcing Bars,” November 1998-May 1999, Structural Metals, Inc., \$24,000 (with C. E. Locke).

“Evaluation of Corrosion Protection Systems for Concrete Highway Structures,” January 1999-May 2000, Kansas Department of Transportation, \$39,000 (with C. E. Locke).

“Accelerated Testing for Concrete Reinforcing Bar Corrosion Protection Systems,” January 1999-February 2003, National Science Foundation and Kansas Department of Transportation, \$350,000 (with C. E. Locke and T. V. Nguyen).

“Evaluation of Corrosion-Resistant Steel Reinforcing Bars,” April 1999-May 2003, AmeriSteel Corporation, \$225,000 (with C. E. Locke, J. Browning, and T. V. Nguyen).

“Accelerated Testing for Concrete Reinforcing Bar Corrosion Protection Systems - Field Study,” January 2000-July 2001, Kansas Department of Transportation, \$22,500 (with C. E. Locke and T. V. Nguyen).

“Evaluation of Corrosion-Resistant Steel,” March 2001-March 2002, South Dakota Department of Transportation, \$50,000 (with C. E. Locke, T. V. Nguyen, and J. Browning).

“Performance of Silica Fume Overlays on Bridge Decks,” May 2001-February 2004, Kansas Department of Transportation, \$57,000 (with J. Browning).

“Accelerated Testing for Concrete Reinforcing Bar Corrosion Protection Systems - Field Study,” July 2001-August 2010, Kansas Department of Transportation, \$258,550 (with C. E. Locke, T. V. Nguyen, and J. Browning).

“Construction of Crack-Free Concrete Bridge Decks,” September 2002-March 2010, Kansas Department of Transportation, Federal Highway Administration, Texas DOT, Idaho Trans. Dept., Indiana DOT, Michigan DOT, Minnesota DOT, Mississippi DOT, Montana DOT, New Hampshire DOT, Oklahoma DOT, Missouri DOT, North Dakota DOT, South Dakota DOT, Delaware DOT, Wyoming DOT, \$995,000 (with J. Browning).

“Evaluation of Metallized Stainless Steel Clad Reinforcement,” October 2002-July 2007, South Dakota Department of Transportation, \$70,000 (with J. Browning, C. E. Locke, and T. V. Nguyen).

“Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components,” September 2003-September 2008, Federal Highway Administration, \$500,000 (with J. Browning, C. E. Locke, and T. V. Nguyen).

“Manual for Optimized Concrete Mix Design,” June 2004-August 2005, Kansas Department of Transportation, \$24,000 (with J. Browning).

“Evaluation of Bond Characteristics of MMFX Steel,” October 2005-June 2007, MMFX Technologies Corporation, \$83,000 (with J. Browning).

“Critical Chloride Corrosion Threshold for Galvanized Reinforcing Bars,” July 2006-March 2007, International Lead Zinc Research Organization, \$18,000 (with J. Browning).

“Construction of Crack-Free Concrete Bridge Decks – Phase II,” August 2006-August 2008, Kansas Transportation Research Institute, \$200,000 (with J. Browning).

“Construction of Concrete Bridge Decks,” May 2007-April 2010, City of Overland Park, Kansas, \$40,000 (with J. Browning).

Courses Taught at the University of Kansas:

CE 312	Strength of Materials for Architects, Fall 1974
CE 368	Concrete Properties and Mix Design, Fall 1974, Spring 1975
CE 412	Civil Engineering Materials, Fall 1975-Spring 1980 (fall and spring)
CE 412	Structural Engineering Materials, Fall semester 1981-86, 1988-93, 1995-2000, 2002-2006, Spring semester 2004.
CE 763	Advanced Concrete Design I, Fall semester 1981-86, Spring semester 1975-80, 2006
CE 764	Advanced Concrete Design II, Summer 1975, Fall semester 1975-79, Spring semester 1982-87, 1990, 1993, 1996, 1998, 2000, 2003, 2005, 2007
CE 795	Scanning Electron Microscopy and X-Ray Microanalysis, Spring semester 1989, 1991, 1997, 1999, 2001 (Presented as CE 890/991 in 1989, 1991)
CE 890	Special Problems, regular basis
CE 892	Structural Engineering and Mechanics Seminar, Spring semester 1975-80, 1982-87, 1989-2001, 2003-07
CE 899	Thesis, regular basis
CE 991	Research, regular basis
CE 999	Ph.D. Thesis, regular basis

Chairperson on Examinations:

Ph.D.:	Chairperson for 24 candidates. Nineteen have graduated, and five are currently enrolled.
MSCE:	Chairperson for 66 candidates. Sixty have graduated, and six are currently enrolled.

University Service:

Department of Civil, Environmental and Architectural Engineering

Faculty Secretary, 1975-77
Authored changes to and updated Civil Engineering Framework Schedules, 1976
Curriculum Committee, 1976-78, 1979-80
Materials Committee, 1976-80
Co-advisor to the Student Chapter of the American Society of Civil Engineers, 1977-80
Advisor for concrete canoe, 1975-2006
Graduate Studies Committee, 1981-95
Librarian, 1982-2007
Promotions and Tenure Committee, Co-Chair 1984-91, Chair 2003-Present
Faculty Advisor to the KU Chapter of the Chi Epsilon Honor Society, 1996-Present
Chair Search Committee, 2003

School of Engineering

School Ad Hoc Committee on Laboratories, 1974-75
Member of the School Ad Hoc Committee on Graduate Student Stipends. Conducted a survey of 88 engineering departments across the United States. Issued report: Darwin, D. and Moore, R. K., “Report of the Engineering School Ad Hoc Committee on Graduate

Student Stipends," University of Kansas, Jan. 1976, 32 pp., 1974-76
Library Committee, 1975-78, 1995-99, 2002-04, Chairman 1975-78
Promotions and Tenure Committee, 1978-80, 1984-87, 1989-91, Chairman 1985-87
Equipment and Facilities Utilization Committee, 1978-79
Scholarship Committee, 1979-80
Center for Research, Inc., Coordinating Committee, 1979-84
Faculty Rights, Privileges and Responsibilities Committee, 1980-83
Sabbatical Leave Committee, 1988, 1995, Chairman 2002
Center for Research, Inc., Special Research Committee, 1991
Research Megathemes Task Group, 1999
Sharp Teaching Professorship Selection Committee, Chairman 2004
Space Advisory Committee, 2004-2007

University

Founding member and secretary of KU Chapter of Phi Kappa Phi, National All-University Honor Society. Organized chapter installation and first two initiations, 1974-76, President, KU Chapter, 1976-78. Chair of Fellowship Committee, 1978-80, Scholarships and Awards Coordinator 2000-Present.
Co-Chairman of the Structural Engineering Conference, 1975-80, 1982-86
Parking and Traffic Board, 1977-79
Faculty Advisor, KU Crew Club, 1980-86
Military Science Faculty Review Committee, 1985-Present
Steering Committee, Council of Distinguished Professors, 1991-94, 1998-2001
Research Policies Committee, 1992-94
Center for Research, Inc., Board of Trustees 1993-97, Executive Committee, 1993-97
Higuchi Achievement Award Selection Committee, 1992-94
Selection Committee for Harper Chair in School of Business, 1994
Chancellor's Science Education Task Force, 1999-2000
Faculty Mentor, Swim team, 2005-Present