

**CURRICULUM VITAE (March 2012) of****Dr. A. Emin Aktan****John Roebling Professor of Infrastructure Studies  
Drexel University, Philadelphia 19104****Ph: 215-895-6135; e-mail: [aaktan@drexel.edu](mailto:aaktan@drexel.edu); [www.di3.drexel.edu](http://www.di3.drexel.edu)****Founding Principal of Intelligent Infrastructure Systems****Ph: 610-639-4919; e-mail: [Eaktan@Pennoni.com](mailto:Eaktan@Pennoni.com)  
A Division of Pennoni Associates, Inc. Philadelphia****Education:**

Post-Doctoral Research in Earthquake-Structural Engineering at University of California, Berkeley (1979-1984)

Ph.D. in Earthquake Structural Engineering from the University of Illinois at Urbana-Champaign (1970-1973)

B.S. (1967) and M.Sc. (1968) in Civil/Structural Engineering, Middle East Technical University (METU), Ankara

**Employment History:**

John Roebling Professor of Infrastructure Studies, Drexel University, Philadelphia, (1997 – current)

Associate Professor (1988), Professor of Civil Engineering (1991), University of Cincinnati (1988-1997)

Associate Professor of Civil Engineering, Louisiana State University, Baton Rouge (1984-1987)

Associate Research Engineer, EERC, University of California at Berkeley (1979-1984)

Assistant/Associate Professor of Civil Engineering, Middle East Technical University (METU) (1973 -1979)

Research Assistant, University of Illinois at Urbana-Champaign (1970-1973)

Research Assistant, METU (1968-1970)

**RESEARCH CAREER OVERVIEW:**

My career has been naturally shaped by the values and academic quality measures of my advisors and mentors at METU, Urbana and Berkeley. At the current stage of my career I am motivated to excel in the scholarships of integration and teaching. If we are able to remove the traditional institutional and organizational barriers between civil and other engineering disciplines and the social sciences we will greatly increase our chances for finding effective solutions to our infrastructure concerns and reform civil engineering education. Civil engineers have served in different roles and capacities in service to society throughout the history of civilization. However, the present time may prove to be the most critical one as civil engineers have to assume the responsibility and leadership in the planning, engineering and management of critical infrastructures and the built environment. This “[grand challenge](#)” requires organizing, coordinating and integrating the products of multi-disciplinary teams in order to observe and understand for engineering and management of multi-domain infrastructure systems. To

formulate prudent policy, financing, engineering and management solutions addressing infrastructure performance concerns we need to identify, map and generate simulation models for their intersecting human, natural and engineered elements. In the following, I summarize my research career-journey and my contributions to the progressively broadening civil engineering challenges that I have selected to engage in:

Starting from MS studies at METU, PhD studies at Urbana and through my work as a research engineer at Berkeley (1968-1984) the core area of my contributions during this period was to advance the analytical modeling and structural analysis of RC and Steel building systems for understanding their 3D seismic behavior. I am one of the earliest structural engineering researchers to explore the riddle of 3D versus 2D earthquake response of midrise reinforced concrete buildings, especially with walls and cores integrated with their frames:

- Aktan, A. E. and Pecknold, D. A. W., "Response of a Reinforced Concrete Section to Two-Dimensional Curvature Histories," Journal of the American Concrete Institute, May 1974.
- Aktan, A. E., Pecknold, D. A. W., and Sozen, M. A., "R/C Column Earthquake Response in Two Dimensions," Journal of the Structural Division, ASCE, October 1974.
- Sucuoglu, H. and Aktan, A. E., "Hysteretic Response of R/C Frames," ACI SP-63, Reinforced Concrete Structures Subjected to Wind and Earthquake Forces, 1980.
- Aktan, A. E. and Bertero, V. V., "Seismic Responses of R/C Frame-Wall Structures," Journal of Structural Engineering, ASCE, August 1984.
- Huria, V., Raghavendrchar, M., and Aktan, A.E., "3D Characteristics of RC Wall Response," Journal of Structural Engineering, ASCE, October 1991.

During and following post-doctoral research at Berkeley, a new area of expertise was gained on small as well as large-scale physical modeling and testing of reinforced concrete and structural steel buildings and the correlation of these experiments with analytical predictions and simulations:

- Aktan, A. E. and Bertero, V. V., "R/C Structural Walls: Seismic Design for Shear," Journal of Structural Engineering, ASCE, August 1985 (winner, Moisseiff Award).
- Bertero, V. V., Aktan, A. E., Charney, F. A. and Sause, R., "Earthquake Simulator Tests and Associated Analytical and Correlation Studies of a 1/5 Scale Replica Model of a Full Scale, 7-Story R/C Frame-Wall Structure," Publication SP-84, American Concrete Institute, 1985 (winner, R.C. Reese Structural Research Award).
- Aktan, A. E. and Bertero, V. V., "Evaluation of Seismic Response of RC Buildings Loaded to Failure," Journal of Structural Engineering, ASCE, May 1987.
- Aktan, A. E., and Nelson, G., "Problems in Predicting Seismic Responses of RC Buildings," Journal of Structural Engineering, ASCE, September 1988.
- Aktan, A.E. and Ho, I.-K., "Seismic Vulnerability Evaluation of Existing Buildings," Earthquake Spectra, Journal of the Earthquake Engineering Research Institute, August 1990.
- Hosahalli, S.R. and Aktan, A.E., "*Seismic Vulnerability of Flat Slab-Core Buildings*," Journal of Structural Engineering, ASCE, February 1994.

As faculty at LSU, followed by Cincinnati and then during my initial years at Drexel University (1984-2004), a new research focus emerged. Leveraging the experiences in integrated research on laboratory testing of physical models and correlating the results with analysis, research on effective means of testing and structural-identification of actual operating constructed systems in the field, followed by their long-term health monitoring was adopted as a research thrust. Contributions to advance this emerging field were made by collaborating with Dr. David Brown, a pioneer in modal analysis of mechanical systems at Cincinnati to transform modal analysis as a tool for testing and for vibration controlling of actual constructed systems. In addition, with support from the State of Ohio, a laboratory for monitoring of operating systems and for autopsy

of decommissioned constructed systems was developed. A mid-rise building was tested by exciters and subsequently monitored during implosion. A dozen bridges were tested nondestructively, while four decommissioned bridges were tested to damage and failure. Several bridges, including long-span bridges, were continuously monitored over multiple years. These efforts helped to bridge the gap between earthquake engineering of buildings and bridge engineering, demonstrating the challenges and opportunities in structural identification and health monitoring of constructed systems. Representative contributions include:

