

Lawrence L. Sutter, Ph.D.
Professor

BUSINESS ADDRESS

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EDUCATION

- 2001 - Ph.D., Civil Engineering
*Department of Civil and Environmental Engineering
Michigan Technological University*
- 1995 - M.S., Civil Engineering – Environmental Engineering Option
*Department of Civil and Environmental Engineering
Michigan Technological University*
- 1991 - B.S., Metallurgical Engineering - Mineral Processing Option
*Department of Metallurgical & Materials Engineering
Michigan Technological University*
- 1976 - A.A.S., Electrical Engineering Technology
Ohio Institute of Technology

EXPERIENCE

2007 – present Director, Michigan Tech Transportation Institute

Responsible for administration of the Michigan Tech Transportation Institute (MTTI). MTTI is an umbrella organization that includes numerous centers and individual principal investigators. The key centers include the Local Technical Assistance Program (LTAP), Technology Development Group (TDG), University Transportation Center for Materials in Sustainable Transportation Infrastructure (MiSTI), Transportation Materials Research Center (TMRC), Center for Structural Durability (CSD), Rail Transportation Program (RTP), and the Aggregate Research Center (ARC). Duties include developing and implementing a strategic plan for growing multi-disciplinary transportation research at Michigan Tech, development of and participation in graduate student recruiting, marketing MTTI capabilities, serving as the MTTI representative to numerous external and internal stakeholders, managing the operating budget, and staff supervision.

2006 – present Professor, Michigan Tech Transportation Institute

Full-time appointment to the Michigan Tech Transportation Institute with responsibilities for conducting sponsored research in the area of construction materials. Specific areas of research include development and application of materials characterization methods, concrete petrography, and various projects to understand and improve portland cement concrete durability. Research sponsors have included the Michigan, Wisconsin, and South Dakota Departments of Transportation, Federal Highways Administration, National Cooperative Highway Research Program, Innovative Pavement Research Foundation, and the National Science Foundation. Other duties include serving as Director of the Non-Conductive/Volatile Materials Characterization Facility.

EXPERIENCE (cont.)

1997 - 2006 **School of Technology, Michigan Tech**
2006 **Professor**
2005 – 2006: **Program Chair, Graduate Programs**
2004 – 2006: **Program Chair, Construction Management**
2002 – 2006: **Associate Professor**
1997 - 2002: **Assistant Professor**
2001 - present: **Adjunct Associate Professor, Department of Civil and Environmental Engineering, Michigan Tech**

Instructional Experience

Lecture and laboratory instruction in the construction management and civil engineering technology program. Subjects taught included cemented aggregate mixtures, soils engineering technology, building materials & methods, building electrical and mechanical systems, construction equipment management, construction contracts and specifications, strength of materials, water and wastewater technology, public speaking and leadership.

Accomplishments – Instituted MDOT and ACI/MCA technician certification for students taking cemented aggregate mixtures; Member of the MTU Academy of Teaching Excellence; Development of an Internet 2 based on-line scanning electron microscope for use in on-campus classes, distance education, and outreach to K-12 science classes.

Research Experience

Research focused on the forensic analysis of concrete, concrete petrography, cement and clinker characterization, bituminous concrete characterization, and advanced methods of materials characterization utilizing electron microscopy, x-ray diffraction, x-ray microscopy, and x-ray fluorescence spectroscopy. Served as Principal Investigator or Co-Principal Investigator on \$3.8M in externally funded research projects.

Accomplishments – Published over 30 peer-reviewed journal and proceedings papers; national and international presentations and recognition of research results; collaboration with researchers at MTU benchmark institutions and various international leaders in concrete research; Co-Principal Investigator on a NSF Major Research Instrumentation Grant.

Administrative Experience

Served as Program Chair for Construction Management/Civil Engineering Technology/Surveying Engineering. Responsible for curriculum development, course scheduling, teaching assignments, accreditation, enrollment/marketing, faculty professional development plans, and other program management duties. Also served as Program Chair for School of Technology Graduate Programs leading development of graduate programs. Other administrative duties included academic advising of undergraduate and graduate students, participation in the strategic planning process both at the unit and University level, and service on the University Senate and various university wide committees.

