

RESUME

DAVID DARWIN, Ph.D., P.E., F.SEI, F.AAAS, Hon.M.ACI, 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, 1982-2013, 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, 2008-13; Subcommittee 130-F, Social Issues, Chairman, 2009-13; Committee 222, Corrosion of Metals in Concrete, 2003-Present; Committee 224, Cracking, 1977-Present, Chairman, 1979-85; Committee 318, Structural Building Code, 2019-Present; Subcommittee 318-B, Reinforcement and Development, 2005-Present; Subcommittee 318-N, Sustainability, 2019-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, 2008-12; 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, 2008-14, Chair 2013-14; Committee on Awards for Papers, 2008-11, Chairman, 2009-11; Standards Board, 2009-14; 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, 1984-2016

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 on 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; Department Heads Council, 2014-Present; Committee on Accreditation, Corresponding member, 2020-Present; Infrastructure and Research Policy Committee, 2021; Kansas Section, President, 2002-03, President Elect 2001-02, Board of Direction, 2001-04

American Society of Concrete Contractors, 2013-Present

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 City Kansas Public Schools Diploma+ Steering Committee, 2016-2019

Kansas Industry University Government Engineering Education Consortium, 1997-2001

Nuclear Energy Standards Coordination Collaborative, 2010-2016; Concrete Task Group, 2010-11; Concrete Repair Task Group, 2011-13

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), 2013-2020; Standing Committee on Concrete Bridges (AFF30), 2017-2020, (AKB30) 2020-Present; Standing Committee on Concrete Materials and Placement Techniques (AFN40), 2018-2020; Standing Committee on Structures Maintenance (AKT40), 2020-Present; Subcommittee on Corrosion, (AKT40(4)), 2020-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, 2017

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 distinguished 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
Honorary Member of the American Concrete Institute, 2016
Fellow of the American Association for the Advancement of Science, 2016
ACI Foundation – Concrete Research Council Robert E. Philleo Award, 2019
Icon of Education, *Ingram's Magazine*, 2020

Publications:

Books, Chapters in Books, and Monographs:

- 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*, Design Guide No. 2, American Institute of Steel Construction, Chicago, 1990, 63 pp.
- Composite Construction in Steel and Concrete II*, D. Darwin and C. C. Buckner, Eds, Proc. of Composite Construction in Steel and Concrete II conference, Potosi, Missouri, June 14-19, 1992, ASCE, 1993, 945 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).
- High-Strength Concrete*, A. Azizinamini, D. Darwin and C. French, Eds, Proc. of First International Conference on High-Strength Concrete, Kona, Hawaii, July 13-18, 1997, ASCE, 1999, 945 pp.
- 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.

Darwin, D., Dolan, C. W., and Nilson, A. H., *Design of Concrete Structures*, 15th Ed., McGraw-Hill, New York, 2016, 776 pp.