- Raghavendrachar, M. and Aktan, A.E., “*Flexibility by Multireference Impact Testing for Bridge Diagnostics*,” Journal of Structural Engineering, ASCE, August 1992; pp: 2186-2203.
- Miller, R.A., Aktan, A.E. and Shahrooz, B.M., “*Destructive Testing Of A Decommissioned Concrete Slab Bridge*,” Journal of Structural Engineering, ASCE, July 1994.
- Shelley, S.J, Lee, K.L., Aksel, T. and Aktan, A.E., “*Active Control and Forced Vibration Studies on a Highway Bridge*,” Journal of Structural Engineering, September 1995.
- Aktan, A.E., Helmicki, A.J and Hunt, V.J., “*Issues In Health-Monitoring For Intelligent Infrastructure*,” Journal of Smart Materials and Structures, October 1998, pp: 674-692.
- Catbas, F.N. and Aktan, A.E., “*Condition and Damage Assessment: Issues and Some Promising Indices*,” Journal of Structural Engineering, Vol. 128, No. 8, Aug. 1, 2002.
- Naghavi, R. and Aktan, A.E., “*Nonlinear Behavior of Existing Heavy-Class Steel Truss Bridges*,” Journal of Structural Engineering, August 2003.
- A.E. Aktan, S.K. Ciloglu, K.A. Grimmelsman, Q.Pan, F.N. Catbas, “*Opportunities and challenges in health monitoring of constructed systems by modal analysis*,” Keynote paper presented at and published in the Proceedings of EVACES 2005, Experimental Vibration Analysis for Civil Engineering Structures 26-28 October 2005, Bordeaux, France.
- Aktan, A.E., Chase, S., Pines, D. and Inman, D., “*Monitoring and Managing the Health of Infrastructure Systems*,” Editor’s Introduction to the SPIE Conference Proceedings of the 6th International Symposium on NDE for Health Monitoring and Diagnostics, SPIE Proceedings, Vol 4337, March, 2001
- Catbas, F. N., Ciloglu, and Aktan, A. E., “*Strategies for Condition Assessment of Infrastructure Populations: A Case Study on T-beam Bridges*,” Structure and Infrastructure Engineering, Vol. 1 No. 3, August 2005.
- Moon, F. and Aktan, A.E., “*Impacts Of Epistemic Uncertainty on Structural Identification of Constructed Systems*”, Invited State-of-Art Review, *Shock And Vibration Digest*, Vol. 38, No. 5, September 2006.
- Catbas, F.N., S. K. Ciloglu, O. Hasancebi, K. Grimmelsman, A. E. Aktan, “*Limitations In Structural Identification of Large Constructed Structures*,” *Journal of Structural Engineering*, Vol. 133, No. 8, August 1, 2007, pp. 1051-1066.
- Aktan, A.E., et al, “*Long-Term Vision for the ASCE Technical Committee: Structural Identification of Constructed Systems*,” Paper presented at and published in the Proceedings of SHMII-3, the 3rd International Conference on Structural Health Monitoring of Intelligent Infrastructure, 13-16 November 2007, Vancouver, BC, Canada.

Drexel University is located in Philadelphia, at the center of a vast metropolitan region of aging and dense urban infrastructure extending between New York City and Washington DC. This location, as well as the events following 9/11 provided opportunities to experience and appreciate how all constructed systems are in fact elements of interconnected multi-domain infrastructures with intersecting and interacting human, natural and engineered elements. Consequently, research area inevitably shifted from structural identification of constructed systems to defining and addressing the societal problems related to actual infrastructures such as preserving historic bridges and sustainability. Research focus evolved towards how we may leverage the paradigms of “performance-based engineering” and “asset management” to advance the planning, management and engineering of infrastructures such as transportation and water systems for sustainability. International collaborations with senior and junior colleagues from history, psychology, government and policy, structural, water, environmental and systems engineering were initiated. Representative contributions:

- Aktan, A.E. and Comfort, L., “*Management of Multi-Hazards Risk For Metropolitan Regions*,” Presentation at SPIE’s 8<sup>th</sup> Annual International Symposium on Nondestructive Detection and Measurement for Homeland

- Security and Published in the Proceedings of SPIE, Volume 5048, pp 1-16, San Diego, CA, 2-6 March 2003.
- Emin Aktan, Dan M. Frangopol, Hamid M. Ghasemi, Masanobu Shinozuka, Samer Madanat and Harry W. Shenton III, "A Problem-Focused Agenda for the Highway Transportation Infrastructure: A Holistic Systems Identification and Integration Approach Using Field Test Sites," *Final Report: NSF Grant CMS 0338817*, 2004.
- Aktan, A.E., Ellingwood, Bruce and Kehoe, Brian, "Performance-Based Engineering of Constructed Systems," Journal of Structural Engineering, Committee Report, Journal of Structural Engineering, Forum, March 2007.
- Moon, F.M., Aktan, A.E., Furuta, H. and Dogaki, Masahiro, "Governing Issues and Alternate Resolutions for a Highway Transportation Agency's Transition to Asset Management," Paper published at a special issue of the SIE Journal, Taylor and Francis, Nov 2008, Vol. 5 (1), 2009.
- Franco Montalto, Patrick L. Gurian, Franklin Moon, and A. Emin Aktan, "A Research Agenda for Infrastructure Asset Management," Report of an International Workshop on Asset Management, Presentation made to NSF Program Directors, Dec 9, 2008.
- Aktan, A.E. and F.L. Moon, "Mitigating Infrastructure Performance Failures Through Risk-based Asset Management," Paper Presented at and Published in the Proceedings of the Fifth International Conference of IABMAS (International Association for Bridge Management and Safety), Philadelphia, USA, 11-15 July 2010

### **Civil Engineering Education Reform as a Research Area:**

The experiences from research on actual, operating infrastructure systems as well as collaborations with Dr. Thomas Hewett, Professor of Psychology and Cognitive Engineering, influenced my education philosophy greatly. Once we approach civil engineering education as a research problem, we notice the considerable chatter and multitude of approaches at the ASCE education forums, ASEE and ABET on how to best prepare civil and environmental engineers for the future. ***However, to classify and structure this chatter requires an ability to synthesize a multi-domain system problem similar to that of infrastructure performance and asset management.***

If we wish to look at the complex system of engineering education, we recognize the students and their family, community, K-12 education backgrounds, the university community, program faculty, departments, college and university, as well as curriculum and pedagogy as the principal contributors to the quality of the civil engineering education.

