

RESUME

DAVID DARWIN, Ph.D., P.E., F.ACI, F.SEI, Dist.M.ASCE

Deane E. Ackers Distinguished Professor and Chair
Department of Civil, Environmental & Architectural Engineering
University of Kansas, Lawrence, KS 66045

Licensed Professional Engineer, State of Kansas

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), 1967-1972.

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, Chair of the Department of Civil, Environmental & Architectural Engineering, 2013-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, 2007-08; Vice President, 2005-07; Executive Committee, 2005-09; Board of Direction, 1988-91, 2005-2012; 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 130, Sustainability of Concrete, 2008-Present; Subcommittee 130-F, Social Issues, Chairman, 2009-Present; 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, 1988-91, 2003-06;

Blue Ribbon Membership Recruitment Committee, 1989-91; TAC Technology Transfer Committee, 1992-2010, Chairman, 1997-2003; Technology Transfer Advisory Group, 2010-Present; Financial Advisory Committee, 1995-98, 2001-07, 2008-Present; Strategic Plan Oversight/Overview Committee, 1997-2000; Board Task Group on Publications Issues, 1998; Journal Oversight Team, 1998-2001; Committee on Nominations, 1999, 2008-11, Chairman 2009; Committee on Personal Awards, 2008-Present, Chair 2013-Present; Committee on Awards for Papers, 2008-11, Chairman, 2009-11; Standards Board, 2009-Present; ASCE-ACI Task Group on Joint Committees, Chairman, 2004-07; Benchmarks Task Group on Sustainable Development, Strategic Development Council, 2007; Honorary Member Selection Committee, 2008-12, Chair 2011-12; Chapter Activities Awards Committee, Chair, 2008-09; Honors and Awards Committee, 2010-2014, Chair 2011-2012; Representative to Strategic Development Council, 2011-Present; 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, 1992-95, Committee on Technical Assistance, 2004-10

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, Vice Chairman, 2013-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, 2000-04, Treasurer, 2003-04; *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, 1993-2006, 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, 1993-2012; 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; Kansas Section, President, 2002-03, President Elect 2001-02, Board of Direction, 2001-04

American Society of Concrete Contractors

Concrete Reinforcing Steel Institute Standards Committee, 2011-Present.

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*, 1998-2009.

Kansas Industry University Government Engineering Education Consortium, 1997-2001

Nuclear Energy Standards Coordination Collaborative, 2010-Present; Concrete Task Group, 2010-11; Concrete Repair Task Group, 2011-Present

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

Prestressed Concrete Institute

Sigma Xi

Transportation Research Board Standing Committee on Corrosion (AHD45), 2013-Present

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

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, 2010, 2012

ACI Joe W. Kelly Award, 2005

Honorary Member of the Wire Reinforcement Institute, 2005

University of Kansas, Civil, Environmental & 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 Ready Mixed Concrete 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

Chapter Honor Member, University of Kansas Chapter of Chi Epsilon (Civil Engineering Honor Society), 2009

Distinguished Visiting Professor, American University in Cairo, Egypt, 2009

Recognized as one of the five most influential individuals in the concrete industry for 2009 in the January 2010 issue of *Concrete Construction*.

ACI Certification Award, 2010

2010 Thomas C. Kavanagh Memorial Lecturer, Penn State University

Recognized by the Ad Astra Kansas Initiative as one of 150 “scientists” in Kansas, both past and present, in celebration of Kansas’ Sesquicentennial, 2011

Fellow of the Structural Engineering Institute of ASCE – member of the inaugural class, 2012

University of Kansas Leading Light Award – recognizing recent recipients of externally funded awards of \$1 million or more (first year of award), 2012

Distinguished Member of the American Society of Civil Engineers, 2012

ACI Foundation – Concrete Research Council Arthur J. Boase Award, 2013

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.
- Nilson, A. H., Darwin, D., and Dolan, C. W., *Design of Concrete Structures*, 14th Ed., McGraw-Hill, New York, 2010, 795 pp. 14th Ed. in SI Units published 2011.

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.

