

Curriculum Vitae of

LAWRENCE C. BANK

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EDUCATION

1985	PhD	COLUMBIA UNIVERSITY, New York, NY Graduate School of Arts and Sciences Department of Civil Engineering and Engineering Mechanics <u>Thesis:</u> The Elasto-Plastic Behavior of Composite Laminates <u>Advisor:</u> Dr. Maciej P. Bieniek
1984	MPhil	COLUMBIA UNIVERSITY Graduate School of Arts and Sciences Department of Civil Engineering and Engineering Mechanics
1982	MS	COLUMBIA UNIVERSITY School of Engineering and Applied Science Department of Civil Engineering and Engineering Mechanics
1980	BSc Cum Laude	TECHNION, Haifa, Israel Department of Civil Engineering
1976		UNIVERSITY OF CAPE TOWN, Cape Town, South Africa School of Architecture and Planning
1975		UNIVERSITY OF CAPE TOWN Department of Civil Engineering

PROFESSIONAL REGISTRATION

Registered Professional Engineer (PE) in the State of Wisconsin. License Number E-32781.
Registered Professional Engineer (PE) in the District of Columbia. License Number PE-9465.

EMPLOYMENT

Feb 2008 - present Program Director - NATIONAL SCIENCE FOUNDATION, Arlington, VA.
Structural Materials and Mechanics.

- Sept 1997 - present Professor - UNIVERSITY OF WISCONSIN-MADISON, Madison, WI.
Department of Civil and Environmental Engineering.
Research in composite materials and innovative systems for civil engineering infrastructure. Teaching in construction materials, structural engineering and construction management.
- Sept 2003 – June 2004 UPS Foundation Visiting Professor – STANFORD UNIVERSITY, Palo Alto, CA. Department of Civil and Environmental Engineering.
- Sept 1995 - Aug 1997 Professor - THE CATHOLIC UNIVERSITY OF AMERICA, Washington, DC.
Department of Civil Engineering.
- Sept 1994 - Aug 1995 Visiting Associate Professor - TECHNION, Israel Institute of Technology, Haifa, Israel. Department of Civil Engineering. Visiting Researcher - National Building Research Institute of Israel (NBRI).
- Sept 1990 - Aug 1995 Associate Professor - THE CATHOLIC UNIVERSITY OF AMERICA,
Department of Civil Engineering.
- Sept 1988 - Aug 1990 Assistant Professor - THE CATHOLIC UNIVERSITY OF AMERICA,
Department of Civil Engineering.
- June 1987 - Aug 1987 Summer Faculty Research Associate - US ARMY MATERIALS
TECHNOLOGY LABORATORY, Watertown, MA. Structures and Mechanics
Division.
- Sept 1985 - Aug 1988 Assistant Professor - RENSSELAER POLYTECHNIC INSTITUTE, Troy, NY.
Department of Civil Engineering.
- Sept 1981 - May 1985 Teaching and Research Assistant - COLUMBIA UNIVERSITY, Department of
Civil Engineering and Engineering Mechanics.
- Oct 1980 - Aug 1981 Structural Engineer - SKILLING, HELLE, CHRISTIANSEN, ROBERTSON,
PC, New York, NY. Full-time structural engineer. Design of structural steel and
reinforced concrete for buildings.
- Feb 1980 - July 1980 Construction Engineer - NITZAN-INBAR, LTD, Tel-Aviv, ISRAEL. Full-time
construction engineer. On-site construction management.

HONORS AND AWARDS

- 2009 Best Overall Technical Paper, Best Infrastructure Track Technical Paper
“Durable Fiber Reinforced Polymer Bar Splice Connections for Precast Concrete
Structures,” by A.J. Tibbetts, M.G. Oliva and L.C. Bank. Awarded by American
Composites Manufacturers Association, at the COMPOSITES & POLYCON 2009
Convention and Trade Show, January 15-17, 2009, Tampa, FL.

- 2007 Best Applied Research Paper
 “Double Layer Prefabricated FRP Grids for Rapid Bridge Deck Construction: Case Study,” by L.C. Bank, M.G. Oliva, J.S. Russell, D.A. Jacobson, M. Conachen, B. Nelson and D. McMonigal, ASCE Journal of Composites for Construction, Vol. 10, No. 3, pp. 204-212, 2006. Awarded by the American Society of Civil Engineers.
- 2007 Harvey Spangler Award for Technology Enhanced Instruction
 Recognizing Innovative Teaching and Learning Practices Using Technology
 Awarded by the College of Engineering, University of Wisconsin-Madison.
- 2006 Engineering and Physical Sciences Research Council (EPSRC)
 Appointed to a five year term on the Research Council which is the UK’s main agency for funding research in engineering and the physical sciences.
- 2006 Best Infrastructure and Construction Technical Paper
 “Pultruded FRP Plank as Formwork and Reinforcement for Concrete Structures,” by L. Bank, M. Oliva, H-U. Bae, J. Barker and S-W. Yoo. Awarded by American Composites Manufacturers Association, at the COMPOSITES 2006 Convention and Trade Show, October 18-20, 2006, St. Louis, MO.
- 2006 Outstanding Instructor Award
 Awarded by the Polygon Engineering Students Organization of the College of Engineering at the University of Wisconsin-Madison for the most outstanding instructor in the Department of Civil and Environmental Engineering for 2005-2006.
- 2006 Charles Pankow Award for Innovation
 “GRIDFORM – Prefabricated Modular FRP Stay-in-Place Reinforcement for Accelerated Construction of Bridge Decks.” FRP system developed by Bank and colleagues at the Universities of Wisconsin-Madison and Missouri-Rolla selected as one of two finalists by the Civil Engineering Research Foundation, American Society of Civil Engineers.
- 2006 NOVA Construction Innovation Award Finalist
 GRIDFORM – Prefabricated FRP panel for rapid bridge deck construction
 Selected as one of eight finalist for the 2006 Construction Innovation Awards.
<http://www.cif.org/nom2006/nom2006.htm>
- 2006 Vilas Associate Award
 Awarded by the Graduate School of the University of Wisconsin-Madison.
- 2005 Popular Science “Best of What’s New 2005” Selection
 Fiber Reinforced Polymer Bridge system developed by Bank and colleagues selected as one of the five top engineering innovations of 2005 by Popular Science Magazine.
<http://www.popsci.com/popsci/bown2005/engineering/index.html>
- 2005 Best Paper Award
 “Mechanically Fastened FRP Strengthening of Large Scale RC Bridge T Beams,” by A.J., Lamanna, L.C., Bank and D.T. Borowicz, Journal Advances in Structural Engineering, Vol. 7, No. 6, pp. 525-538, 2004.