Obviously there cannot be a unique curriculum and a delivery model suitable for each and every program in the country. The best curriculum to be adopted by a program should depend on the number, specialty focal areas and the research interests of the core faculty, the student backgrounds and any special needs of a city, state and region in conjunction with the goals, mission and traditions of the university. The best curriculum for a program can only be developed by grass-roots and consensus effort by the faculty together with the participation and support of administration. Curriculum needs to be refined by continuous improvement, somewhat analogous to successful automotive designs that are refined over decades. There are naturally very important roles and critical contributions to be made by the alumni and students as well as segments of the profession as stakeholders. In the past, it was considered suitable for a research university program to find a balance between a systems-oriented and engineering science-based curriculum with some level of practice-oriented courses. In the last several years, NAE's Engineer 2020 study and ASCE's Body of Knowledge Committees developed metrics for engineering and civil engineering graduates that are impossible to satisfy without institutional reform and by comprehensively reforming both the curricula and its delivery.

Various progressive universities including MIT, CMU, Johns Hopkins and Princeton have eliminated institutional barriers between disciplines and sub-disciplines, offering student-centric and highly flexible curricula promoting project-based learning. The main issue is in impacting a larger number of more than 300 engineering schools in North America.

Civil and environmental engineers need knowledge and skills for conceptualizing, modeling, designing, constructing, maintaining and managing large-scale and multi-domain infrastructure systems. The behaviors and performance of these systems are governed by epistemic uncertainty since they are not fully observable or measurable. To educate the civil engineering leaders of the future to become competent infrastructure system engineers and managers, there is an urgent need to break the partitions between highly compartmentalized engineering departments and to offer a general systems-based multi-disciplinary education throughout the MS. Such an education will need to emphasize the basic skills for making observations and measurements not only in the physical and chemical laboratory but also in the field, and modeling and analysis of physical, chemical and social phenomena in the computer.

To further study this argument in the context of a research program, stakeholders from NSF, ASCE and other international organizations such as IABSE, ISHMII and IABMAS were brought together at various Workshops and Sessions dedicated to Civil Engineering Education Reform. NSF Granted a research proposal in September 2009 entitled: The Learning Bridge. This is a collaborative research effort in partnership with Purdue, Texas A&M, Northeastern and Drexel Universities. The focus is on transforming a major bridge and the highway infrastructure within the influence area of this bridge into a living laboratory to further explore and document the multi-domain systems nature of infrastructures. Teaching modules for Structural Design, Bridge Engineering, Risk and Uncertainty, Hydrology and Runoff Water Quality have been developed by taking advantage of this laboratory. Representative contributions in the civil engineering education reform area are:

- A.E. Aktan, P. Balaguru, H. Ghasemi, A. Mufti and S. McCabe, "Reforming Civil Engineering Education Given the Challenges Related to Infrastructure Engineering and Management," Keynote Paper Presented at and Published in the Proceedings of the Workshop on Structural Health Monitoring of Intelligent Infrastructures, SHMII'05, November 2005, China (CRC Press). This paper offered a detailed analysis of civil engineering education and its reform needs.
- A.E. Aktan (Drexel University) and Jose M. Roësset (Texas A&M University), "The Need for a Renaissance in Civil Engineering to Effectively Address our Societal Concerns Related to Infrastructures." This paper was presented at the CEE EDU Reform Workshop at Istanbul, 4-7 October 2006, supported by NSF. This NSF-EC-Japan supported International Workshop was organized in Istanbul during October 4-7, 2006.
- Emin Aktan (Drexel University) and Aftab Mufti (University of Manitoba), Transformation of Civil Engineering Education, Research and Practice, Civil Engineering Education Reform Workshop, SHMII-3 conference, (<http://www.ishmii.org/Literature/SHMII3EducationReformWorkshop.html>), Vancouver, Nov 2007. This was the opening paper for a dedicated session on education reform that was organized at the SHMII-3 conference. Participants from Canada, EC, Switzerland and Japan complemented those from the USA.
- To continue the leadership of research for reforming civil engineering education, special Seminars were organized at the ASCE-SEI Structures Congresses at Austin (2009) and at Orlando (2010). These Seminars brought critical stakeholders from NSF, ASCE and university programs in US and Canada with curricular reform initiatives.
- The Learning Bridge Poster Presentations at the 2010 and 2012 NSF EEC Grantees Workshops

## MENTORS

**Ugur Ersoy (retired)**, MS Advisor, Professor Emeritus of Civil Engineering, Middle East Technical University, Ankara

**Mete Sozen**, PhD Advisor, Member NAE, Kettelhut Distinguished Professor of Civil Engineering, Purdue University

**Vitelmo Bertero (retired)**, Post-Doc Advisor, Member NAE, Professor Emeritus, University of California, Berkeley, CA

**Egor Popov (Deceased)**, Mentor, Professor Emeritus, University of California, Berkeley, CA

**James Yao (Deceased)**, Mentor, Professor Emeritus of Civil Engineering Mechanics, Texas A&M University

**Jose Roesset (retired)**, Mentor, Member NAE, Wofford Cain Chair of Offshore Technology, Texas A&M University

**Masanobu Shinozuka, mentor**, Member NAE, Distinguished Professor and Chair, Civil and Env Eng, UC Irvine

### **COLLABORATORS**

**David Brown**, Professor Emeritus of Mechanical Engineering, University of Cincinnati (1988-1997)

**Arthur Helmicki**, Professor of Electrical Engineering, University of Cincinnati (1990-1997)

**Alex Meystel (Deceased)**, Professor Emeritus of Electrical Engineering, Drexel University (1997-2006)

**Louise Comfort**, Professor of Public and International Affairs, University of Pittsburgh (2001-2005)

**Thomas Hewett**, Professor of Psychology and Computer Science, Drexel University (2006-current)

**Franklin Moon**, Associate Professor of Civil Engineering, Drexel University (2004-current)

**Franco Montalto**, Assistant Professor of Environmental Engineering, Drexel University (2006-current)

**Patrick Gurian**, Associate Professor of Environmental Engineering, Drexel University (2006-current)

**Anu Pradhan**, Assistant Professor of Civil Engineering, Drexel University (2009-current)

**Ivan Bartoli**, Assistant Professor of Civil Engineering, Drexel University (2010-current)

**Sabrina Spatari**, Assistant Professor of Environmental Engineering (2010-current)

### **PhD ADVISEES**

Dr. T. Hogue, Hogue Engineering, Inc., Stillwater, OK, graduated from LSU in 1988

Dr. M. Rachar, Senior Engineer with CALTRANS, Sacramento, graduated from UC in 1991

Dr. K.L. Lee, Senior Associate at Ove Arup & Partners, Hong Kong, graduated from UC in 1991