- Attigobe, 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.
- Attigobe, E. K. and Darwin, D., "Submicrocracking in Cement Paste and Mortar," *ACI Materials Journal*, Vol. 84, No. 6, November-December 1987, pp. 491-500.
- Attigobe, 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.
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- "Status Report on Reinforcing Bar Corrosion Protection Systems," Structural Engineering Conference, University of Kansas, Lawrence, Kansas, March 4, 2003. Invited.
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- "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.
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“Reinforcing Bar Corrosion Research,” ASTM International, Subcommittee G01.14 on Corrosion of Rebar, Kansas City, Missouri, June 14, 2004. Invited.

“Multiple Corrosion Protection Systems 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. With Will Lindquist. 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.

“Construction of Low-Cracking High Performance Concrete (LC-HPC) Bridge Decks: Field Experience,” 2008 Concrete Bridge Conference, St. Louis, Missouri, May 4-7, 2008.

“Concrete and Infrastructure Research at KU: Toward Sustainable Bridges,” University of Kansas Engineering School Advisory Board, Lawrence, Kansas, May 9, 2008. Invited.

“Construction of Crack-Free Bridge Decks,” BASF Admixtures, Beachwood, Ohio, May 12, 2008. Invited.

“Leadership Workshop on Construction of Crack-Free Bridge Decks,” Kansas Department of Transportation, Topeka, Kansas, July 8, 2008. Invited.

“Construction of Low-Cracking High Performance Concrete (LC-HPC) Bridge Decks,” Mississippi Valley Conference of State Highway and Transportation Officials, Kansas City, Missouri, July 9, 2008. Invited.

“Reinforcing Steel Corrosion Protection Systems,” 58th Annual Concrete Conference, University of Minnesota, Minneapolis, December 4, 2008. Invited.

Workshop on Crack-Free Bridge Decks, New York State DOT, January 6, 2009. With JoAnn Browning. Invited.

“Corrosion Protection Strategies for Reinforced Concrete Structures,” Transportation Research Board, Washington, D.C., January 13, 2009. Invited.

“Corrosion Protection Systems for Reinforcing Steel,” Concrete Reinforcing Steel Institute 2009 Technical Meeting, Phoenix, AZ, March 4, 2009. Invited.

“Reinforcing Bar Research at the University of Kansas,” Concrete Reinforcing Steel Institute 2009 Technical Meeting, Keynote Presentation, Phoenix, AZ, March 4, 2009. Invited.

“Sustainable Development: The ongoing challenge,” Chi Epsilon Central District Conference, University of Kansas, Lawrence, Kansas, April 4, 2009, and ASCE Student Chapter, University of Kansas, Lawrence, Kansas, April 8, 2009. Invited.

“Control of Cracking and Corrosion in Concrete Structures” Housing and Building National Research Center, Cairo, Egypt, December 12, 2009. Invited.

“Sustainable Development: The Ongoing Challenge,” American University in Cairo, Egypt, December 14, 2009. Invited.

“Bond of Reinforcing Steel to Concrete,” Department of Construction and Architectural Engineering, American University in Cairo, Egypt, December 15, 2009. Invited.

“Control of Corrosion in Concrete Structures,” Department of Construction and Architectural Engineering, American University in Cairo, Egypt, December 17, 2009. Invited.

“Update on Pooled Fund Study on Construction of Crack-Free Bridge Decks,” MnDOT High Performance Concrete Seminar, Minnesota Department of Transportation, Oakdale, Minnesota, February 3, 2010. Invited.

“Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components: Laboratory and Field Tests,” 2010 National Concrete Bridge Conference, Phoenix, Arizona February 24-26, 2010.

“Effects of Construction Procedures and Material Properties on Low-Cracking High-Performance Concrete (LC-HPC) Bridge Decks,” 2010 National Concrete Bridge Conference, Phoenix, Arizona, February 24-26, 2010.

“Toward Crack-Free Bridge Decks,” Thomas C. Kavanagh Memorial Lecture, Penn State University, State College, Pennsylvania, April 1, 2010. Invited.

“Update on Pooled Fund Study of Crack-Free Bridge Deck Mixes & Project Applications,” High Performance Concrete Seminar, Western New York Chapter, Association of Bridge Construction & Design Engineers, Geneseo, New York, April 13, 2010. Invited.

“Multiple Corrosion Protection Systems for Reinforced Concrete Bridge Components,” Transportation Research Board, Washington, D.C., January 24, 2011. Invited.