- 2005 Best Basic Research Paper
 “Flexural Strengthening of RC Beams by Mechanically Attaching FRP Strips,” by A.J. Lamanna, L.C. Bank and D.W. Scott, ASCE Journal of Composites for Construction, Vol. 8, No. 3, pp. 203-210, 2004. Awarded by the American Society of Civil Engineers.
- 2005 Grand Award Winner
 “FRP Cage Reinforced Deck.” Awarded by the American Council of Engineering Companies (ACEC) Wisconsin Section to Alfred Benesch & Co for implementing an FRP grid systems developed by Bank and colleagues at the University of Wisconsin.
- 2004 Fellow
 Elected by the International Institute of FRP in Construction, Hong Kong, China.
- 2004 Best Pultrusion Technical Paper
 “Pultruded Glass Fiber Reinforced Plastic and Paperboard Composite Tubes,” by E.M. Fink and L.C. Bank. Awarded by the American Composites Manufactures Association at the COMPOSITES 2004 Convention and Trade Show, October 6-8, 2004, Tampa, FL.
- 2004 Charles Pankow Award for Innovation
 “HYDECK – A Durable and Efficient Hybrid Bridge Deck System.” FRP system developed by Bank and colleagues selected as one of four finalists by the Civil Engineering Research Foundation, American Society of Civil Engineers.
- 2003 UPS Foundation Visiting Professor
 Awarded by the Department of Civil and Environmental Engineering, Stanford University, California.
- 2003 Most Outstanding Professor
 Awarded by ASCE Student Chapter of the Department of Civil and Environmental Engineering, University of Wisconsin-Madison.
- 2003 Best Paper Award - Honorable Mention Applied Research Paper
 “Fiber-Reinforced Polymer Composites for Construction—State-of-the-Art Review” by C.E. Bakis, L.C. Bank, V.L. Brown, E. Cosenza, J.F. Davalos, J.J. Lesko, A. Machida, S.H. Rizkalla, and T.C. Triantafillou, Journal of Composites for Construction, Vol. 6, No. 2, pp. 73-87, 2002. Awarded by the American Society of Civil Engineers.
- 2002 Thomas Fitch Rowland Prize
 “Construction of a Pultruded Composite Structure: A Case Study,” by L.C. Bank, T.R. Gentry, K.H. Nuss, S.S. Hurd, A. Lamanna, S. Duich, and B. Oh, Journal of Composites for Construction, Vol. 4., No. 3, pp. 112-119, 2000. Awarded by the American Society of Civil Engineers.
- 2001 Richard R. Torrens Award
 Awarded by the American Society of Civil Engineers.
- 2001 Fellow
 Elected by the American Society of Civil Engineers.
- 1999 Walter L. Huber Civil Engineering Research Prize
 Awarded by the American Society of Civil Engineers.

- 1999 Best Paper Award - Honorable Mention Basic Research Paper
 “Effect of High Temperature on the Bond Strength of FRP Rebars” by A. Katz, N. Berman and L.C. Bank, Journal of Composites for Construction, Vol. 3, No. 2, pp. 73-81, 1999. Awarded by the American Society of Civil Engineers.
- 1994 Lady Davis Foundation Visiting Professorship Award
 Awarded by the Lady Davis Foundation Trust to spend the 1994-1995 academic year as a visiting faculty member in the Department of Civil Engineering, The Technion, Haifa, Israel.
- 1994 Best Design Paper, and Best Overall Paper
 “Local Buckling of Pultruded FRP Beams - Analysis and Design” by L.C. Bank, T.R. Gentry, and M. Nadipelli. Awarded by the Composites Institute of the Society for the Plastics Industry at the 49th Annual Conference.
- 1992 Best Design Paper, Best Commercial Innovation Paper, and Best Overall Paper
 “Design and Performance of Connections for Pultruded Frame Structures” by L.C. Bank, A.S. Mosallam and G.T. McCoy. Awarded by the Composites Institute of the Society for the Plastics Industry at the 47th Annual Conference.
- 1987 Visiting Faculty Research Associate Award
 Awarded by the US Army Summer Faculty Research and Engineering Program.
- 1983-1985 Graduate Fellowship - Ford Motor Company
 Awarded by the Department of Civil Engineering and Engineering Mechanics, Columbia University.
- 1982-1983 Quincy Ward Boese Fellowship
 Awarded by the School of Engineering and Applied Science, Columbia University.
- 1982 Citation of Merit
 Awarded by the Department of Civil Engineering and Engineering Mechanics, Columbia University.
- 1977-1979 Dean’s List
 Awarded by the Department of Civil Engineering, The Technion, Israel Institute of Technology.

MILITARY SERVICE

Jan 1974 - Jan 1975 South African Defense Forces (SADF).

PATENTS AND INVENTION DISCLOSURES

1. “Composite Material Highway Guardrail Having High Impact Energy Dissipation Characteristics,” Lawrence C. Bank and T. Russell Gentry, United States Patent No. 6,149,134. Issued November 21, 2000.
2. “Structural Reinforcement using Composite Strips,” Lawrence C. Bank and Anthony J. Lamanna, United States Patent No. US 6,811,861. Issued November 2, 2004.

3. “Reinforced Paperboard Tube,” Lawrence C. Bank, United States Patent Application Publication No. US 2004/0052986 A1, March 18, 2004. Filed September 17, 2002.
4. “Prefabricated FRP Formwork for Rapid Bridge Construction,” Lawrence C. Bank, Thomas Ringelstetter, Antonio Nanni, Fabio Matta, disclosed to the Wisconsin Alumni Research Foundation (WARF), June 15, 2005.
5. “Concrete Formwork from Paperboard Tube Segments,” Lawrence C. Bank and Andrew J. Spottiswoode, disclosed to the Wisconsin Alumni Research Foundation (WARF), July 6, 2007.
6. “Method and System for Assessing Response of a Building System to an Extreme Event”, Benjamin P. Thompson and Lawrence C. Bank, disclosed to the Wisconsin Alumni Research Foundation (WARF), February 2008. Patent filed with USTPO.
7. “Splice System for Fiber-Reinforced Polymer Rebars.” Michael G. Oliva and Lawrence C. Bank, disclosed to the Wisconsin Alumni Research Foundation (WARF), July 2008. Patent filed with USTPO.

PROFESSIONAL ACTIVITIES

I Editorial

1. Member, International Editorial Board, and Founder and former Editor-in-Chief (1997-2003), Journal of Composites for Construction, American Society of Civil Engineers (ASCE), 1997 - present.
2. Member, International Editorial Board, Advances in Structural Engineering - An International Journal, Multi-Science, 2002 - 2007.
3. Member, Editorial Board, Journal of Construction and Building Materials, Elsevier, 2007 - present.

II Technical Society Committee Memberships

1. International Institute for FRP in Construction (IIFC), Senior Vice-President and President-Elect (2008 – present), Vice-President (2003-2008) .
2. Plastics, Section D20, American Society for Testing and Materials.
3. Composite Materials, Section D30, American Society for Testing and Materials.
4. FRP Reinforcement Committee, Committee 440, American Concrete Institute.
5. Ladders - Portable Reinforced Plastic - Safety Requirements, American National Standards Institute (ANSI), Committee A14.5.
6. Structural Fiber Reinforced Plastics Committee, Committee A2C07, Transportation Research Board.

7. ASCE/SEI Blast Protection of Buildings Standards Committee, Structural Engineering Institute, American Society of Civil Engineers.
8. ASCE/SEI Fiber Composites and Polymers Standards Committee, Structural Engineering Institute, American Society of Civil Engineers.
9. ASCE/SEI FRP Composite Grating Standards Committee, Structural Engineering Institute, American Society of Civil Engineers.
10. Materials Engineering Division, American Society of Civil Engineers, Former Division Chair (1998 - 1999).

III Technical Society Memberships

1. American Society of Civil Engineers (ASCE), Fellow
2. International Institute for FRP for Construction (IIFC), Fellow/Vice-President
3. American Concrete Institute (ACI), Member
4. American Society for Testing and Materials (ASTM), Member
5. American Society of Mechanical Engineers (ASME), Member
6. American Society of Engineering Education (ASEE), Member

IV Professional Development Courses Taught

1. “Bolted Connections for Pultruded Frame Structures,” presented in the short-course “Design and Retrofit of Structures with Fiber Composites” held at the First International Conference on Composites in Infrastructure, Tucson, AZ, January 13-14, 1996.
2. “Structural Shapes,” presented in the short-course “Design and Retrofit of Structures with Fiber Composites” held at the 2nd International Conference on Composites in Infrastructure, Tucson, AZ, January 5-7, 1998.
3. “A Design Basis and Construction Documents for Structures Using Pultruded Composite Materials - Procedures, Codes, and Standards,” presented at the University of Wisconsin Short Course “Composite Materials – Using New Materials and Methods to Design and Construct, and Strengthen our Civil Engineering Infrastructure,” Madison, WI, Jan 25-26, 1999.
4. “Mechanics of Composite Materials for FRP Repair and Strengthening,” presented at the University of Wisconsin Short Course “Strengthening Bridges with Composites,” Montana Department of Transportation, Helena, Montana, May 24-25, 1999.