Dr. C. Chuntavan, Professor, Chulachomkloa Academy, Thailand, graduated from UC in 1993

Dr. Somaprasad R. Hosahalli, Senior Engineer with JMGR, Inc., Memphis, graduated from UC in 1993

Dr. Zongfen Zhang (Aerospace Engineering-CE), GM Truck Division, graduated from UC in 1996

Dr. Razi Naghavi, with PEDCo E&A Services Inc., Cincinnati, graduated from UC in 1997

Dr. Alper Levi, Contractor, Istanbul, Turkey, graduated from UC in 1997

Dr. F. Necati Catbas (CE-ME), Professor, University of Central Florida, graduated from UC in 1997

Dr. Ahmet Turer, Professor at METU, Ankara, graduated from UC in 1998

Dr. M. Lennett (CE-ME), Principal, URS Corporation, Cincinnati, graduated from UC in 1998

K. Ciloglu (ME-CE), Director of Research, L.B. Foster Company, Pittsburgh, graduated from Drexel in 2006

K. Grimmelsman (CE-ME), Professor at University of Arkansas, graduated from Drexel in 2006  
 Q. Pan (CE-EE), Structural Dynamics Specialist, Bechtel Power Corporation, graduated from Drexel in 2007  
 J. Prader (CE-EE), Current PhD Student to graduate in 2012  
 Benjamin Cohen (CE-Business), Current PhD Student

### **HONORS:**

Scholarship from the Turkish Scientific and Technical Research Council, 1968-1970  
 Fellowship from the US Agency for Interior Development, State Department, 1970-1973  
 US Permanent Residency sponsored by UC Berkeley and NSF as a National Interest Case through the International Communications Agency, 1982  
 Co-recipient, R.C. Reese Structural Research Award of the American Concrete Institute, 1986  
 Co-recipient, Moisseiff Award of the American Society of Civil Engineers, 1987  
 United Nations Development Program Scholar, 1987  
 Consultant to Ohio Adjutant General's Department for Earthquake Risk Recognition, 1990  
 Co-recipient, ASCE-CERF Pankov Innovative Research Award, 1997  
 Invited by Drexel University President Constantine Papadakis (his former Dean at Cincinnati) to join Drexel University and to establish an Infrastructure Institute, 1997  
 Invited/supported for a Sabbatical as visiting faculty at Kansai University, Japan, 2006  
 Elected Fellow of International Society for Health Monitoring of Intelligent Infrastructures, 2007  
 Appointed Honorary Professor at Mugla University, Turkey, 2010

### **PROFESSIONAL SERVICE AND PROFESSIONAL SOCIETY LEADERSHIPS:**

- Specialty editor and member of the Editorial Board:
  - **Journal of Structural Engineering** (2004-current)
  - **Structure and Infrastructure Engineering**, Taylor and Francis (2004-current)
  - **International Journal of Lifecycle Performance Engineering**, Inderscience (2010-current)
- Founding Chair, ASCE SEI Technical Committee: "Structural Identification of Constructed Systems" (1996-2000), Chair (2005-2010);
- Founding Chair, ASCE SEI Technical Committee: "Performance-Based Design and Evaluation of Constructed Facilities" (1999-2005)
- Founding Chair, Health Monitoring Committee of the International Association for Bridge Maintenance, Safety and Management (IABMAS, <http://www.iabmas.org> since 2000)
- Founding Vice President and Fellow, the International Society for Health Monitoring of Intelligent Infrastructures (ISHMII, [www.ishmii.org](http://www.ishmii.org) since 2003)
- Member, ASCE SEI Technical Administrative Committee on Performance of Structures (1996-2011)
- Member, ASCE SEI National Technical Program Committee for Structures Congress (2007-2011)
- Member, NRC Transportation Research Board Committees: "Dynamics and Field Testing of Bridges," and, "Concrete Bridges" (1993-2003)
- Served as member of Executive Committee and Conference Co-Chair, "Smart Structures and NDE and Measurement for Homeland Security" Conferences of SPIE, (1999-2009)
- Member, ASCE Administrative Committee on Continuing Education (2011-current)
- Vice-Chair, NRC TRB Long-Term Bridge Performance (LTBP) Committee (2012-2015)

**CONFERENCE SESSIONS, SEMINARS AND WORKSHOPS ORGANIZED:**

- **Finite Element Analysis of RC Structures**, ASCE 5th Structures Congress, 1985
- **Vulnerability Assessment of Existing Buildings**, ASCE 6th Structures Congress, 1986
- **Experimental Identification of Buildings for Reliable Modeling**, ASCE National Convention, 1988
- **Evaluating Seismic Vulnerability of Existing Buildings**, ASCE 7th Structures Congress, 1989
- **Field Tests of Constructed Facilities**, ASCE 8th Structures Congress, 1990
- **Modal Testing of Constructed Facilities**, IMAC12, 1994
- North American Workshop for **Bridge Instrumentation and Vibration Analysis**, sponsored by FHWA Advanced Research Office and NSF, Cincinnati, July 18-20, 1995
- **Modal testing and Instrumented Monitoring for Bridge Damage Detection**, IMAC 15, 1997
- The International Society of Optical Engineering (SPIE) Annual Symposium on **Smart Systems, Health-Monitoring and NDE of Infrastructure Systems**, Organized Symposia and Sessions at 2000-2005
- Workshop on **Health Monitoring of Long-Span Bridges**, co-sponsored by NSF and FHWA, Organizing Committee Member, 2001, Irvine, CA
- The International Society of Optical Engineering (SPIE) Symposium on **Homeland Security**, Organized Sessions at 2003-2005
- Session on **Health Monitoring of Bridges** at the First International Association for Bridge Maintenance and Safety (IABMAS) Conference, Barcelona, July 2002
- Workshop Session on “**Model Guide for Health Monitoring of Major Bridges**,” at the Conference on Structural Materials Technology (SMT): NDE/NDT for Highways and Bridges, Organized by FHWA, September 2002, Cincinnati
- Sessions on **Performance and Health Monitoring**, at the 2<sup>nd</sup> WCSE in Yokohama, Japan and at the First fib Conference in Osaka Japan, October, 2002
- ASCE Structures Congress 2003, Sessions on the **Performance of: (a) Buildings, (b) Bridges**
- Workshops on “**A Problem-Focused Research Agenda for the Highway Transportation Infrastructure: A Holistic Systems Identification and Integration by Using Field Test-Sites**,” co-sponsored by NSF and FHWA, Chair, 14 September 2003, Palo Alto, CA and 12 November 2003, Tokyo, Japan.
- **Leveraging Technology for the Management of Highway Transportation by an Integrated Holistic Systems Approach**, Special Theme Sessions, First International Conference on Structural Health Monitoring and Intelligent Infrastructure (SHMII-1'2003), 15 November 2003, Tokyo, Japan
- International Association for Bridge Maintenance and Safety (IABMAS) Conference, October 2004, Kyoto, Japan, **Health Monitoring Special Sessions**
- Workshop on “**Evaluating Bridge Reliability Following Natural and Man-Made Hazards in Real-Time**” co-sponsored by NSF and FHWA, Organizing Committee Chair, October 2004, Kyoto, Japan
- Special Sessions 1 and 2: **Status and Findings of Current BHM Applications in the World**, IABMAS 06, Porto, Portugal July 2006.
- Workshop on “**Reforming Civil and Environmental Engineering Education Given the Societal Challenges Related to Infrastructures**” Sponsored by NSF, October 2006, Istanbul, Turkey