“Some (Random?) Thoughts from a Research Professor,” ACI Foundation Research Workshop, Ontario-on-the Lake, Canada, March 9, 2011. Invited.

“Evaluation of Multiple Corrosion Protection Strategies used in Conjunction with Epoxy-Coated Reinforcement,” ACI Convention, Tampa, Florida, April 3, 2011. Invited.

“Controlling Cracks,” National Highway Institute-Highways for Life Webinar on Control of Cracking in Bridges and Pavements, September 15, 2011. Invited.

“Splice Tests of Beams with High-Strength Reinforcement,” ACI Convention, Cincinnati, Ohio, October 16, 2011. Invited.

“Implementing Lessons Learned From Twenty Years of Bridge-Deck Crack Surveys,” ACI Convention, Cincinnati, Ohio, October 17, 2011. Invited.

“Anchorage of High-Strength Reinforcing Bars with Standard Hooks” Concrete Reinforcing Steel Institute 2011 Fall Business and Technical Meeting, Chicago, Illinois, November 8, 2011. Invited.

“Building Code Requirements for Structural Concrete – ACI 318,” Vietnam Institute for Building Science and Technology (IBST) and American Concrete Institute (ACI), Hanoi and Saigon, Vietnam, December 12, 13, 15, 16, 2011. Invited.

“Empirical Life Expectancy Modeling of Corrosion Protection Systems,” Transportation Research Board, Washington, D.C., January 23, 2012. Invited.

“Bridge Deck Cracking – What We Know and What We Can Do About It,” ACI Convention, Dallas, Texas, March 18, 2012. Invited.

“Corrosion Performance of Reinforcement in Concrete,” Wire Reinforcement Institute Spring Meeting, Houston, Texas, April, 12, 2012. Invited.

“Low-Cracking High-Performance Concrete for Bridge Decks,” ACI Convention, Toronto,

Canada, October 24, 2012. Invited.

“Control of Cracking in Concrete,” 62nd Annual Concrete Conference, University of Minnesota, Minneapolis, December 6, 2012. Invited.

“Corrosion Protection Systems for Reinforcing Steel,” 62nd Annual Concrete Conference, University of Minnesota, Minneapolis, December 6, 2012. Invited.

“R & D with Test Results and State-of-the-Art of High-Strength Reinforcing Steel,” International Seminar on High-Strength Rebar for Nuclear Power Plants, Korea Concrete Institute and Central Research Institute of Korea Hydro & Nuclear Power (KHNP), Daejeon, Korea, December 12, 2012. Invited.

“Bond and Development Length of Steel Reinforcement,” Seoul National University, Seoul, Korea, December 13, 2012. Invited. .

“Reducing Volume Change-Induced Cracking of Concrete: Field Implementation and Evaluation of Crack-Reduction Technologies,” ACI Strategic Development Council Technology Forum #34, Indianapolis, Indiana, September 6, 2013. Invited.

“Stainless Steel Reinforcement as a Replacement for Epoxy-Coated Steel in Bridge Decks,” ODOT-OkTC Research Day, Oklahoma City, OK, September 12, 2013. Invited.

“Controlling Cracks,” American Society of Concrete Contractors Conference, Columbus, OH, September 13, 2013. Invited.

“High-Strength Reinforcement: Yield Strength Determination and Anchorage with Hooks and Headed Bars,” International Seminar on High-Strength Rebar for Nuclear Power Plants, Central Research Institute of Korea Hydro & Nuclear Power (KHNP), Daejeon, Korea, November 20, 2013. Invited.

“Control of Cracking in Concrete,” Professional Development Series, University of Kansas Department of Civil and Environmental Engineering, Kansas City, Missouri, March 3, 2014. Invited.

“Control of Cracking in Concrete,” 50th Annual Concrete Conference, South Dakota School of Mines and Technology, Rapid City, South Dakota, March 7, 2014. Invited.

“Corrosion Protection for Reinforcing Steel,” 50th Annual Concrete Conference, South Dakota School of Mines and Technology, Rapid City, South Dakota, March 7, 2014. Invited.