ACADEMIC ACTIVITIES

I Graduate Student Thesis Supervision

1. Paul J. Bednarczyk, "Shear Deflection in Thin-Walled Fiber-Reinforced Composite Beams," MS, 1987.
2. Christine H. Kao, "Vibrations of Thin-Walled Composite Beams," MS, 1988.
3. Thomas P. Melehan, "Shear Deflection in Thin-Walled Multicelled Orthotropic Composite Beams," MS, 1988.
4. Ayman S. Mosallam, "Short and Long-term Behavior of a Pultruded Fiber Reinforced Plastic Frame," PhD, 1990.
5. Steven J. Smith, "An Investigation of Coupled Deformation in Thin-Walled Open-Section Composite Beams," MS, 1991.
6. Zuhan Xi, "A Study of Full-Size Pultruded FRP Grating Reinforced Concrete Bridge Decks," MS, 1992.
7. Alrik L. Svenson, "Impact Characteristics of Glass Fiber Reinforced Composite Materials for use in Roadside Safety Barriers," MS, 1993.
8. Emmanuel Cofie, "Analysis of Thin-Walled Isotropic and Anisotropic Composite Structures by the Direct Stiffness Method," PhD, 1993.
9. Gregory V. Clarke, "Analysis of Thin-Walled Composite Beams using Degenerate Finite Elements," PhD, 1994.
10. Murali Nadipelli, "Experimental Investigation of the Local Buckling and Failure of Pultruded Fiber Reinforced Plastic Beams," MS, 1994.
11. Martin W. Hargrave, "Impact Behavior of Thin Laminated Anisotropic Beams," M. Eng., 1997.
12. Jianshen Yin, "Modeling and Numerical Simulation of the Progressive Failure of Pultruded Fiber Reinforced Plastic Structures," PhD, 1997.
13. Feng Wang, "Diffusion in Glass/Vinylester Pultruded Composite Rods," MS, 1998.
14. David J. Merkes, "Investigation of a Connection System for a Pultruded GFRP Highway Guardrail System," MS, 1999.
15. Jason R. Smith, "Parametric Study of the Behavior of Composite Box Beams Subjected to Impact Using LS-DYNA," MS, 2000. Engineering Mechanics Program.
16. Stephanie I. Gagne, "Fiber Reinforced Plastic Joists for the Construction Industry - A Feasibility Study," MS, 2000.
17. Federico A. Tavarez, "Simulation of the Behavior of Composite Grid Reinforced Concrete Beams using Explicit Finite Element Methods," MS, 2001.

18. Anthony J. Lamanna, "Flexural Strengthening of Reinforced Concrete Beams with Mechanically Fastened Fiber Reinforced Polymer Strips," PhD, 2002.
19. Melda Ozel, "Behavior of Concrete Beams Reinforced with 3-D Fiber Reinforced Plastic Grids," PhD, 2002.
20. David T. Borowicz, "Rapid Strengthening of Concrete Beams with Powder Actuated Fasteners and Fiber Reinforced Polymer (FRP) Composite Materials," MS, 2002.
21. Joshua S. Dietsche, "Characterization of FRP Materials for a Fiber Reinforced Composite Bridge Deck," MS, 2002.
22. David A. Dieter, "Experimental and Analytical Study of Concrete Bridge Decks Constructed with FRP Stay-in-Place Forms and FRP Grid Reinforcing," MS, 2002. (Co-advisor).
23. Saiphon Charoenphan, "Computer Methods for Modeling the Progressive Damage of Composite Material Plates and Tubes," PhD, 2002. (Co-advisor). Engineering Mechanics Program.
24. Eric M. Fink, "Investigation of the Properties of Hybrid Paperboard and Fiber Reinforced Polymer Tubes," MS, 2003.
25. Andrew L. Kuether, "Longitudinal Tensile and Transverse Crushing Behavior of a Prototype Multi-cellular FRP Composite Materials Highway Guardrail System," MS, 2003.
26. Dushyant Arora, "Rapid Strengthening of Reinforced Concrete Bridge with Mechanically Fastened – Fiber Reinforced Polymer Strips," MS, 2003.
27. Oncu Gonenc, "Durability and Service Life Prediction of Concrete Reinforcing Materials," MS, 2003.
28. K. Owen Mertens, "Experimental Studies of the Progressive Tearing Failure of Pultruded FRP Tubes in Flexure," MS, 2003.
29. Federico A. Tavarez, "Simulation of Impact and Blast in Concrete with Discrete Element Methods," PhD, 2005 (Co-advisor). Engineering Mechanics Program.
30. Adam C. Berg, "Analysis of a Bridge Deck Built On U.S. Highway 151 with FRP Stay-In-Place Forms, FRP Grids, and FRP Rebars," MS, 2004.
31. David A. Jacobson, "Experimental and Analytical Study of Fiber Reinforced Polymer (FRP) Grid Reinforced Concrete Bridge Decking," MS, 2004.
32. Mack J. Conachen, "Modular 3-D FRP Reinforcing System for a Bridge Deck in Fond du Lac, Wisconsin," MS, 2005.
33. Scott M. Markowski, "Experimental and Analytical Study of Full Depth Precast / Prestressed Concrete Deck Panels For Highway Bridges, MS, 2005. (Co-advisor).
34. Thomas E. Ringelstetter, "Investigation of Modular FRP Grid Reinforcing Systems with Integral Stay-in-place Form for Concrete Structures," MS, 2006.

35. Forrest G. Ehmke, "Analysis of a Bridge Deck Built on Interstate Highway 39/90 with Full-Depth, Precast, Prestressed Concrete Deck Panels," MS, 2006. (Co-advisor).
36. Huldah J. Gronvall, "Exploring Techniques of Measuring Moisture-Content in Paperboard Tubes," MS, 2006.
37. Steven J. Preston, "Portals to an Architecture," MS, 2006.
38. Joseph P. Hanus, "Investigation of a Deployable Military Bridge System with a Fiber Reinforced Concrete Deck," PhD, 2007.
39. Ajaya P. Malla, "Development of a Specification for Thin Stay-in-Place Forms for Bridge Deck Construction," MS, 2007.
40. Andrew J. Spottiswoode, "An Investigation into the use of Paperboard Tube Segments for Bridge Deck Formwork," MS, 2007.
41. Linda M. Vanevenhoven, "LRFD factors for Pultruded Structural Members," MS, 2007.
42. Alyssa E. Schorer, "Feasibility of Rehabilitating Timber Bridges with Mechanically Fastened Fiber Reinforced Polymer (MF-FRP) Strips," MS, 2008.
43. David T. Borowicz, "Pultruded Beams Subjected to Local Concentrated Loads," PhD in progress.
44. Andrew J. Tibbetts, "Durable Fiber Reinforced Polymer Connections for Precast Concrete Structures," MS, 2008 (co-advisor).
45. Benjamin P. Thompson, "Investigation of System Dynamics Applied to Building Simulation for Anti-Terrorism Resource Allocation," PhD, 2008.
46. Michael J. McCarthy, "Calibration of Professional Factors for a LRFD Standard for Pultruded Beams," MS in Progress.
47. Ricardo G. D'Alessandro, "Statistical Study of Properties of Pultruded Materials," MS in Progress.
48. Jeffrey J. Brunton, "Design of Grid-Reinforced Concrete Slabs," MS in Progress.

II Undergraduate Independent Study Reports

1. Andrew M. Schwarz, "Straw Bale Construction: A Sustainable Building Technique," Spring 1999.
2. Joseph Moser, "Reducing Stress Concentrations in Composite Plates using Pre-formed Holes," Spring 2000. Hilldale Undergraduate Research Fellow.
3. Nicholas R. Mason, "The Strength and Stiffness of Fiber Reinforced Plastic and Concrete Fastener Connections," Fall 2000.
4. Beau M. Sanders, "Structural and Physical Tests of CDS-FRP Reinforced Deck Form and Concrete," Fall 2001.