Darwin, D. and Dolan, C. W., *Design of Concrete Structures*, 16th Ed., McGraw-Hill, New York, Published 2020, Copyright 2021, 866 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.
- Attigbe, 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.
- Attigbe, 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.
- Attigbe, E. K. and Darwin, D., "Submicrocracking in Cement Paste and Mortar," *ACI Materials Journal*, Vol. 84, No. 6, November-December 1987, pp. 491-500.
- Attigbe, 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.
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- Lafikes, J., Khajehdehi, R., Feng, M., O'Reilly, M., and Darwin, D., "Internal Curing and Supplementary Cementitious Materials in Bridge Decks," *SL Report* 18-2, University of Kansas Center for Research, Inc., Lawrence, KS, April 2018, 67 pp.
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- Khajehdehi, R. and Darwin, D., "Controlling Cracks in Bridge Decks," *SM Report* No. 129, University of Kansas Center for Research, Inc., Lawrence, KS, December 2018, updated September 2019, 218 pp.
- Lafikes, J., Darwin, D., O'Reilly, M., Feng, M., Bahadori, A., and Khajehdehi, R., "Construction of Low-Cracking High-Performance Bridge Decks Incorporating New Technology," *SM Report* No. 132, University of Kansas Center for Research, Inc., Lawrence, KS, June 2019, 98 pp.
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- Hano, M. M., Darwin, D., Misra, A., O'Reilly, M., "Headed Reinforcing Bars: CCT Node Tests, Design Provisions, and Evaluation of a Granular Micromechanics Model for use in Finite Element Analysis of Bond," *SM Report* No. 135, University of Kansas Center for Research, Inc., Lawrence, KS, December 2019, 282 pp.
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- Abdul Baki, A., Darwin, D., and O'Reilly, M., "Effects of Deicing Salts on the Durability of Concrete Incorporating Supplementary Cementitious Materials," *SM Report* No. 140, University of Kansas Center for Research, Inc., Lawrence, KS, May 2020, 201 pp.
- Lafikes, J., Darwin, D., and O'Reilly, M., "Durability, Construction, and Early Evaluation of Low-Cracking High-Performance Concrete (LC-HPC) Bridge Decks," *SM Report* No. 141, University of Kansas Center for Research, Inc., Lawrence, KS, June 2020, 403 pp.
- Lepage, A., Yasso, S., and Darwin, D., "Recommended Provisions and Commentary on Development Length for High-Strength Reinforcement in Tension," *SL Report* 20-2, University of Kansas Center for Research, Inc., August 2020, Lawrence, KS, 12 pp.
- Darwin, D., O'Reilly, M., Vosough Grayli, P., and Hartell, J. A., "Evaluating the Performance of Existing Reinforcement for Oklahoma Bridges," *Final Project Report – FHWA-OK-20-06*, Oklahoma Department of Transportation, November 2020, 194 pp., also *SM Report* No. 146, University of Kansas Center for Research, Inc., Lawrence, Kansas

Standardized Tests:

- Beam-end test, first appearing in ASTM A944-95, "Standard Test Method for Comparing Bond Strength of Steel Reinforcing Bars to Concrete Using Beam-End Specimens," ASTM International, West Conshohocken, Pennsylvania, 1995, 4 pp.
- Rapid macrocell test to qualify the corrosion resistance of stainless steel reinforcement, first appearing in ASTM A955/A955M-07, "Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement," ASTM International, West Conshohocken, Pennsylvania, 2007, 11 pp.

Oral Presentations since 2009:

- "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.

Workshop on Crack-Free Bridge Decks, Ohio DOT, Cleveland, Ohio, July 22, 2014. With Ben Pendergrass. Invited.

“Effects of Deicers on Concrete Deterioration,” web presentation to Connecticut Academy of Science and Engineering, Winter Highway Maintenance Study Committee, October 21, 2014. Invited.

“Principal Factors Controlling Cracks in Bridge Decks,” Transportation Research Board Workshop on Emerging and Implementation-Ready Technologies to Control Cracking of Concrete Transportation Infrastructure, Washington, D.C., January 11, 2015. Invited.

“Reducing Volume Change-Induced Cracking of Concrete: Field Implementation and Evaluation of Crack-Reduction Technologies,” ACI Strategic Development Council Technology Forum #37, St. Louis, MO, February 26, 2015. Invited.

“Anchorage of High-Strength Reinforcing Bars,” Nuclear Energy Standards Coordination Collaborative, Washington, D.C., May 12, 2015. Invited.

“KDOT Supplemental Cementitious Material Additions,” Kansas Chapter, Structural Engineering Institute of ASCE, Topeka, Kansas, June 9, 2015. Invited.

“Anchorage of High-Strength Reinforcement with Standard Hooks and Heads” University of Notre Dame, South Bend, Indiana, March 23, 2016. Invited.

“Bridge Deck Cracking,” National Concrete Consortium, Columbus, Ohio, April 27, 2016. Invited.