“High-Performance Concrete Bridge Decks and Cracking,” 6th Annual Concrete Spring Symposium, University of Utah, Salt Lake City, Utah, March 13, 2014. 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 2010, 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 2016, University of Kansas Transportation Research Institute, Kansas Department of Transportation, Colorado DOT, Idaho Trans. Dept., Indiana DOT, Michigan DOT, Minnesota DOT, Mississippi DOT, New Hampshire DOT, New York DOT, North Dakota DOT, Oklahoma DOT, Ohio DOT, Texas DOT, Wisconsin DOT, BASF Construction Chemicals, Silica Fume Association, \$1,575,000 (with J. Browning).

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

“Corrosion Performance of a Prototype Reinforcing Steel,” February 2009-February 2015, MMFX Technologies Corporation, \$88,000 (with J. Browning).

“Use of Innovative Concrete Mixes for Improved Constructability and Sustainability of Bridge Decks,” July 2010-October 2012, Kansas Department of Transportation, \$40,000 (with J. Browning).

“Stainless Steel Reinforcement as a Replacement for Epoxy Coated Steel in Bridge Decks,” October 2010-September 2013, Oklahoma Department of Transportation and University of Kansas Transportation Research Institute, \$259,045 (with J. Browning).

“Corrosion Performance of Prestressing Strands in Contact with Two Different Grouts,” April 2011-April 2012, Kansas Department of Transportation, \$27,500 (with J. Browning).

“Evaluation of Concrete Strength and Permeability,” May 2011-May 2014, Kansas Department of Transportation, \$198,000 (Co-investigator with J. Browning, PI).

“Anchorage of High-Strength Reinforcing Bars with Standard Hooks,” January 2012-December 2014, Electric Power Research Institute, Concrete Reinforcing Steel Institute Education and Research Foundation, University of Kansas Transportation Research Institute, Charles Pankow Foundation, Commercial Metals Company, Gerdau Corporation, Nucor Corporation, MMFX Technologies Corporation, \$360,000 (with J. Browning).

“Effect of Simulated Cracks on Lap Splice Strength of Reinforcing Bars,” March-July 2012, First Energy Nuclear Operating Corporation, \$136,000 (with A. Matamoros and J. Browning).

“Use of Headed Reinforcing Bars to Develop High-Strength Reinforcing Steel,” January 2013-December 2015, Electric Power Research Institute, Concrete Reinforcing Steel Institute Education and Research Foundation, ERICO International Corporation, Headed Reinforcement Corp., BarSplice Products, Inc., \$450,000 (with A. Matamoros and M. O’Reilly).

“Reducing Volume Change-Induced Cracking of Concrete: Field Implementation and Evaluation of Crack-Reduction Technologies,” January 2013-December 2017, ACI Foundation and University of Kansas Transportation Research Institute, \$775,000 (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, 2002-03, Spring semester 2004, Fall Semester 2004-06, 2008-12
CE 763	Design of Prestressed Concrete Structures (formerly Advanced Concrete Design)

CE 764	I), Fall semester 1981-86, Spring semester 1975-80, 2006, 2010, 2012 Advanced Design of Reinforced Concrete Structures (formerly Advanced Concrete Design II), Summer 1975, Fall semester 1975-79, Spring semester 1982-87, 1990, 1993, 1996, 1998, 2000, 2003, 2005, 2007, 2009, 2011, 2013
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, 2009-14
CE 895	Advanced Special Topics: Design Special Problems, Fall 2010-12, Spring 2011-13
CE 899	Thesis, regular basis
CE 991	Research, regular basis
CE 999	Ph.D. Thesis, regular basis

Chairperson on Examinations:

PhD:	Chairperson for 30 candidates. Twenty five have graduated, and five are currently enrolled.
MSCE:	Chairperson for 91 candidates. Eighty five 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
Laboratory Director, 2010-12
Structures Faculty Search Committee, Chair 2012-13
Advanced Materials Faculty Search Committee, 2013-Present

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, 2004-07
Miller Awards Selection Committee, 2009
NIST Building Advisory Committee, 2010
Strategic Planning Committee, Co-chair Sustainable Infrastructure and Buildings White Paper Committee, 2010-11
Research Facilities Design and Use Committee, Coordinator 2011-12
Phase II Building Committee, 2012-13
Chemical and Petroleum Engineering Chair Review Committee, 2014

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, 2009-13
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, 2005-08, Rowing team, 2011-13
Transportation Research Institute Internal Review Committee, 2010
University Core Curriculum Committee, 2012-13
Transportation Research Institute (TRI) Committee, 2014