5. Eric J. Helmueller, "The Effect of Freeze Thaw and Aggregate Coating on the Bond Between FRP Stay-in-Place Deck Forms and Concrete," Spring 2002. Hilldale Undergraduate Research Fellow.
6. Peter W. Gulbrandsen, "Tensile and Bearing Tests on Composite Material Strengthening Strips," Fall 2002. Hilldale Undergraduate Research Fellow.
7. Linda M. Vanevenhoven, "Closed-form Equations for Predicting Failure Loads of Pultruded Profiles," Spring 2006.
8. Bryan V. Bindrich, "Hybrid Pultruded Plank with a Concrete Compression Flange for Pedestrian Bridges," Spring 2007. Hilldale Undergraduate Research Fellow.
9. Robert C. Hillsabeck, "Investigation of Strength and Stiffness Properties of the Safplank System," Fall 2007.

III Post-Doctoral/Research Engineer Supervision

1. Dr. Ayman S. Mosallam, 1990-1991.
2. Dr. David W. Palmer, 1995-1996.
3. Ms. Stephanie H. Hurd, 1996-1997.
4. Dr. Steven J. Smith, 1997-1998.
5. Mr. Benjamin P. Thompson, 2000-2002.
6. Dr. Anthony J. Lamanna, 2002.
7. Mr. David A. Dieter, 2002.
8. Mr. David Borowicz, 2003.
9. Mr. Bryan Bindrich, 2007.

IV Undergraduate Courses Offered

1. Engineering Mechanics I (Statics)
2. Mechanics II (Continuum Mechanics)
3. Mechanics of Solids
4. Statics and Strength of Materials
5. Mechanics of Materials
6. Structures I (Statics for Architects)
7. Structures II (Mechanics of Materials for Architects)
8. Structures III (Wood and Steel Design for Architects)
9. Structural Analysis I
10. Structural Analysis II (Matrix Structural Analysis)
11. Building Information Modeling (BIM)
12. Construction Field Observation

V Graduate Courses Offered

1. Advanced Mechanics of Solids
2. Mechanics of Composite Materials
3. Introduction to Continuum Mechanics
4. Composite Material Structures
5. Composite Structures
6. Matrix Structural Analysis
7. Structural Engineering Seminar
8. FRP Composites in Structural Engineering (also offered “live over the Internet”)
9. Architecture/Engineering/Construction Global Teamwork Project

VI University Service

1. Member, University Laboratory Safety Committee, CUA, 1989-1994.
2. Member, Academic Senate Library Committee, CUA, 1989-1997.
3. Member, Committee for Appointments and Promotions, Engineering School, CUA, 1994-1997.
4. Member, Dean Search Committee, Engineering School, CUA, 1996.
5. Chair, Faculty Search Committee, Department of Civil Engineering, CUA, 1991, 1994, 1996.
6. Graduate Admissions Coordinator, Structures Program, UW-Madison, 1998-2003.
7. Senator, Academic Senate, UW-Madison, 1999-2002.
8. Chair, Ad-Hoc Space Committee, CEE Department, UW-Madison, 2000.
9. Member, Equity and Diversity Committee, College of Engineering, UW-Madison, 2001-2004.
10. Member, Development Committee, CEE Department, UW-Madison, 2001-present.
11. Associate Chair, CEE Department, Constructed Facilities Division, UW-Madison, 2002-2003.
12. Member, Election Committee, CEE Department, UW-Madison, 2002-2003.
13. Advisory Board Member, Center for Human Performance and Risk Analysis, University of Wisconsin-Madison, 2003-present.
14. Member, College of Engineering Ad-Hoc Space Committee, College of Engineering, University of Wisconsin-Madison, 2005-2006.
15. Member, University General Education Committee, University of Wisconsin-Madison, Sept 2005-2008.
16. Member, Graduate School Physical Sciences Research Committee, University of Wisconsin-Madison, Sept 2006-2008.
17. Member, Salary Committee, CEE Department, UW-Madison, 2006-7.
18. Graduate Admissions Coordinator, Structures Program, UW-Madison, 2006 – 2007.
19. Associate Chair for Graduate Studies, Department of Civil and Environmental Engineering, UW-Madison, 2007-2008.

TECHNICAL PUBLICATIONS

I Books

1. G.J. Voyiadjis, L.C. Bank, L.J. Jacobs (eds.), (1994), Mechanics of Materials and Structures - Studies in Applied Mechanics 35, Elsevier Science Publishers B.V., Amsterdam, The Netherlands, ISBN: 0-444-89918-9. Proceedings of the Symposium on the Mechanics of Materials and Structures in honor of Professor Maciej P. Bieniek held at “MEET'N'93” the ASCE-ASME-SES Joint Mechanics Meeting, University of Virginia, Charlottesville, Virginia, June 1993.

2. L.C. Bank and M. Ben-Bassat (eds.), (1995), Composite Materials for Civil Engineering Construction, National Building Research Institute, Haifa, ISRAEL. Proceedings of the First Israeli Workshop on Composite Materials for Civil Engineering Construction, Haifa, ISRAEL, 28-29 May 1995.
3. L.C. Bank (ed.), (1999), Materials and Construction: Exploring the Connection, Proceedings of the 5th ASCE Materials Engineering Congress, Cincinnati, OH, 10-12 May 1999.
4. L.C. Bank (ed.), (2001), Proceedings of the Workshop on Building-Vulnerability Science, University of Wisconsin-Madison, January 18-19, 2001, CD-ROM.
5. L.C. Bank, (2006), Composites for Construction: Structural Design with FRP Materials, John Wiley & Sons, ISBN: 0-471-68126-1, 551 pages.
<http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471681261.html>

II Chapters in Books

1. L.C. Bank, (1993), "Properties of FRP Reinforcements for Concrete," in Fiber-Reinforced Plastic (FRP) for Concrete Structures: Properties and Applications, (ed. A. Nanni), Elsevier Science Publishers, NY, pp. 59-86.
2. L.C. Bank, (2004), "Fiber Reinforced Polymer Composites," Handbook of Structural Engineering, 2nd Edition, (eds. W.F. Chen and E. Liu), Chapter 16, 2004, CRC Press, FL.
3. L.C. Bank, (2008), "Design of Fiber-Reinforced Polymer (FRP) Reinforced and Strengthened Concrete Members," Concrete Construction Engineering Handbook, Second Edition, (ed. E. Nawy), Chapter 25, CRC Press, FL.

III Refereed Technical Papers in Journals

1. L.C. Bank, (1987), "Shear Coefficients for Thin-Walled Composite Beams," Composite Structures, Vol. 8, pp. 47-61.
2. L.C. Bank and P.J. Bednarczyk, (1988), "A Beam Theory for Thin-Walled Composite Beams," Composites Science and Technology, Vol. 32, pp. 265-277.
4. L.C. Bank and M.P. Bieniek, (1988), "Stress Resultant Plasticity Theories for Composite Laminated Plates," International Journal of Plasticity, Vol. 4, pp. 317-333.
5. L.C. Bank, (1989), "Flexural and Shear Moduli of Full-Section Fiber Reinforced Plastic (FRP) Pultruded Beams," ASTM Journal of Testing and Evaluation, Vol. 17, No. 1, pp. 40-45.
5. L.C. Bank and T.P. Melehan, (1989), "Shear Coefficients for Multicelled Thin-Walled Composite Beams," Composite Structures, Vol. 11, pp. 259-276.
6. L.C. Bank and C.H. Kao, (1989), "The Influence of Geometric and Material Design Variables on the Free Vibration of Thin-Walled Composite Material Beams," ASME Journal of Vibration, Acoustics, Stress and Reliability in Design, Vol. 111, pp. 290-297.
7. L.C. Bank, T.D. Gerhardt and J.H. Gordis, (1989), "Dynamic Mechanical Properties of Spirally Wound Paper Tubes," ASME Journal of Vibration, Acoustics, Stress and Reliability in Design, Vol. 111, pp. 489-490 (technical note).