Accomplishments – Developed and gained approval of new Construction Management baccalaureate degree, eight years service on the University Senate, twice candidate for University Senate President, served on two University wide search committees for Associate Vice Provost for Student Affairs and Provost (Committee Chair).

EXPERIENCE (cont.)

1992 - 1998 Consulting Engineer, Superior Analytical, Houghton MI.

Performed on-site training of technologists in the use of a scanning electron microscope (SEM), electron microprobe analyzer (EMPA), energy dispersive x-ray spectrometer (EDS), or electron backscattered diffraction (EBSD) system.

1995 - 1997 Instructor, Department of Civil and Environmental Engineering, Michigan Tech

Responsible for instruction in a freshman computer literacy course covering computer architecture, systems concepts, operating systems, and applications. This was one of the first service courses offered at MTU where course information, instructional materials, and grades were published and distributed to the students using the World Wide Web.

1979 - 1994: Engineer/Scientist/Instructor, Department of Metallurgical and Materials Engineering, Michigan Tech

Responsible for supervision and coordination of research and educational activities in the Department's Electron Optics Facility. Major instruments included three SEM's, an EMPA, a transmission electron microscope (TEM), a high voltage scanning transmission electron microscope (HVSTEM), and a scanning transmission electron microscope (STEM) plus the necessary sample preparation equipment such as sputter coaters, high vacuum evaporators and ion milling apparatus. Additional responsibilities involved daily maintenance of all instrumentation and equipment in the facility including various high vacuum systems, cryogenic systems, electronics and electrical systems, water cooling, and pneumatic control systems. In addition, responsibilities included serving as principle operator of the EMPA and SEM's to support research and educational efforts.

Instructional responsibilities included lecture and laboratory instruction in a senior level course in scanning electron microscopy. This course addressed the application of scanning electron microscopy, quantitative digital imaging, and X-ray microanalysis to material science, geology, and biological sciences. Additional teaching duties included training and certification of students and other researchers using the facilities EMPA and SEM's. Also, training was provided on the operation of ancillary computer software for data analysis and presentation.

Worked with faculty members to develop research proposals and supervise students conducting research using the Facility. Served as a principal researcher in the development of a patented on-line coal slurry ash analyzer.

1976 - 1979: Field Service Engineer, Philips Electronic Instruments, Skokie IL

Responsible for on-site repair of X-ray fluorescence spectrometers and X-ray powder diffractometers. Duties included repair and user training.

1975 - 1976: Lab Technician, Ohio Institute of Technology, Columbus OH

Duties included repair of electronic test equipment, design and fabrication of electronic systems to serve as teaching aids, distribution and inventory of parts, and laboratory management.

PROFESSIONAL AFFILIATIONS

International Cement Microscopy Association - *Current Office Held - Proceedings Editor*
American Concrete Institute
American Society for Testing and Materials - *Voting Member - Committee C01 and C09, Chair, Joint Sub-Committee 01/09.99 on Research, Chair Task Group 2, Committee 9.24 on Coal Fly Ash (ASTM C 618)*
American Society of Civil Engineers
Toastmasters International – *Club Offices Held - President, Vice-President of Education*
Microscope Society of America
Microbeam Analysis Society

CERTIFICATIONS

Michigan Concrete Technician - Level 1 - Michigan Concrete Association
Michigan Aggregate Inspector - Michigan Department of Transportation

UNIVERSITY SERVICE ACTIVITIES

2006 – present: University Athletic Council
2005 – 2007: Research Advisory Council, University Senate Representative
2006 – 2007: University Search Committee for Provost (Committee Chair)
2005 – 2006: University Search Committee for Provost (Assoc. Committee Chair)
2004 – 2007: University Senator At-Large
2004 – 2007: University Senate Executive Committee Member
2004 – 2007: University Senate Research Committee Chair
2004 & 2005: University Senate President Candidate
2002 – 2004: University Senate Representative to Computer Executive Committee
2001 – 2002: Provost’s Select Committee to Review the School of Technology
1998 – 2003: University Senator for the School of Technology
1998 – 2003: University Senate Research Committee Member
1998 – 2007: University Senate Liaison Committee on Intellectual Property Policy
1997 – 2006: Faculty Advisor for Civil Engineering Technology Students