- International Workshops on **Structural Health Monitoring** (IWSHM) held at Stanford University, Organized Sessions and contributed to the **Program on Civil Structures**, 1997-2007
- World Forum on Smart Materials and Smart Structures Technology, *May 22-27, 2007*, Chongqing & Nanjing, CHINA, Three Sessions on “**Paradigms and Technologies related to the Engineering and Management of Intelligent Infrastructures and Constructed Systems**,” organized on behalf of ISHMII.
- Organized the session on **Structural Identification of Constructed Systems**, and, the Symposium on **Reforming Civil Engineering Education** at SHMII-3, the 3rd International Conference on Structural Health Monitoring of Intelligent Infrastructure, 13-16 November 2007, Vancouver, BC, Canada.
- Organizer, Special Sessions on **Integrating Health Monitoring and Lifecycle Management**, IABMAS’08 (<http://www.iabmas08.org/>).
- Organizer and Co-Chair, **International Workshop on Performance-Based Infrastructure Asset Management**, sponsored by NSF, Turkish Science Council, European Commission and Japan Education Ministry, 6-9 July, 2008, Istanbul, Turkey.
- Organizer and Chair, **Special Session on Civil Engineering Education Reform**, ASCE-SEI Structures Congress, Austin, April 30, 2009
- Organizer and Chair, **Two Special Sessions on Civil Engineering Education Reform**, ASCE-SEI Structures Congress, Orlando, May 13, 2010
- Organizer and Chair of a **mini-symposium-MS9** “Performance Based Asset & Risk Management of Highway Infrastructure System,” International Association for Bridge Maintenance and Safety (IABMAS) Conference, Philadelphia, USA, 11-15 July 2010

#### CONSULTING EXPERIENCE:

I subscribe to the principle that engineering faculty should practice their art as **consultants to consulting engineers**, and that they **should not compete with practicing engineers**. I do not maintain a P.E. license and I do not consider it necessary for an academic to maintain professional licensure as long as meaningful intellectual partnerships are maintained with practicing consulting engineers and contractors through professional societies and consulting contracts. None of my mentors maintained a P.E. license, however, many of my students do.

#### Examples of Consulting Projects:

- **Moeser**: Blast and earthquake performance of steel doors for nuclear facilities, 1990
- **Henderson and Bodwell**: Mystery of the collapsed pipeline system over Foster's Bridge, 1991
- **Rumpke**: Study for minimizing blast effects on the construction in the vicinity of a landfill, 1992-97
- **US Army Corps of Engineers**: Preservation of Historic Monuments, 1992-93
- **University of Pittsburgh**: Evaluation of the Civil Engineering Graduate Program, 1995
- **New Mexico Transportation Alliance**: Review of Korean Bridge Studies, 1995 and 1996
- **Owens Corning**: Composites for infrastructure research support, 1995 and 1996
- **Federal Highway Administration Advanced Research Office**, Bridge Research Support, 1996, 1997, 2002, 2012
- **Applied Technologies**, NIST ATP Competition, 2001
- **ISIS-Canada**, the integration and interrogation of fiber-optic sensor systems with various conventional sensing systems for health monitoring, 2001-2004

- **Caterpillar** and **Motorola**, NIST ATP Sponsored “Shield” Research Program, 2002-2005
- **Steinman-Parsons TG of NY**, Vibration Testing of Brooklyn, Henry Hudson and Throgs Neck Bridges, 2002-2005
- **Burgess and Niple**, Field Testing for Fatigue-Life Evaluation of the Brent Spence Bridge, 2004
- **Pennsylvania Quartz**, Commercial and Technical Feasibility Evaluation of the Lawrence Livermore Laboratory’s HERMES GPR Technology for Condition Evaluation of Bridge Decks, 2004
- **US EPA**, Opportunities to Improve Structural Integrity Monitoring Capabilities for Water Mains through Federal Research and Technology Transfer, 2005-2006
- **Rutgers University**, Center for Advanced Infrastructure & Transportation, Consultant for the FHWA Long Term Bridge Performance Program (2008-present)
- **European Commission 7<sup>th</sup> Framework Research Project – IRIS** (2008-2012t)
- **Pennoni Associates, Inc**, joined as Founding Principal of the Intelligent Infrastructure Systems Division (2010)

### SPONSORED RESEARCH EXPERIENCE

#### University of California, Berkeley:

- “Seismic Behavior of Structural Components,” Research Engineer under Prof. E. P. Popov and Prof. V. V. Bertero, Sponsor: National Science Foundation, PFR-7908984 and CEE 81-07217 (1979-84).
- “The U.S.-Japan Cooperative Earthquake Research, RC Building Structures: Earthquake Simulator Tests and Associated Studies on a 1/5-Scale Model,” Research Engineer under Prof. V. V. Bertero and Prof. R. W. Clough, Sponsor: National Science Foundation, CEE 80-90478 (1981-84).
- “The U.S.-Japan Cooperative Earthquake Research, Steel Building Structures: Earthquake Simulator Tests and Associated Studies on a 1/3-Scale Model,” Research Engineer under Prof. V. V. Bertero and Prof. R. Clough, Sponsor: National Science Foundation, CEE 82-08141 (1982-84).

#### Louisiana State University:

- “Development of a Nondestructive Dynamic Test laboratory,” Principal Investigator, Sponsors: Louisiana State University, Louisiana Center for Energy Studies, Genrad, Inc., PCB Piezotronics, Inc., and Fluor Corp., Inc., \$75,000 (1984-86).
- “Implementing Diagnostic Testing in Bridge Maintenance,” Principal Investigator, Sponsors: Louisiana Transportation Research Center and FHWA, \$90,000 (1986-88).
- “Diagnosis and Repair of Prestressed Concrete Girders,” Co-Principal Investigator, Sponsors: Fluor Corp., Inc., Biloxi Prestress Concrete, Inc., and Louisiana State University, \$12,500 (1986).
- “GT STRUDL as a CAD Tool and Microcomputer as a Structural Engineering Workstation,” Bridge Engineer Training Program, Sponsors: Louisiana Department of Transportation and Development, and IBM Corporation, \$16,000 (1986).