8. G.J. Dvorak, Y.A. Bahei-El-Din and L.C. Bank, (1989), "Fracture of Fibrous Metal Matrix Composites - I. Experimental Results," Engineering Fracture Mechanics, Vol. 34, No. 1, pp. 87-104.
9. L.C. Bank, (1989), "Properties of Pultruded Fiber Reinforced Plastic (FRP) Structural Members," Transportation Research Record 1223, Bridge Design and Performance and Composite Materials, Transportation Research Board, National Research Council, pp. 117-124.
10. L.C. Bank and P.J. Bednarczyk, (1990), "Deflection of Thin-Walled Fiber-Reinforced Composite Beams," Journal of Reinforced Plastics and Composites, Vol. 9, No. 2, pp. 118-126.
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 27. L.C. Bank, A.J. Lamanna, J.C. Ray and G.I. Velazquez, (2002), “Rapid Strengthening of Reinforced Concrete Beams with Mechanically Fastened, Fiber Reinforced Polymeric Composites Materials,” Report ERDC/GSL TR-02-5, US Army Corps of Engineers, 93 pages.
 28. L.C. Bank, J.S. Russell, T.R. Gentry, and B.P. Thompson, (2002), “Accelerated Test-Based Material Specifications for Fiber Reinforced Plastics for Highway Structures,” Final Report, Contract No. DTFH61-00-C-00021, FHWA, 186 pages.
 29. L.C. Bank, D.T. Borowicz, A.J. Lamanna, J.C. Ray and G.I. Velazquez, (2002), “Rapid Strengthening of Full-Size Concrete Beams with Powder-Actuated Fastening Systems and Fiber-Reinforced Polymer (FRP) Composite Materials,” Report ERDC/GSL TR-02-12, US Army Corps of Engineers, 110 pages.
 30. E.M. Fink and L.C. Bank, (2003), “Hybrid Paperboard/Reinforced Plastic Tubes Utilizing Advanced Manufacturing Processes,” Final Report, Industrial and Economic Development Research (I&EDR) Program, Project No. 020787, 163 pages.
 31. L.C. Bank, M.G. Oliva, D. Arora, and David T. Borowicz, (2003), “Rapid Strengthening of Reinforced Concrete Bridges,” Report WHRP 03-06, Wisconsin Highway Research Program, 166 pages.
 32. L.C. Bank, D.T. Borowicz, D. Arora, A.J. Lamanna, J.C. Ray and G.I. Velazquez, (2004), “Strengthening of Concrete Beams with Fasteners and Composite Material Strips – Scaling and Anchorage Issues,” Report ERDC/GSL TR-04-5, US Army Corps of Engineers, 154 pages.
 33. L.C. Bank, M.G. Oliva, J.S. Russell, D.A. Dieter, J.S. Dietsche, A.C. Berg, F.G. Ehmke, J. Carter, R. Henke, R. Hill. and B. Gallagher, (2005), “Bridge B-20-133 on US-151 with Fiber Reinforced Polymer Reinforced Concrete Deck,” Final Report, No. 1000-02-03, Wisconsin Department of Transportation, 101 pages.
 34. L.C. Bank, M.G. Oliva, J.S. Russell, D.A. Jacobson, M. Conachen, T. Ringelstetter, A. Spottiswoode, J. Carter, and R. Henke, (2006), “Bridge B-20-148 on US-151 with Fiber Reinforced Polymer Reinforced Concrete Deck,” Final Report, No. 1009-03-10, Wisconsin Department of Transportation, 64 pages.
 35. L.C. Bank, J.S. Russell, J.P. Hanus, W. Varela-Ortiz, G.I. Velazquez, and J.C. Ray, (2006), “Conceptual Studies for Rapidly Deployable Battlespace Gap Structures” Report ERDC/GSL TR-06-25, US Army Corps of Engineers, 203 pages.
 36. L.C. Bank, A.P. Malla, M.G. Oliva, J.S. Russell, A. Bentur, and A. Shapira, (2007), “Specification and Design of Fiber Reinforced Bridge Deck Forms for use on Wide-Flange T-

Girders,” SPR # 0092-06-07, WHRP Report 07-10, Wisconsin Highway Research Program, 127 pages.

37. A.E. Schorer, L.C. Bank, M.G. Oliva, J.P. Wacker, and D.R. Rammer, (2008), “Feasibility of Rehabilitating Timber Bridges with Mechanically Fastened FRP Strips,” MRUTC Report 08-02, Midwest Regional University Transportation Center, 175 pages.

GRANTS AND CONTRACTS

1. L.C. Bank, “A Theoretical and Experimental Investigation of Thin-Walled Fiber-Reinforced Plastic Beams,” Research Initiation Grant, The Engineering Foundation, Grant No. RI-A-87-2, September 1987 - August 1988, \$20,000.00.
2. L.C. Bank, “Research Initiation: Experimental and Theoretical Investigation of the Short and the Long Term Behavior of a Pultruded Composite Rigid Frame,” Research Initiation Grant, National Science Foundation, Grant No. MSM-8896265, September 1988 - February 1991, \$68,816 + \$11,125 (REU supplements) = \$79,941.00.
6. L.C. Bank, “Bending Modulus Test Method,” Sonoco Products Company, Hartsville, SC, Grant No. MS9-003, April 1989 - June 1990, \$26,775.00.
7. A.M. Baz, L.C. Bank and J.J. Gilheany, “Active Control of Nitinol Reinforced Smart Structural Composites,” US Army Research Office, Grant No. DAAL03-89-G-0084, August 1989 - August 1992, \$373,756.00.
8. L.C. Bank, “SGER: A Composite Fiber-Reinforced Plastic and Concrete Structural Slab,” National Science Foundation, Grant No. MSM-9003687, February 1990 - February 1992, \$15,620.00.
9. L.C. Bank, “Continuous Testing Data Analysis,” Sonoco Products Company, Hartsville, SC, September 1990 - May 1991, \$5,184.00.
10. L.C. Bank, “The Influence of Transverse Material Properties on the Design and Performance of Pultruded Fiber Reinforced Plastic Structures,” National Science Foundation, Grant No. MSM-9015502, December 1990 - May 1993, \$110,238.00 + \$10,000 (REU supplements) = \$120,238.00.
11. L.C. Bank, “Performance of an FRP Grating Reinforced Concrete Bridge Deck Slab - Fellowship for Z. Xi,” Federal Highway Administration, Grant No. DTFH61-91-P-40012, June 1, 1991 - October 31, 1992, \$28,080.00.
9. L.C. Bank, “Impact Behavior of Fiber Reinforced Composite Materials/ Structures for use in Roadside Safety Applications - Fellowship for A. Svenson,” Federal Highway Administration, Grant No. DTFH61-91-P-40005, July 1, 1991 - December 31, 1992, \$30,350.00.
10. The Catholic University of America, “The Advanced Composite Bridge Deck Demonstration Project at Catholic University,” Intermodal Surface Transportation Efficiency Act - Public Law 102-240, December 1991, \$200,000.00.
11. L.C. Bank, “Analysis and Design of FRP Grating/Concrete Structural Slabs,” National Science Foundation, Grant No. MSS-9114188, December 1991 - May 1995, \$104,235.00.