SELECTED FUNDED PROPOSALS

“Specifications and Protocols for Acceptance Tests of Fly Ash Used in Highway Concrete”, Funded by the National Cooperative Highway Research Program, February, 2006, \$749,125, L.L. Sutter, T.J. Van Dam, D.W. Hand, R.D. Hooton (University of Toronto), Scott Schlorholtz (Iowa State University).

“Impact of Hydrated Cement Paste Quality and Entrained Air-Void System on the Durability of Concrete”, April, 2007, \$304,826, L.L. Sutter, T.J. Van Dam, K.R. Peterson

“Reduction of Minimum Required Weight of Cementitious Materials in WisDOT Concrete Mixtures” October 2007, \$114,938, L.L. Sutter, T.J. Van Dam, K.R. Peterson.

“Alkali-Silica Reactivity (ASR) Development and Deployment Program”, January 2007, \$2,450,000/yr – 3 years (open task orders), L.L. Sutter, T.J. Van Dam, K.R. Peterson, numerous external.

“Concrete Mixes and Pavement Construction for De-icing Facilities”, T.J. Van Dam, L.L. Sutter, Funded by the Innovative Pavement Research Foundation, IPRF Project 01-G-002-03-3, September 2005, \$175,977

"Evaluation of Methods for Characterizing Air-Void Systems in Wisconsin Paving Concrete", L. L. Sutter, T.J. Van Dam, M.D.A Thomas (University of New Brunswick), Funded by the Wisconsin Department of Transportation, January, 2003, \$199,965

"Investigation of the Long Term Effects of Magnesium Chloride and Other Concentrated Salt Solutions on Pavement and Structural Portland Cement Concrete", L. L. Sutter, T.J. Van Dam, R. Douglas Hooton (University of Toronto), Funded by the South Dakota Department of Transportation, September, 2002, \$600,000

"Mineral Characterization and Cataloging of Quarried Aggregate Sources Used in Michigan Highway Construction", L. L. Sutter, K.R. Peterson, T.J. Van Dam, Funded by MDOT June 1, 2001, \$126,298

“The Acquisition of Instrumentation for Microstructural Characterization of Materials that are Non-Conductive or Include Volatile Phases,” funded by the National Science Foundation on September 1, 2000 for three years at \$724, 654. T.J. Van Dam, L.L. Sutter, J.A. King, S.A. Grant, L.M. Matuana.

“Durability of ‘Early-Opening-to-Traffic’ Portland Cement Concrete for Pavement Rehabilitation,” Funded by the National Cooperative Highway Research Council, February, 2000, \$350,000. T.J. Van Dam, L.L. Sutter and N. Buch (Michigan State).

“A Study of Materials-Related Distress (MRD) in Michigan’s PCC Pavements—Phase II,” Funded by Michigan Department of Transportation, 1998 \$253,000, PI: T.J. Van Dam, Co-PI’s: L.L. Sutter and N. Buch (Michigan State).

“Transportation Materials Research Center (TMRC)”, G.R. Dewey, T.J. Van Dam, L.L. Sutter, T.M. Ahlborn, S.J. Vitton, K.G. Mattila, “October 1998, \$250,000 per year for five years, funded by the Michigan Department of Transportation.

“A Study of Materials-Related Distress (MRD) in Michigan's PCC Pavements”, T.J. Van Dam, L.L. Sutter, funded by Michigan Department of Transportation, December, 1997, \$124,135 over three years.

“Detection, Analysis, and Treatment of Materials-Related Distress in Concrete Pavements”, T.J. Van Dam, G.R. Dewey L.L. Sutter, funded by the Federal Highway Administration, September, 1996. \$400,913 over three years.