“Research Update: Reducing Volume Change-Induced Cracking of Concrete: Field Implementation and Evaluation of Crack-Reduction Technologies,” ACI Strategic Development Council Technology Forum #40, Salt Lake City, Utah, September 8, 2016. Invited.

“Design and Construction Techniques to Improve the Life of Bridge Decks by Minimizing Cracking,” ACI Saskatchewan Chapter Fall Seminar, Saskatoon, SK, Canada, October 14, 2016. Invited.

“Anchorage of High-Strength Reinforcement with Standard Hooks and Heads” 66th Annual Concrete Conference, University of Minnesota, Minneapolis, Minnesota, December 8, 2016. Invited.

“Control of Cracking in Concrete,” American Society of Concrete Contractors, Webinar, February 8, 2017. Invited.

“Anchorage of High-Strength Reinforcing Bars with Heads,” ACI Convention, Detroit, Michigan, March 27, 2017. Invited.

“Proposed Code Provisions for Anchoring Reinforcing Bars with Standard Hooks and Heads,” ACI Convention, Detroit, Michigan, March 27, 2017. Invited.

“Corrosion of Poorly Pickled Stainless Steel Bars and Damaged Epoxy-Coated Bars” RILEM TC 262-SCI, Anaheim, California, October 14, 2017. Invited.

“Controlling Bridge Deck Cracking,” Ward R. Malisch Concrete Construction Symposium, ACI Convention, Anaheim, California, October 17, 2017. Invited.

“Corrosion Protection Systems for Reinforcing Steel,” ACI Presidential Webinar Series, February 6, 2018. Invited.

“Reducing Volume Change-Induced Cracking of Concrete: Field Implementation and Evaluation of Crack-Reduction Technologies,” SDC-KU Early Crack Reduction Advisory Team, ACI Strategic Development Council Technology Forum #44, Denver, Colorado, September 5, 2018. Invited.

“Controlling Bridge Deck Cracking,” Minnesota Department of Transportation, Oakdale, Minnesota, August 26, 2019. Invited.

“New ACI Provisions for Anchorage of Reinforcement with Standard Hooks and Heads,” AASHTO Committee T-10, Oakdale, Minnesota, August 27, 2019. Invited.

“Research Update & Dissemination Efforts for Reduced Cracking,” ACI Strategic Development Council Technology Forum #46, Pittsburgh, Pennsylvania, August 29, 2019. Invited.

“New Development Length Requirements for Hooked and Headed Bars” International Workshop on Structural Concrete, ACI Convention and Exposition, Cincinnati, Ohio, October 19, 2019. Invited.

“New ACI Provisions on Hooked and Headed Reinforcing Bars,” 69th Annual Concrete Conference, Minneapolis, Minnesota, December 5, 2019. Invited.

“Evaluating the Performance of Existing Reinforcement for Oklahoma Bridges,” Midwest Bridge Preservation Partnership, Online, December 1, 2020. 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-PI 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-PI 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 2017, 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-January 2015, Kansas Department of Transportation, \$198,000 (Co-PI 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 2019, ACI Foundation and University of Kansas Transportation Research Institute, \$825,000 (with J. Browning).

“Headed Bars as Shear Reinforcement,” August 2014-August 2017, Electric Power Research Institute, \$400,000 (with A. Lepage, R. Lequesne, and M. O’Reilly).

“Assessment of Moisture-Tolerant Coatings for Decreasing Open Top Construction Time,” August 2015-December 2016, Electric Power Research Institute, \$188,000 (with M. Medina and M. O’Reilly).

“Construction of Low-Cracking High-Performance Bridge Decks Incorporating New Technology,” January 2016-June 2019, Kansas DOT, Minnesota DOT, \$270,000 (with M. O’Reilly).

“Development of Corrosion Threshold Test Method for ASTM A1035,” January 2017-April 2018, MMFX Technologies Corporation, \$62,141 (Co-PI with M. O’Reilly, PI).