12. L.C. Bank, "Fiber Reinforced Composite Materials for Transportation Structures," Federal Highway Administration, Cooperative Agreement No. DTFH61-92-X-00012, August 1992 - December 1995, \$165,510.00.
13. L.C. Bank, "Durability of Concrete Reinforced with FRP Grating - Fellowship for G. Anderson," Federal Highway Administration, Grant No. DTFH61-92-P-40018, July 15, 1992 - July 15, 1993, \$21,274.00.
14. L.C. Bank, "Dynamic Response of an FRP Grating Reinforced Concrete Bridge Deck Slab - Fellowship for V. Ravishankar," Federal Highway Administration, Grant No. DTFH61-92-P-40028, September 1, 1992 - September 1, 1993, \$21,274.00.
15. L.C. Bank, "Computer Simulation of Motor Vehicle Collisions into Roadside/Roadway Objects using DYNA 3D/NIKE 3D - Fellowship for Emmanuel Cofie," Federal Highway Administration, Grant No. DDEGRF-93-P-01, June 1, 1993 - June 1, 1994, \$31,556.00.
16. L.C. Bank, "Connection for Standard Structural," Creative Pultrusions, Inc., June 1, 1993 to December 31, 1993, \$4,000.00.
17. L.C. Bank, A. Barkatt and T.R. Gentry, "Accelerated Test Methods to Determine the Long-Term Behavior of FRP Composite Structures," subcontract with Georgia Institute of Technology, September 1, 1993 - August 31, 1997, \$346,074.00. Prime contract with Federal Highway Administration, Contract No. DTFH61-93-C-00012, September 1, 1993 - August 31, 1997, \$1,109,669.00.
18. T.W. Kao, A. Barkatt, L.C. Bank, H.S. Pao and L. May, "Acquisition of an Advanced Analytical Facility for Studies of Novel Materials and Environmental Interactions," National Science Foundation, Grant No. BES-9413942, September 1994 - August 1995, \$131,167.00.
19. L.C. Bank and T.R. Gentry, "Evaluation of a Bridge Deck Reinforced with Composite Materials," National Science Foundation, Grant No. CMS-9400223, September 1994 - August 1996, \$28,746.00.
20. L.C. Bank and T.R. Gentry, "Fiber Reinforced Composite Materials for Highway Safety Structures," Federal Highway Administration, Cooperative Agreement No. DTFH61-95-X-00024, January 1996 - August 1997, \$100,000.00.
21. L.C. Bank, M. Puterman and Y. Frostig, "Composite Materials for Construction - Durability of Fiber Reinforced Plastic Reinforcing Bars for Concrete," January 1995 - December 1995, Contract 017-014, Israel Ministry of Construction and Housing, 75,000 NIS (\$25,000.00).
22. L.C. Bank and T.R. Gentry, "Conceptual Designs for Pultruded Composite Causeway Systems - Phase 1A," subcontract with AEPCO Inc., October 1995 - March 1996, \$66,277.00. Prime contract with US Navy, Contract No. N00167-96-C-0003.
23. A. Shapira and L.C. Bank, "Three-dimensional Composite Reinforcement for Concrete: Design and Construction Aspects," January 1996 - December 1996, Contract 017-553, Israel Ministry of Construction and Housing, 63,000 NIS (\$21,000.00).

24. L.C. Bank and T.R. Gentry, "Conceptual Designs for Pultruded Composite Causeway Systems - Phase 1B," subcontract with AEPCO Inc., May 1996 - January 1997, \$106,746.00. Prime contract with US Navy, Contract No. N00167-96-C-0003.
25. L.C. Bank, "The Use of Photo-Elastic Coatings in the Bridge Engineering Field - Fellowship for Daniel Lamtenzan," Federal Highway Administration, Grant No. DDEGRF-96-X-00404, July 1996 - June 1997, \$32,400.00.
26. L.C. Bank, "Travel Grant for the US Delegation to the Third International Symposium on Non-Metallic (FRP) Reinforcement for Concrete Structures," National Science Foundation, Grant No. CMS-9617293, January 1997 - December 1997, \$50,952.00.
27. L.C. Bank, "Conceptual Designs for Pultruded Composite Causeway Systems - Phase 1C," subcontract with AEPCO Inc., Feb 1997 - Sept 1997, \$67,028.00. Prime contract with US Navy, Contract No. N00167-96-C-0003.
28. L.C. Bank, "Conceptual Designs for Pultruded Composite Causeway Systems - Phase II," subcontract with AEPCO Inc., June 1997 - Sept 1997, \$59,300.00. Prime contract with US Navy, Contract No. N00167-96-C-0003.
29. L.C. Bank, "Three-Dimensional FRP Reinforcements for Concrete," National Science Foundation, Grant No. CMS-9896074, June 1997 - May 2002, \$246,954.00.
30. L.C. Bank, "Conceptual Designs for Pultruded Composite Causeway Systems - Phase III/IV," subcontract with AEPCO Inc., September 1997 - July 1998, \$54,537.72. Prime contract with US Navy, Contract No. N00167-96-C-0003.
31. L.C. Bank, "Analysis and Design of Energy Absorbing Flexurally Loaded Pultruded Tubes," National Science Foundation, Grant No. CMS-9713566, March 1998 - February 2002, \$189,200.00.
32. L.C. Bank, "Joint Modular Lighter System," subcontract with AEPCO Inc., March 1998- July 1998, \$60,000.00. Prime Contract with US Navy, Contract No. N47408-98-C-2226.
33. L.C. Bank, "Innovative Multicellular Pultruded Composite Guardrail," October 1998 - April 1999, \$16,500.00. Subcontract with Creative Pultrusions. Prime Contract with Department of Transportation, SBIR Contract No. DTRS57-98-C00080.
34. L.C. Bank, "Rapid Repair of Concrete Structures Using Composite Materials and Power Actuated Fastening Systems," US Army Corps of Engineers, December 1998 - November 1999, Contract No. DACA39-99-K-0001, \$43,040.00.
35. L.C. Bank, "Rapid Strengthening of Full-sized Concrete Beams with Powder Actuated Fastening Systems and Composite Materials," US Army Corps of Engineers, December 1999 - November 2000, Contract No. DACA42-00-P-0044, \$47,381.00.
36. L.C. Bank, J.S. Russell and T.R. Gentry, "Specification for FRP Highway Bridge Applications," Federal Highway Administration, February 2000 - May 2002, Contract No. DTFH61-00-C-00021, \$351,996.00.

37. L.C. Bank, "A Design Procedure for Rapid Strengthening of Concrete Beams with Powder Actuated Fastening Systems and Composite Material Strips," December 2000 - November 2001, US Army Corps of Engineers, Contract No. DACA42-00-P-0364, \$62,247.00.
38. L.C. Bank, M.G. Oliva and J.S. Russell, "Innovative Bridge Research and Construction Program 1 – Highway 151/Rte. 26," December 2000 - October 2003, Wisconsin Department of Transportation, Contract No. 1000-02-03, \$287,967.00. Prime Contract from FHWA \$499,336.00.
39. L.C. Bank, "Composite Material Highway Guardrail - SBIR Phase II," June 2001 - June 2003, subcontract with Creative Pultrusions, \$63,266.00. Prime Contract with US Department of Transportation, SBIR Contract No. DTRS57-01-C10054.
40. L.C. Bank, "Hybrid Paperboard/Reinforced Plastic Tubes Utilizing Advanced Manufacturing Processes," July 2001- June 2002, Industrial and Economic Development Research Program, University-Industry Relations, Project Number 020787, \$22,250.00.
41. M.E. Plesha and L.C. Bank, "Eisenhower Fellowship Grant for Federico A. Tavarez," September 2001 - September 2002, National Highway Institute, Grant No. DDEGRD-01-X-00414, \$25,500.00.
42. L.C. Bank, "Service Life Prediction of Concrete Reinforcing Materials for the Modular Hybrid Pier," August 2001 - August 2003, subcontract with Berger/ABAM Engineering, \$57,347.00. Prime Contract with US Navy.
43. L.C. Bank, "Rapid Strengthening of Reinforced Concrete Bridges," November 2001 - November 2003, Wisconsin Highway Research Program, \$73,009.00.
44. L.C. Bank, "Strengthening of Concrete Beams with Fasteners and Composite Material Strips - Scaling and Anchorage Issues," February 2002 - February 2004, US Army Corps of Engineers, Contract No. DACA42-02-P-0064, \$67,171.00.
45. M.E. Plesha and L.C. Bank, "Eisenhower Fellowship Grant for Federico A. Tavarez," September 2002 - September 2004, National Highway Institute, Grant No. DDEGRD-01-X-00414, \$48,000.
46. L.C. Bank, "Hybrid Tube Research," July 2002 - September 2002, Sonoco Products Company, \$8,184.00.
47. L.C. Bank, M.G. Oliva and J.S. Russell, "Innovative Bridge Research and Construction Program 2 – Highway 151/De Nevue Creek, August 2002 - June 2006, Wisconsin Department of Transportation, Contract No. 1009-03-10, \$324,279.00. Prime Contract from FHWA \$499,085.00.
48. M.G. Oliva, L.C. Bank, and J.S. Russell, "Innovative Bridge Research and Construction Program 3 – Interstate 90/ Door Creek, August 2003 - June 2007, Wisconsin Department of Transportation, Contract No. 0687-48-01, \$350,846.00. Prime Contract from FHWA \$499,450.00.
49. L.C. Bank and J.S. Russell, "Conceptual Studies for Rapidly Deployable Battlespace Gap Structures – Phase I," April 2004 – September 2004, US Army Corps of Engineers, Contract No. W912HZ-04-P-0150, \$43,960.