#### University of Cincinnati:

- “Identification of Civil Engineered Structures,” Principal Investigator; Sponsor: National Science Foundation, ECE 86-14235; \$30,000 (1986-1988).

- “Nondestructive Testing and Identification for Bridge Rating,” Principal Investigator; Sponsors: Ohio Department of Transportation and FHWA; Phase 1: \$78,670 (1988-89); Phase 2: \$162,000 (1991-93).
- “Identification of Important Constructed Facilities as a Component of Their Seismic Vulnerability Assessment,” Principal Investigator; Sponsor: National Science Foundation through the National Center for Earthquake Engineering Research at Buffalo; \$20,000 initiation; \$60,000 for year 2; \$45,000 for year 3 (1988-1991).
- “Development of an Infrastructure Knowledge and Information Engineering Laboratory,” Principal Investigator; Sponsor: Ohio Board of Regents Research Challenge Grant; \$15,000 (1988-1989).
- “Development of an Excitation System for Field Dynamic Testing of Constructed Facilities,” Principal Investigator; Sponsor: Ohio Board of Regents Research Challenge Grant; \$72,000 (1989).
- “Destructive Testing of a Decommissioned RC Highway Bridge,” Principal Investigator; Sponsor: Ohio Department of Transportation and FHWA; \$348,248 (1990-1992).
- “Destructive Field Testing of a RC Bridge as a Benchmark to Validate FE Modeling and Analysis of RC Structures,” Principal Investigator, joint proposal with Wiss, Janney, Elstner Associates; Sponsor: National Science Foundation; \$170,300 (1990-1992).
- “Support of Fundamental Research Activities at the Cincinnati Infrastructure Institute,” Principal Investigator; Sponsor: Ohio Board of Regents Research Challenge Grant; \$125,000 (1990-1992).
- “Effect of Utility Cuts on Pavements,” Co-Principal Investigator; Sponsor: City of Cincinnati and American Public Works Association; \$375,955 (1991-1993).
- “Nondestructive/Destructive Tests and Associated Studies on Two Decommissioned Steel Truss Bridges,” Principal Investigator; Sponsor: Ohio Department of Transportation and Development, Franklin County, Ohio and FHWA; \$785,000 with \$100,000. (in-kind) support from Franklin County (1992-1994).
- “Exploring the Problems in Active Structural Control & Health Monitoring of Existing Constructed Facilities by Utilizing a Decommissioned Steel Truss Highway Bridge,” Principal Investigator; Sponsor: National Science Foundation; \$49,876 (1992-1993).
- “Technologies for Infrastructure Assessment,” Principal Investigator; Sponsor: Ohio Board of Regents Investment Fund, Research Consortia Centers of Excellence Program award through a statewide Competition, to the Ohio Infrastructure Institute; \$1,060,000 (1993-1995) and Operating Funds for the grant from the Research Challenge Program; \$20,000.
- “Instrumentation, Testing and Monitoring Reinforced Concrete Deck-On-Steel Girder Bridges,” Principal Investigator; Sponsor: Ohio Department of Transportation and Development and FHWA; \$320,000 for Phases I and II; \$630,000 for Phase III (1994-1998).
- “Evaluating Condition of Historic Steel Bridges,” Principal Investigator; Sponsors: National Science Foundation and the FHWA, Advanced Research Office; \$200,000 (1994-1997).
- “Implementing Active Control under the Ballroom Floor of the Cincinnati Convention Center - Feasibility Studies,” Principal Investigator; Sponsor: National Science Foundation; \$30,000 (1995).
- “Bridge Monitoring by Passive Smart-Sensors,” Principal Investigator from UC and in equal partnership with Dr. Bruce Westermo, President of Strain Monitor Systems, Inc., San Diego, Sponsor: Federal Highway Administration, (Nationwide Competitive BAA), \$449,558 (1996-1997).
- “Bridge-Type Specific Management of Steel-Stringer Bridges, Principal Investigator, Phase 1: Verification and Demonstration of the Experimental Tools,” Sponsors: Ohio Department of

- Transportation and FHWA Advanced Research Office, \$676,890 (1996-1998).
- “Nondestructive Condition Assessment and Preservation Design of a Historic Bridge,” Principal Investigator, Sponsors: Ohio Department of Transportation and FHWA, \$45,961 (1996-1997).
- “Instrumentation, Proof-Testing and Monitoring Three RC Deck on Steel Girder Bridges Prior to, During and After Super-load,” Principal Investigator, Sponsors: Ohio Department of Transportation and FHWA, \$88,800 (1996-1997).

#### **Drexel University:**

- “Bridge Structural Identification for Condition Assessment,” Sponsor: NSF CMS-9622259; Drexel Budget: \$83,418 (1997-2000) Multi-university research with Cincinnati, Tufts and Northeastern Universities.
- “Establishing Drexel Intelligent Infrastructure Institute and Transportation Safety Center,” Sponsor: FHWA HSR-20, \$810,000 (1997-2000).
- “Investigative Studies for Performance Evaluation and Condition Assessment of the Commodore Barry Bridge,” Sponsor: Delaware River Port Authority of PA and NJ, Phase 1: \$1,050,000 (1998-2000); Phase 2: \$1,560,000 (2000-2003).
- “Re-Qualification of RC T-Beam and Arched-Slab Bridges in Pennsylvania,” Sponsor: PennDOT and FHWA, \$880,000 (2000-2003).
- “Development of a Model Health Monitoring Guide for Major Bridges,” Sponsor: FHWA, Nationwide Competitive BAA, Contract DTFH61-01-P-00347, \$50,000 (2001-2002).
- A Problem-Focused Research Agenda for the Highway Transportation Infrastructure: A Holistic Systems Identification and Integration by Using Field Test-Sites, Proposal for Developing a Joint FHWA-NSF Initiative, Sponsor: National Science Foundation; \$34,900 (2003-2004).
- Evaluating Bridge Reliability Following Natural and Man-Made Hazards in Real-Time: Formulating an International Collaborative Research Program, NSF Workshop Grant, \$35,000 (2004-2005)
- Corrosion Monitoring Research For New York City Bridges, In Partnership With Columbia University, Physical Acoustics Corporation and Parsons TG of NY, USDOT-FHWA BAA Competitive Contract, Drexel Budget \$95,000 (2005-2009)
- Field Monitoring and Output-Only Modal Analysis of the Henry Hudson, Brooklyn and Throggs Neck Bridges at NY City, NY City MTA and NY City DOT through Parsons TG of NY, \$288,000 (2004-2009)
- Opportunities to Improve Structural Integrity Monitoring Capabilities for Water Mains through Federal Research and Technology Transfer, US EPA - EP05C000106, Competitive Small Business Contract, \$119,900 (2005-2006)
- Providing technical support to FHWA NDE Laboratory for Re-qualification of WV Coal Transport Route Bridges without documentation, \$ 377,723 (2005-2008)
- Reforming Civil Engineering Education Given the Societal Challenges Related to Infrastructures, Istanbul, Turkey, October 4-7, 2006, Sponsor: NSF (\$16,500) and TUBITAK (\$20,000) (2006-2007)
- Performance-Based Infrastructure Asset Management, 6-9 July, 2008, Istanbul, sponsored by NSF (\$25,000), FHWA (\$30,000), Turkish Science Council (\$25,000), European Commission and Japan Education Ministry.
- Health Monitoring and Asset Management of Burlington County Long-Span Bridges, CO-PI (with Dr. Franklin Moon as PI), Burlington County Bridge Commission, (\$975,000 since 2008-2012).