“Investigating Mechanical Splicing of Reinforcing Steel” January-December 2017, Electric Power Research Institute, \$49,994 (Co-PI with M. O’Reilly, PI, and A. Lepage).

“Evaluating the Performance of Existing Reinforcement for Oklahoma Bridges,” October 2017-September 2020, Oklahoma Department of Transportation, \$372,347 (with M. O’Reilly) – includes \$115,040 subcontract to Oklahoma State University.

“Development of Precision and Bias Statement for ASTM A1061,” October 2017-September 2018, Precast/Prestressed Concrete Institute, \$105,288 (Co-PI with R. Lequesne, PI, and W. Collins).

“Development of Large High-Strength Headed Reinforcing Bars,” August 2018-August 2022, Charles Pankow Foundation, ACI Foundation, BarSplice Products, Headed Reinforcement Corporation, Pentair, and CRSI Education and Research Foundation, \$380,000 (with M. O’Reilly, A. Lepage, and R. Lequesne).

“Construction of Low-Cracking High-Performance Bridge Decks Incorporating New Technology,” January 2019-December 2021, Kansas DOT, Minnesota DOT, \$390,000 (with M. O’Reilly).

“Development Length and Splice Strength of High-Strength Reinforcing Bars in High-Strength Concrete,” January 2020-December 2022, CRSI Education and Research Foundation, Commercial Metals Company, Nucor Corporation, Steel Dynamics, Inc., and Cascade Steel Rolling Mills, University of Kansas Endowment Association, \$330,000 (with M. O’Reilly and A. Lepage).

“Splicing, Coupling, and Anchorage of Large High-Strength Steel Reinforcing Bars in Earthquake-Resistant Structures,” January 2020-December 2023, Electric Power Research Institute, \$650,000 (Co-PI with R. Lequesne, PI, and A. Lepage).

“Development of Hooked, Headed and Straight Bars in Compression,” May 2020-December 2022, Concrete Steel Reinforcing Institute, \$90,000 (with R. Lequesne, PI, and A. Lepage).

“Bond Strength of Textured Epoxy-Coated Bars,” December 2020-December 2022, Sherwin-Williams, \$300,000 (Co-PI with M. O’Reilly, PI).

“Bond Behavior of Epoxy Coated Reinforcing Bars in Non-proprietary UHPC,” October 2021-September 2023, Oklahoma Department of Transportation, \$251,820 (with R. Lequesne and M. O’Reilly).

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 1981-86, 1988-93, 1995-2000, 2002-03, Spring 2004, Fall 2004-06, 2008-12 |
| CE 763 | Design of Prestressed Concrete Structures (formerly Advanced Concrete Design I), Spring 1975-80, Fall 1981-86, Spring 2006, 2010, 2012 |
| CE 764 | Advanced Design of Reinforced Concrete Structures (formerly Advanced Concrete Design II), Summer 1975, Fall 1975-79, Spring 1982-87, 1990, 1993, 1996, 1998, 2000, 2003, 2005, 2007, 2009, 2011, 2013 |
| CE 795 | Scanning Electron Microscopy and X-Ray Microanalysis, Spring 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 1975-80, 1982-87, 1989-2001, 2003-07, 2009-22
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 41 candidates. Thirty-six have graduated, and five are currently enrolled.
MSCE: Chairperson for 100 candidates. Ninety-eight have graduated, and two 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 2003-2013
Faculty Advisor to the KU Chapter of the Chi Epsilon Honor Society, 1996-2013
Chair Search Committee, 2003
Laboratory Director, 2010-12
Structural Engineering Faculty Search Committee, Chair 2012-13
Advanced Materials Faculty Search Committee, 2013-14
Structural Engineering Faculty Search Committee, 2014-15

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, 2012-15
Chemical and Petroleum Engineering Chair Review Committee, 2014

University

Founding member and secretary of KU Chapter of Phi Kappa Phi, National All-Academic 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
Campus Climate Task Force, 2015-16
Chairs Working Group on Course Transformation, 2015-2017