PATENTS

U.S. Patent # 4,916,719

Patent Date: April 10, 1990

Title: “On-line Analysis of Ash Containing Slurries”

Investigators: S.K. Kawatra, L.L. Sutter, T.C. Eisle

SELECTED PUBLICATIONS

Journal Articles

Sutter, L.L., K.R. Peterson, S.H. Touton T.J. Van Dam, and D. Johnston (2006). "Petrographic Evidence Of Calcium Oxychloride Formation In Mortars Exposed To Magnesium Chloride Solution", *Cement and Concrete Research*, Volume 36, Issue 8, August, pp. 1533-1541.

Peterson, K.R., D. Gress, T.J. Van Dam, and L.L. Sutter (2006). "Crystallized Alkali-Silica Gel in Concrete from the Late 1890s", *Cement and Concrete Research*, Volume 36, Issue 8, August, pp. 1523-1532.

Carlson, J., L.L. Sutter, T.J. Van Dam, and K.R. Peterson (2006). "Comparison Of A Flat-Bed Scanner And The RapidAir 457 System For Determining Air-Void System Parameters Of Hardened Concrete," *Journal of the Transportation Research Board*, *Transportation Research Record* 1979, Transportation Research Board. pp. 60-68.

Sutter, L.L., T.J. Van Dam, K.R. Peterson, and D. Johnston (2006). "Long Term Effects of Magnesium Chloride and Other Concentrated Salt Solutions on Pavement and Structural Portland Cement Concrete – Phase I Results," *Journal of the Transportation Research Board*, *Transportation Research Record* 1979, Transportation Research Board. pp. 54-59.

Buch, N., T.J. Van Dam, K.R. Peterson, L.L. Sutter (2006). "Evaluation of High-Early Strength PCC Mixtures Used in Full Depth Repairs," Accepted for publication to the *Journal of Construction and Building Materials*, Elsevier.

Sutter, L.L., K.R. Peterson, T.J. Van Dam, "The Role of Scanning Electron Microscopy in Concrete Petrography", Submitted to *Journal of ASTM International*, Accepted for publication in 2006.

Delem, L., T. Van Dam, K. R. Peterson, and L.L. Sutter, "Evaluation of Premature Deterioration of Concrete Bridge Barriers by Petrographic Examination", *Transportation Research Record-Journal of the Transportation Research Board*, TRR1893, pp. 11-17, 2004.

Mitchell, D., G. Frohnsdorff, L.L. Sutter, et. al, "Service-Life Modeling and Design of Concrete Structures for Durability", *Concrete International*, December 2004, pp. 1-7

Heiser, J.A., J.A. King, J.P. Konell, I. Miskioglu, and L. L. Sutter, "Tensile and Impact Properties of Carbon Filled Nylon 6,6 Based Resins", *Journal of Applied Polymer Science*, Vol. 91, 2004, pp. 2881-2893.

Heiser, J.A., J.A. King, J.P. Konell, and L. L. Sutter, "Shielding Effectiveness of Carbon Filled Nylon 6,6", *Polymer Composites*, Volume 25, Issue 4 , Pages 407 - 416

Heiser, J.A., J.A. King, J.P. Konell, and L. L. Sutter, "Electrical Conductivity of Carbon Filled Nylon 6,6", *Advances in Polymer Technology*, *Advances in Polymer Technology*, Vol. 23, No.2, pp.135-146, 2004.

Hansen, K.F., T.J. Van Dam, K.R. Peterson, and L.L. Sutter "Effect of Sample Preparation on Chemical Composition and Morphology of Alkali-Silica Reaction Products," *Transportation Research Record-Journal of the Transportation Research Board*, TRR1834, 2003, pp. 1-7.

Van Dam, T.J., K.R. Peterson, L.L. Sutter, and M.E. Housewright, "Study of Deterioration in Concrete Pavements Constructed with Slag Coarse Aggregate," Transportation Research Record-Journal of the Transportation Research Board, TRR1834, 2003, pp. 8-15.

Sutter, L.L., K.R. Peterson, and T.J. Van Dam, "Using Epifluorescence Optical Microscopy to Identify the Causes of Portland Cement Concrete Distress: A Case Study," Transportation Research Record-Journal of the Transportation Research Board, TRR1798, 2002, pp. 22-30.