50. L.C. Bank, "An Embedded Sensing System for Paperboard Tubes," July 2004- June 2005, Industrial and Economic Development Research Program, The Graduate School, The University of Wisconsin, Project Number 118502, \$30,022.00.
51. L.C. Bank and J.S. Russell, "Conceptual Studies for Rapidly Deployable Battlespace Gap Structures – Phase II," October 2004 – September 2005, US Army Corps of Engineers, Contract No. W912HZ-04-P-0150, \$66,246.00.
52. M.G. Oliva, L.C. Bank, and J.S. Russell, "Innovative Bridge Research and Construction Program 4 – USH 12 over Coffee Creek," August 2004 - June 2008, Wisconsin Department of Transportation, Contract No. 1009-03-12, \$376,000.00. Prime Contract from FHWA \$400,000.
53. V.M. Bier, L.C. Bank and L. Samuelson, "Center for Risk and Economic Analysis of Terrorist Events," University of Wisconsin Sub-award, February 2004 – February 2007, Department of Homeland Security, \$750,000.00. Prime Contact with University of Southern California, \$12,000,000.00.
54. L.C. Bank, "Testing and Specification of a Gridform Panel," January 2005 – June 2006, University of Missouri-Rolla University Transportation Center, \$10,000.00.
55. L.C. Bank and J.S. Russell, "Experimental Testing of the Suspension Net Concept Variation," September 2005 – September 2006, US Army Corps of Engineers, Contract No. W912HZ-04-P-0150, \$14,600.00.
56. L.C. Bank, M.G. Oliva, and J.S. Russell, "Specification and Design of Fiber Reinforced Bridge Deck Forms for use on Wide Flange T-Girders," November 2005 - November 2006, Wisconsin Highway Research Program, \$94,735.00.
57. L.C. Bank, "Research Studies of Hybrid Deck Systems using SafPlank," February 2006, Strongwell, \$5,000.
58. L.C. Bank, "Recyclable Paperboard Forms for Concrete Construction," July 2006- June 2007, Industrial and Economic Development Research Program, The Graduate School, The University of Wisconsin, Project Number 110701, \$27,160.
59. M.G. Oliva, L.C. Bank, and J.S. Russell, "Rapid Bridge Construction Technology – Precast Elements for Substructures," October 2006 – October 2008, Wisconsin Highway Research Program, \$124,411.
60. M.G. Oliva, L.C. Bank, and J.S. Russell, "Innovative Bridge Research and Construction Program 5," June 2007 - August 2010, Wisconsin Department of Transportation, Contract No. 1009-03-13, \$289,567.00. Prime Contract from FHWA \$400,000.
61. L.C. Bank and M.G. Oliva, "Managing Wisconsin's freight system by rehabilitation and strengthening of timber railroad bridges with composite materials, March 2007 – June 2008, Midwest Regional University Transportation Center (MRUTC), Award number DTRS99-G-0005, \$92,732.
62. M.G. Oliva and L.C. Bank, "Durable Fiber Reinforced Polymer Connections for Precast Concrete Structures," July 2007- June 2008, Industrial and Economic Development Research Program, The Graduate School, The University of Wisconsin, Project Number 1180810, \$33,532.

63. M.G. Oliva and L.C. Bank, "Rapid Repair and Replacement Techniques for Transportation Infrastructures Damaged from Natural or Man-Made Disasters," September 2007 – January 2009, Wisconsin Department of Transportation, Contract No. 1009-04-08, \$62,860.
64. L.C. Bank, "Development of ASCE Prestandard for LRFD Pultruded Structures," October 2007 – September 2010, American Society of Civil Engineers, \$240,926.
65. L.C. Bank and M.G. Oliva, "Testing of Concrete Slabs Reinforced with Double Layer Pultruded Grids," September 2008 – January 2009, Strongwell Corporation, \$17,860.
66. L.C. Bank, "Rainwater Catchment System (P3 Project)," August 2008 – July 2009, Environmental Protection Agency, \$9,950.
67. L.C. Bank, "Use of System Dynamics as a Decision-Making Tool in Sustainable Building Design," July 2009- June 2010, Industrial and Economic Development Research Program, The Graduate School, The University of Wisconsin, \$35,288.

TECHNICAL PRESENTATIONS

I Invited Presentations

1. L.C. Bank, "Properties of Pultruded Fiber Reinforced Plastic (FRP) Structural Members," presented at the Transportation Research Board (TRB) 68th Annual Meeting, Washington, DC, January 22-26, 1989.
2. L.C. Bank, "Results of Tests on a Rigid Frame of Pultruded Structural Shapes," presented at the Transportation Research Board Task Force A2C51 meeting, Washington, DC, January 10, 1990.
3. L.C. Bank and E. Cofie, "A Test Method for the Determination of the Bending Modulus of Spirally Wound Paper Cores," presented at the 10th meeting of the International Standards Organization ISO/TC 6/SC 3/WG 4, Helsinki, FINLAND, June 18-19, 1990.
4. L.C. Bank and A.S. Mosallam, "Beam-to-Column Connections for Pultruded FRP Shapes," presented at the Transportation Research Board Task Force A2C51 meeting, Washington, DC, January 17, 1991.
5. L.C. Bank, "Full Section Testing of Pultruded Beams," presented at the American Society for Testing and Materials, Section D20.18.02 Committee, Washington, DC, February 18, 1991.
6. L.C. Bank, "Performance of Beam/Column Connections for FRP Pultruded Structural Components," presented at the Owens-Corning Technical Center, Granville, OH, May 20, 1991.
7. L.C. Bank, "Current Research in Analysis, Design and Applications of FRP Pultrusions," presented to the Pultrusion Industry Council, Society for the Plastics Industry, Concord, OH, September 23, 1991.
8. C. Goodspeed, E. Schmeckpeper, M. Zhang, L. Bank and Z. Xi., "Full-Scale Testing of Grid and Grating FRP Reinforced Concrete Bridge Decks," presented at the 71st Annual TRB Meeting, Transportation Research Board, Washington, DC, January 12-16, 1992.