- The Learning Bridge (2009-2011), Sponsor: NSF (\$500,000, Drexel Share: \$225,000).
- Automated Nondestructive Evaluation and Rehabilitation System (ANDERS) for Bridges, CO-PI (with Dr. Franklin Moon as PI), NIST Technology Innovation Program (TIP) (Feb 2010- Jan 2014), Drexel Funding \$2,192,000.

## **SELECTED PUBLICATIONS**

### **Critically Reviewed Journal Articles**

- Aktan, A. E. and Pecknold, D. A. W., "Response of a Reinforced Concrete Section to Two-Dimensional Curvature Histories," Journal of the American Concrete Institute, May 1974.
- Aktan, A. E., Pecknold, D. A. W., and Sozen, M. A., "R/C Column Earthquake Response in Two Dimensions," Journal of the Structural Division, ASCE, October 1974.
- Sucuoglu, H. and Aktan, A. E., "Hysteretic Response of R/C Frames," ACI SP-63, Reinforced Concrete Structures Subjected to Wind and Earthquake Forces, ACI, 1980.
- Aktan, A. E. and Bertero, V. V., "Seismic Responses of R/C Frame-Wall Structures," Journal of Structural Engineering, ASCE, August 1984.
- Aktan, A. E. and Bertero, V. V., "Conceptual Seismic Resistant Design of Frame- Wall Structures," Journal of Structural Engineering, ASCE, November 1984.
- Aktan, A. E. and Bertero, V. V., "R/C Structural Walls: Seismic Design for Shear," Journal of Structural Engineering, ASCE, August 1985 (winner, Moisseiff Award).
- Bertero, V. V., Aktan, A. E., Charney, F. A. and Sause, R., "Earthquake Simulator Tests and Associated Analytical and Correlation Studies of a 1/5 Scale Replica Model of a Full Scale, 7-Story R/C Frame-Wall Structure," Publication SP-84, "Earthquake Effects on Reinforced Concrete Structures, U.S.- Japan Research," American Concrete Institute, 1985 (winner, R.C. Reese Structural Research Award).
- Aktan, A.E., Bertero, V. V. and Sakino, K., "Lateral Flexibility Characteristics of R/C Frame-Wall Structures," Publication SP-86, "Deflections of Concrete Structures," ACI, 1985.
- Aktan, A. E. and Bertero, V. V., "Measuring Internal Forces of Redundant Structures," Journal of Experimental Mechanics, Dec. 1985.
- Aktan, A. E. and Bertero, V. V., "Evaluation of Seismic Response of RC Buildings Loaded to Failure," Journal of Structural Engineering, ASCE, May 1987.
- Aktan, A. E., and Nelson, G., "Problems in Predicting Seismic Responses of RC Buildings," Journal of Structural Engineering, ASCE, September 1988.
- Aktan, A.E. and Ho, I.-K., "Seismic Vulnerability Evaluation of Existing Buildings," Earthquake Spectra, Journal of the Earthquake Engineering Research Institute, August 1990.
- Hogue, T.D., Aktan, A.E. and Hoyos, A., "Localized Identification of Constructed Facilities," Journal of Structural Engineering, ASCE, January 1991.
- Huria, V., Raghavendrchar, M., and Aktan, A.E., "3D Characteristics of RC Wall Response," Journal of Structural Engineering, ASCE, October 1991.
- Raghavendrchar, M. and Aktan, A.E., "Flexibility by Multi-reference Impact Testing for Bridge Diagnostics," Journal of Structural Engineering, ASCE, August 1992.
- Aktan, A.E., Zwick, M.J., Miller, R.A. and Shahrooz, B.M., "Nondestructive and Destructive Testing of a Decommissioned RC Slab Highway Bridge and Associated Analytical Studies," TRR 1371, pp:142-153; National Academy Press, 1993.