Sutter, L.L., K.R. Peterson, T.J. Van Dam, and G.R. Dewey, "Laboratory Testing, Data Analysis, and Interpretation Procedures for Distressed Concrete Pavements," Transportation Research Record-Journal of the Transportation Research Board, TRR1775, 2001, pp. 64-76.

Van Dam, T.J., N.J. Buch, K.F. Hanson, J. Hiller, L.L. Sutter, and R. Muethel, "Michigan's Approach to a State-Wide Investigation of Materials-Related Distress in Concrete Pavements," Transportation Research Record-Journal of the Transportation Research Board, TRR1775, 2001, pp. 1-9.

Peterson, K.R., R.A. Swartz, L.L. Sutter, and T.J. Van Dam, "Air Void Analysis of Hardened Concrete with a Flatbed Scanner," Transportation Research Record-Journal of the Transportation Research Board, TRR1775, 2001, pp. 36-43.

Burns, R.A., Crittenden, J.C., Hand, D.W., Selzer, V.H., Sutter, L.L., Salman, S.R., "Effect of Inorganic Ions in Heterogeneous Photocatalysis of TCE", ASCE Journal of Environmental Engineering, January 1999 Vol. 125 (1), pp. 77-85

Sandell, J.F., G.R., Dewey, L.L., Sutter, J.A., Willemin, "Evaluation of Lead Bearing Phases in Municipal Waste Combustor Fly Ash", ASCE Journal of Environmental Engineering, January 1996 Vol. 122 (1), pp. 34-40.

Willemin, J.A., C.C. Nesbitt, G.R. Dewey, Sandell, J.F., and L.L. Sutter, "Flow Injection Analysis of MWC Fly Ash Leaching Characteristics", Journal of Air and Waste Management, November 1995 Vol. 45 (11), pp. 871-876.

Sandell, J.F., G.R., Dewey, L.L., Sutter, J.A., Willemin, "Evaluation of Lead Bearing Phases in Municipal Waste Combustor Fly Ash", ASCE Journal of Environmental Engineering, January 1996 Vol. 122 (1), pp. 34-40.

Mainwaring, P.R., Sutter, L.L., Kramer, R.S., Hwang, J. Y, "Improved Characterization of Materials by Integrated Image Analysis and Microanalysis Methods," 120th Annual TMS Meeting, New Orleans, Louisiana; Journal of Metals, November 1990, p. 62.

Reviewed Conference Proceedings

Van Dam, T.J., D. Gress, K.R. Peterson, L.L. Sutter, and T.J. Bates (2007), "Comparison of Field and Laboratory Concrete Exposed to Potassium Acetate Runway Deicer," submitted for presentation and publication at the Conference on Advances in Concrete, September 19-21, Washington, D.C.

Sutter, L.L., K.R. Peterson, T.J. Van Dam. "Methods for Threshold Optimization for Images Collected from Contrast Enhanced Concrete Surfaces for Air-Void System Characterization", Proceedings of the 11th Euroseminar on Microscopy Applied to Building Materials, Porto, Portugal, June 5-8, 2007.

Van Dam, T. J., L.L. Sutter, and K.R. Peterson, "Getting it Right: Achieving Long-Life through Material Selection, Mix Design, and Construction," Proceedings of the International Conference on Long-Life Concrete Pavements, Chicago, IL, October 24-27, 2006. pp. 369-386.

C. P. Anderson, L. L. Sutter, D. N. Huntzinger, and J. S. Gierke, "Effects of Carbonation on the Mineral Composition of Cement Kiln Dust", Proceedings of the Twenty-Ninth Conference on Cement Microscopy, Quebec City, PQ, Canada May 20 -24, 2007, p. 442-471.

K. Peterson, L.L. Sutter, T. Van Dam, "Virtual Hardened Concrete Sample Exchange Program", Proceedings of the Twenty-Ninth Conference on Cement Microscopy, Quebec City, PQ, Canada May 20 -24, 2007, pp. 131-134.