9. L.C. Bank, "Composites in Civil Engineering Applications: The Age of New Materials," presented at the Composites Institute Annual Management Meeting, Orlando, FL, May 7-8, 1992.
10. L.C. Bank, "Fiber Composites for Construction" presented at the ASCE International Convention and Exposition, New York, NY, September 14-17, 1992.
11. L.C. Bank, "Pultruded FRP Grating as a Reinforcement for Concrete," presented at the US Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL), Hanover, NH, February 25, 1993.
12. L.C. Bank, "Pultruded FRP Grating as a Reinforcement for Concrete," presented at the Workshop on Research and Applications of Fiber-Reinforced Plastic in Concrete, US Army Corps of Engineers, Huntsville, AL, March 2-3, 1993.
13. L.C. Bank, "Pultruded FRP Grating Reinforced Concrete Slabs," presented at the Wilson Composite Forum, San Francisco, CA, May 20-21, 1993.
14. L.C. Bank, "Impact Performance of Glass Fiber Composite Materials for Roadside Safety Structures," presented at the Wilson Composite Forum, San Francisco, CA, May 20-21, 1993.
15. L.C. Bank, "Composites for Construction - Recent Research," presented at the Federal Facilities Council Standing Committee on Research, National Research Council, Washington, DC, October 18, 1995.
16. L.C. Bank, "Bolted Connections for Pultruded Frame Structures," presented in the short-course "Design and Retrofit of Structures with Fiber Composites" held at the First International Conference on Composites in Infrastructure, Tucson, AZ, January 13-14, 1996.
17. L.C. Bank, "Pultruded Glass-fiber Composite Material Reinforcements for Concrete - Can They Work?" presented at the ATLSS Seminar Series, Lehigh University, Bethlehem, PA, March 17, 1996.
18. L.C. Bank, "Novel Applications of Pultruded Composites in Structures," presented at the University of Naples, Naples, ITALY, June 4, 1998.
19. L.C. Bank, "Applications of Composite Materials in Civil Engineering," presented at the ASCE Wisconsin Section Meeting, Madison, WI, September 18, 1998.
20. L.C. Bank, "Essential Elements of an Accelerated Testing Methodology," Transportation Research Board Annual Meeting, Washington, DC, Jan 10-14, 1999.
21. L.C. Bank, "Composite Materials for Roadside Safety Structures," presented at ACUN-2, International Composites Conference, Composites in the Transportation Industry, Sydney, Australia, Feb 11-14, 2000.
22. L.C. Bank, "A Center for Building-Vulnerability Science," presented at The National Academy of Sciences Workshop: Protecting People and Buildings from Bomb Damage, Washington, DC, Nov 28-30, 2000.
23. L.C. Bank, "Vulnerability Science and Technology," presented at The National Academy of Sciences Roundtable Series to Reduce the Vulnerability of Interdependent Infrastructure Systems, Washington, DC, October 31, 2001.

24. L.C. Bank, "A Model Specification for FRP Composites for Civil Engineering Structures," presented at the International Conference for FRP Composites for Civil Engineering, Hong Kong, December 12-15, 2001. (Keynote Lecture.)
25. L.C. Bank, "Strengthening of Concrete Beams with Fastened Composite Strips," North Carolina State University, April 8, 2002.
26. L.C. Bank, "Building Vulnerability Science - Protecting People with Better Buildings," Bio-Terrorism and Security in a World of Uncertainty, The International Institute and The Biotechnology Center, University of Wisconsin, April 18, 2002.
27. L.C. Bank, "Building Vulnerability Science - Protecting People with Better Buildings," National Conference on Undergraduate Research, University of Wisconsin - Whitewater, April 15, 2002.
28. L.C. Bank, "Building Vulnerability Science and Technology – Implications for Architects and Engineers," Flad and Associates, Madison, WI, February 7, 2003.
29. L.C. Bank, "Building Vulnerability Science – Implications for Architects and Engineers," ASCE UW Student Chapter, Madison, WI, February 13, 2003.
30. L.C. Bank, "Mechanically Fastened FRP (MF-FRP) Strips for Strengthening RC Structures – A Viable Alternative," CICE 2004, 2nd International Conference on FRP Composites in Civil Engineering," Adelaide, AUSTRALIA December 8-10, 2004. (Keynote Lecture).
31. L.C. Bank, "Some Recent Applications of Novel FRP Systems in Wisconsin," EMPA, Swiss Federal Laboratories for Materials Testing and Research, Zurich, SWITZERLAND, February 25, 2005.
32. L.C. Bank, "Mechanical Fastening – Where does it fit in 440.2R?" American Concrete Institute, Spring Convention, New York, April 19, 2005.
33. L.C. Bank, "Application of FRP Composites to Bridges in the USA," International Colloquium on Application of FRP to Bridges, Japan Society of Civil Engineers (JSCE), January 20, 2006. (Keynote Lecture.)
34. L.C. Bank, "Composites for Construction: Building Bridges with Fibers," Wednesday Nite @ the Lab, Wisconsin Alumni Association, University of Wisconsin-Madison, October 4, 2006.
35. L.C. Bank," Recent Research in FRP Reinforcement and Stay-in-Place Formwork for Bridge Decks," Korea Institute of Construction Technology, Ilsan, KOREA, November 12, 2007.
36. L.C. Bank, "Recent Research and Application of FRP Materials in Bridges in North America," Korea Bridge Engineering Research Center, Seoul National University, Seoul, KOREA, November 14, 2007.
37. L.C. Bank, "New Applications of Pultruded FRF Planks in Bridges," International Conference and Exhibition on Reinforced Plastics, ICERP 2008, Mumbai, India, February 7-9, 2008.
38. L.C. Bank, "Some Recent Applications of Novel FRP systems in Bridges in the US," Lightweight Bridge Deck Conference, Arnhem, The Netherlands, June 18-20, 2008.

39. L.C. Bank, "Recent Research in FRP Reinforcement and Stay-in-Place Forms for Bridge Decks," Lou Silano Lecture, Columbia University, New York, NY, September 26, 2008.
40. L.C. Bank, "FRP Bridges in the USA," Diseño Y Concepción de Puentes de Carretera, Madrid, SPAIN, May 20, 2009.

II Conference Presentations

1. L.C. Bank and M.P. Bieniek, "Direct Constitutive Relations for Composite Panels," presented at the 2nd Joint ASCE/ASME Mechanics Conference, Albuquerque, NM, June 23-26, 1985.
2. L.C. Bank and M.P. Bieniek, "A Model for the Nonlinear Response of Composite Laminates," presented at the 27th AIAA/ASME/ASCE/AHS SDM Conference, San Antonio, TX, May 19-21, 1986.
3. L.C. Bank, "A Constitutive Law for Inelastic Metal-Matrix Laminated Composites," presented at the 10th US National Congress of Applied Mechanics, Austin, TX, June 16-20, 1986.
4. L.C. Bank, "The Shear Coefficient for Thin-Walled Composite Beams," presented at the 6th ASCE EMD Specialty Conference, Buffalo, NY, May 20-22, 1987.
5. L.C. Bank and P.J. Bednarczyk, "Deflection of Thin-Walled Fiber-Reinforced Composite Beams," presented at the American Society for Composites, Second Technical Conference, Newark, DE, September 23-25, 1987.
6. L.C. Bank, "Free Vibrations of Thin-Walled Composite Beams," presented at the 29th AIAA/ASME/ASCE/AHS/ASC SDM Conference, Williamsburg, VA, April 18-20, 1988.
7. L.C. Bank, "Flexural and Shear Moduli of Thin-Walled Composite Beam Sections," presented at the 7th ASCE EMD Specialty Conference, Blacksburg, VA, May 23-25, 1988.
8. L.C. Bank and C.H. Kao, "Dynamic Response of Composite Beams," presented at the ASME Winter Annual Meeting, Chicago, IL, November 27-December 2, 1988.
9. L.C. Bank and T.P. Melehan, "Shear Deflection in Multicelled Thin-Walled Orthotropic Composite Beams," presented at the 30th AIAA/ASME/ASCE/AHS/ASC SDM Conference, Mobile, AL, April 3-5, 1989.
10. L.C. Bank, "Flexural and Shear Moduli of FRP Beams," presented at the ASCE Structures Congress, San Francisco, CA, May 1-5, 1989.
11. L.C. Bank and A.S. Mosallam, "Creep and Failure of a Full-Size Fiber Reinforced Plastic Pultruded Frame," presented at the ASME Energy-Sources Technology Conference and Exhibition (ETCE), New Orleans, LA, January 14-17, 1990.
12. L.C. Bank and A.S. Mosallam, "Structural Performance of a Fiber Reinforced Plastic Pultruded Frame," presented at the ASCE 8th Structures Congress, Baltimore, MD, April 30-May 3, 1990.
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