Sutter, L.L., K.R. Peterson, S.H. Touton T.J. Van Dam, and D. Johnston (2006). "Petrographic Evidence Of Calcium Oxychloride Formation In Mortars Exposed To Magnesium Chloride Solution", Proceedings of the 10th Euroseminar on Microscopy Applied to Building Materials, Paisley, Scotland, June 21-25, 2005.

Sutter, L.L., K.R. Peterson, T.J. Van Dam. "The X-Ray Microscope: A New Tool for Measuring the Density of Hardened Cement Paste", Proceedings of the 9th Euroseminar on Microscopy Applied to Building Materials, Trondheim, Norway, September 8-12, 2003.

Sutter, L.L., T.J. Van Dam, K.R. Peterson, and A. Ganguly, "The X-Ray Microscope: A New Tool for Determining Chloride Ion Diffusion in Hardened Concrete", Proceedings of the Conference on Advances in Cement and Concrete, Copper Mountain, Colorado, August 10-14, 2003.

Sutter, L.L., K.R. Peterson, T. J. Van Dam, "Applications of an X-Ray Analytical Microscope to the Analysis of Concrete." Proceedings of the 25th International Conference on Cement Microscopy, Richmond, Virginia. April 6-10, 2003.

Peterson, K.R., L.L. Sutter, T. J. Van Dam. "Air Void Analysis of Hardened Concrete with a High Resolution Flatbed Scanner." Proceedings of the 24th International Conference on Cement Microscopy, San Diego, California. April 8-11, 2002, pp. 304-316.

Hammerling, D., K.R. Peterson, L.L. Sutter, T. J. Van Dam, and G.R. Dewey, "Ettringite: Not Just in Concrete." Proceedings of the 22nd International Conference on Cement Microscopy, Montreal, Canada. April 30 to May 4, 2000, pp. 431-441.

Peterson, K.W., D. Hammerling, L.L. Sutter, T. J. Van Dam, and G.R. Dewey, "Oldhamite: Not Just in Meteorites," Proceedings of the 21st International Conference on Cement Microscopy, Las Vegas, NV, April 25-29, 1999, pp. 394-405

Sutter, L. L., "Macro Programming with NIH Image for Implementing ASTM C 457", Proceedings of the Twentieth Annual Meeting of the International Cement Microscopy Association, 1998, pp. 382-393

Sutter, L. L., P. Lehoux, G. R. Dewey "Composition Based Phase Distribution Analysis of Portland Cement Clinker", Proceedings of the Nineteenth Annual Meeting of the International Cement Microscopy Association, 1997, pp. 14-29

Landon, D.B., L.L. Sutter, "The Place of Scientific Research in Historical Archaeology: An Example from the Ohio Trap Rock Mine Site", Proceedings of the Society for Archaeology, October 1994, Plenum Press.

Sutter, L.L., "Metallurgical Examination of Copper Artifacts from 20KE20", The Michigan Archeologist Vol. 39, No. 3-4 (1993): pp. 166-170.

Non-Reviewed Conference Proceedings

Sutter, L.L., G.R., Dewey, and J.F. Sandell "Characterization of Lead Bearing Phases in Municipal Waste Combustor Fly Ash", The Proceedings of the Microscopy Society of America, August 1996.

Dewey, G.R., L.L., Sutter, and J.F., Sandell "Reactivity Based Approach for Classifying Fly Ash", The Proceedings of the American Power Conference, April 1996, Chicago, Illinois.

Sutter, L.L., J.F. Sandell, and G.R Dewey, "Applications of Electron Microprobe and Mineral Liberation Analysis Techniques to Municipal Solid Waste Combustor Fly Ash", Proceedings of the International Symposium on Extraction and Processing for the Treatment and Minimization of Wastes, February 1994.

Selected Technical Reports

Van Dam, T.J., and L.L., Sutter (2005). "Concrete Mixes and Pavement Construction for De-icing Facilities", Interim Report, Innovative Pavement Research Foundation

Sutter, L.L., K.R. Peterson, and T.J. Van Dam (2004). "Evaluation of Methods for Characterizing Air-Void Systems in Wisconsin Paving Concrete," Interim Report, Wisconsin Department of Transportation, Madison, Wisconsin. September, 2004

Sutter, L.L., K.R. Peterson, and T.J. Van Dam (2005). "Investigation of the Long Term Effects of Magnesium Chloride and Other Concentrated Salt Solutions on Pavement and Structural Portland Cement Concrete," Interim Report, South Dakota Department of Transportation, Pierre, South Dakota. January, 2005.

Sutter, L.L., T.J. Van Dam, and K.R. Peterson (2005). "Mineral Characterization and Cataloging of Quarried Aggregate Sources Used in Michigan Highway Construction," Final Report, Michigan Department of Transportation. Lansing, MI. April, 2005.

Van Dam, T.J., and L.L., Sutter (2005). "Concrete Mixes and Pavement Construction for De-icing Facilities", Interim Report, Innovative Pavement Research Foundation

Sutter, L.L., K.R. Peterson, and T.J. Van Dam (2004). "Evaluation of Methods for Characterizing Air-Void Systems in Wisconsin Paving Concrete," Interim Report, Wisconsin Department of Transportation, Madison, Wisconsin. September, 2004.

Van Dam, T.J., K.R. Peterson, and L.L., Sutter (2004). "Preliminary Investigation of the Role of Bacteria in Concrete Degradation," Final Report, Michigan Department of Transportation. Lansing, MI. August, 2004.

Van Dam, T.J., L. Delem, K.R. Peterson, and L.L. Sutter (2003). "Causes and Cures for Cracking of Concrete Barriers: Draft Final Report, TMRC-03-02," Michigan Department of Transportation, Lansing, MI.

Sutter, L.L., T.J. Van Dam, K.R. Peterson (2003). "Mineral Characterization and Cataloging of Quarried Aggregate Sources Used in Michigan Highway Construction," Draft Final Report, Michigan Department of Transportation. Lansing, MI. December.

Van Dam, T.J., L.L. Sutter, K.D. Smith, M.J. Wade, K.R. Peterson, "Guidelines for Detection, Analysis, and Treatment of Materials-Related Distress in Concrete Pavements, Volume 1: Final Report", FHWA Contract No. DTFH61-96-C-00073, Prepared for the Federal Highway Administration, Turner-Fairbank Highway Research Center, McLean, VA, September, 2001.

Van Dam, T.J., L.L. Sutter, K.D. Smith, M.J. Wade, K.R. Peterson, "Guidelines for Detection, Analysis, and Treatment of Materials-Related Distress in Concrete Pavements, Volume 2: Guidelines Description and Use", FHWA Contract No. DTFH61-96-C-00073, Prepared for the Federal Highway Administration, Turner-Fairbank Highway Research Center, McLean, VA, September, 2001.

L.L. Sutter, K.R. Peterson, Van Dam, T.J., K.D. Smith, M.J. Wade. "Guidelines for Detection, Analysis, and Treatment of Materials-Related Distress in Concrete Pavements, Volume 3: Case Studies Using the Guidelines", FHWA Contract No. DTFH61-96-C-00073, Prepared for the Federal Highway Administration, Turner-Fairbank Highway Research Center, McLean, VA, September, 2001.

Van Dam, T.J., L.L. Sutter, N. Buch, and J. Sytsma, "Durability of 'Early-Opening-To-Traffic' Portland Cement Concrete For Pavement Rehabilitation," Interim Report, NCHRP 18-04B, Prepared for the National Cooperative Highway Research Program, Washington, D.C., May 2000.

Van Dam, T.J., L.L. Sutter, K.D. Smith, D.G. Peshkin, M.B. Snyder, "Detection, Analysis, and Treatment of Materials-Related Distress in Concrete Pavements," Draft Interim Report, FHWA Contract No. DTFH61-96-C-00073, Prepared for the Federal Highway Administration, Turner-Fairbank Highway Research Center, McLean, VA, May 1, 1998.

Selected Oral Presentations

INVITED: "Long Term Effects of Magnesium Chloride and Other Concentrated Salt Solutions on Pavement and Structural Portland Cement Concrete", Presented at the 2007 Michigan Concrete Association Annual Meeting, Troy, MI, February 7, 2007.

INVITED "Concrete Petrography Techniques", International Conference on Cement Microscopy, Panel Discussion on Sample Preparation for Concrete Petrography, 28th Conference on Cement Microscopy, Denver, CO, April 30^t – May 4 2006.

INVITED: "Concrete Petrography: A Sword, A Shield, or a Beacon of Truth?", Presented at the 2006 Michigan Concrete Association Annual Meeting, Troy, MI February 9, 2006.

INVITED: “Cement and Concrete Chemistry”, a one day seminar presented to the Technical Advisory Panel, Dow Corning, Midland MI, January, 2006.

INVITED: “Cement and Concrete Technology”, a one day seminar presented to the Technical Advisory Panel, Dow Corning, Midland MI, May, 2005.

INVITED: “Further Development of a Flat-Bed Scanner for Determining Air-Void System Parameters of Hardened Concrete”, Presented to the Society of Concrete Petrographers Annual Meeting, 2005, Reno, NV.

“The Role of Scanning Electron Microscopy in Concrete Petrography”, Presented at the *Symposium on Techniques for Concrete Petrography*, ASTM Spring meeting 2005, Reno, NV.

INVITED: “Use of a High Resolution Flatbed Scanner to Determine the Air Content of Hardened Concrete” Presented to the Norwegian Geological Survey, May 7, 2004.

INVITED: “The X-ray Microscope: A New Tool for Materials Characterization” Presented to the Norwegian Geological Survey, May 7, 2004.

INVITED: “Materials Related Distress in Concrete Pavements”, Presented at the 2004 Michigan Concrete Association Annual Meeting, Grand Rapids, MI February 6, 2004.

INVITED: “Emerging Microscopy and X-Ray Analytical Techniques for Characterizing the Microstructure of Portland Cement Concrete” Purdue University, Department of Civil Engineering, October 22, 2003.

INVITED: "Field Testing of Fresh Portland Cement Concrete ", Presented at the LTAP Bridge and Culvert Conference, Marquette MI, September 2002.

INVITED: "Air-Void Analysis of Hardened Concrete with a High-Resolution Flatbed Scanner". Presented at the Symposium on Methods for Evaluation of Hardened Field Concrete sponsored by ASTM, Miami Fl., December 2002.

INVITED: - A Systematic Approach to Characterizing Materials Related Distress in Portland Cement Concrete Pavements. Presented at the Symposium on Methods for Evaluation of Hardened Field Concrete sponsored by ASTM, Miami, Fl., December 2002.

INVITED: "New Techniques for Characterizing Transportation Construction Materials", Presented at the 2001 Transportation Materials Research Center Conference, Houghton, MI, October 2001.

INVITED: “Field Distress Survey, Sampling Procedures, Laboratory Testing, Data Analysis, and Interpretation Procedures for Distressed Concrete Pavements,” Presented to the Transportation Research Board Committee for Research on Improved Concrete Pavements, Irvine, CA, June 7, 2001.

Sutter, L.L., (2001). “An Approach to Characterizing Materials Related Distress in Portland Cement Concrete Pavements”, Ph.D. Dissertation, Michigan Technological University.

INVITED: “Data Interpretation and Diagnosis of Deteriorated Concrete Pavements,” Presented at the January 2001 Annual Meeting of the Transportation Research Board, *"Workshop on Investigative Techniques for Assessing Concrete Durability Problems: State-of-the-Practice"*.

INVITED: "Guidelines for Laboratory Tests used to Characterize Materials Related Distress in Portland Cement Concrete Pavements", Presented at the 1999 Transportation Materials Research Center Conference, Houghton, MI, October 1999.

INVITED: "Transportation Materials Research at MTU", presented to the Michigan County Engineers Workshop. Sponsored by the Michigan Local Technical Assistance Program, Houghton MI April, 1999.

INVITED: Panel Discussion: "Automated Methods of Analyzing Concrete", Twentieth Annual Meeting of the International Cement Microscopy Association, 1998, Guadalajara, Mexico.