- Toksoy, T., Chuntavan, C. and Aktan, A.E., "Modal Analysis For Damage Detection In Structures," Discussion, Journal of Structural Engineering, ASCE, February 1993.
- Aktan, A.E., Chuntavan, C., Toksoy, T. and Lee, K.L., "Structural Identification of a Steel-Stringer Bridge for Nondestructive Evaluation," TRR 1393, pp:175-185, National Academy Press, 1993.
- Pant, P.D., Zhou, X., Arudi, R.S., Bodocsi, A. and Aktan, A.E., "A Neural Network Based Rating Index for Condition Evaluation of Pavements with Utility Cuts," TRR 1399, pp 8-13, National Academy Press, 1993.
- Shahrooz, B.M., Ho, I.K., Aktan, A.E., Borst, R., Blaauwendraad, J., Veen, C., Iding, R.H. and Miller, R.A., "Nonlinear Finite Element Analysis of a Deteriorated Slab Bridge," Journal of Structural Engineering, ASCE, February 1994.
- Hosahalli, S.R. and Aktan, A.E., "Seismic Vulnerability of Flat Slab-Core Buildings," Journal of Structural Engineering, ASCE, February 1994.
- Huria, V., Lee, K.-L., and Aktan, A.E., "Nonlinear Finite Element Analysis of a RC Slab Bridge," Journal of Structural Engineering, ASCE, January 1993; Closure to discussions: October 1994.
- Miller, R.A., Aktan, A.E. and Shahrooz, B.M., "Destructive Testing Of A Decommissioned Concrete Slab Bridge," Journal of Structural Engineering, ASCE, July 1994.
- Toksoy, T. and Aktan, A.E., "Bridge Condition Assessment by Modal Flexibility," Experimental Mechanics, Journal of SEM, Vol 34, No 3, pp: 271-278, September 1994.
- Huria, V., Lee, K.L. and Aktan, A.E., "Different Approaches To Rating Slab Bridges," Technical Note, Journal of Structural Engineering, October 1994.
- Aktan, A.E., Lee, K.L., Naghavi, R. and Hebbar, K., "Nondestructive and Destructive Experimental Studies of Two 80-Year Old Bridges," TRR 1460, pp. 62-72, National Academy Press, 1995.
- Shelley, S.J., Lee, K.L., Aksel, T. and Aktan, A.E., "Active Control and Forced Vibration Studies on a Highway Bridge," Journal of Structural Engineering, Vol 121, No 9, September 1995.
- Aktan, A.E., Farhey, D.N., Dalal, V., "Issues in Rating Steel-Stringer Bridges," TRR, 1476, pp.129-138, 1995, National Academy Press, Washington, D.C.
- Aktan, A.E. and Farhey, D., "Condition and Reliability Assessment of Constructed Facilities," ACI SP 162, pp: 73-92, August, 1996.
- Aktan, A.E., Dalal, V., Farhey, D., Helmicki, A., Hunt, V., and Shelley, S., "Condition and Reliability Evaluation for Bridge Management," Journal of Infrastructure Systems, Vol 2, No. 3, ASCE Sep. 1996.
- Helmicki, A.J., Aktan, A.E. and Hunt, V.J., "Issues In Bridge Control Systems Applications," Infrastructure, Vol. 2, No. 4, Wiley, 1997.
- Farhey, D., Thakur, A., Buchanan, R., Aktan, A.E. and Jayaraman, N., "Deterioration Assessment for Steel Bridges," Journal of Bridge Engineering, ASCE, Vol. 2, No. 3, August, 1997.
- Aktan, A.E., Farhey, D.N., Helmicki, A.J., Brown, D.L., Hunt, V.J., Lee, K.L. and Levi, A., "Structural Identification for Condition Assessment: Experimental Arts," Journal of Structural Engineering, ASCE, Vol. 123, No. 12, Dec., 1997.
- Aktan A.E., Catbas, N., Turer, A., and Zhang, Z., "Structural Identification: Analytical Aspects," Journal of Structural Engineering, ASCE, Vol. 124, No. 7, July, 1998.
- Aktan, A.E., Helmicki, A.J. and Hunt, V.J., "Issues In Health-Monitoring For Intelligent Infrastructure," Journal of Smart Materials and Structures, Vol. 7, No. 5, Oct., 1998.
- Lenett, M.S., Griessmann, A., Helmicki, A.J., and Aktan, A.E., "Subjective and Objective

- Evaluations of Bridge Damage,” TRR No. 1688, pp: 76-86, National Academy Press, Washington, D.C., 1999.
- Turer, A. and Aktan, A.E., “Issues in Super-Load Crossing Of Three Steel-Stringer Bridges in Toledo, Ohio,” TRR No. 1688, pp: 87-96, National Academy Press, Washington, D.C., 1999.
  - Aktan, A.E. and Helmicki, A., “Issues In Civil Infrastructure Systems Engineering,” Paper TS 9711-614M, Technology, Vol. 7, pp. 9-19, 2000.
  - Farhey, D.N., Naghavi, R., Levi, A., Thakur, A.M., Pickett, M.A., Nims, D.K. and Aktan, A.E., “Deterioration Assessment and Rehabilitation Design of an Existing Steel Bridge,” Journal of Bridge Engineering, Vol. 5, No. 1, Feb. 2000.
  - A.E. Aktan, K.A. Grimmelsman, R.A. Barrish, F.N. Catbas, and C.J. Tsikos, “Structural Identification of a Long-Span Truss Bridge” TRR No. 1696, pp: 210-218, National Academy Press, Washington, D.C., 2000.
  - A.E. Aktan, F.N. Catbas, K.A. Grimmelsman and C.J. Tsikos, “Issues In Infrastructure Health Monitoring For Management,” Journal of Engineering Mechanics, Vol. 126, No. 7, July, 2000.
  - Catbas, F.N. and Aktan, A.E., “Condition and Damage Assessment: Issues and Some Promising Indices,” Journal of Structural Engineering, Vol. 128, No. 8, Aug. 1, 2002.
  - Naghavi, R. and Aktan, A.E., “Nonlinear Behavior of Existing Heavy-Class Steel Truss Bridges,” Journal of Structural Engineering, Vol. 129, No. 8, August, 2003.
  - Catbas, F.N., Brown, D.L., Aktan, A. E. “Parameter Estimation for Multiple Input Multiple Output Modal Analysis of Large Structures,” Journal of Engineering Mechanics, ASCE, August, 2004.
  - Catbas, F. N., Grimmelsman, K.A., Barrish, R. and Aktan, A.E., “NDE of Tuned-Mass Damper Type Vibration Absorbers Using Vibration Signatures,” Journal of Materials in Civil Engineering, ASCE, December, 2003.
  - Catbas, F. N., Ciloglu, and Aktan, A. E., “Strategies for Condition Assessment of Infrastructure populations: A Case Study on T-beam Bridges,” Structure and Infrastructure Engineering, Vol. 1, No. 3, pp: 221-238, September, 2005, Taylor and Francis.
  - Moon, F. and Aktan, A.E., "Impacts of Epistemic Uncertainty on Structural Identification of Constructed Systems", Invited State-of-Art Review Manuscript, *Shock and Vibration Digest*, Vol. 38, No. 5, Sep. 2006.
  - Catbas, F.N., Brown, D.L., Aktan, A. E., “Use of Modal Flexibility for Damage Detection and Condition Assessment,” *Journal of Structural Engineering*, Vol. 132, No. 11, November 1, 2006.
  - Aktan, A.E., Ellingwood, Bruce, and Kehoe, Brian, “Performance-Based Engineering of Constructed Systems,” Journal of Structural Engineering, Forum Paper, *Journal of Structural Engineering*, March 2007.
  - Kirk A Grimmelsman, Qin Pan, and A. E. Aktan, Analysis of Data Quality for Ambient Vibration Testing of the Henry Hudson Bridge, *Journal of Intelligent Material Systems and Structures*, 4 2007; vol. 0: pp. 1045389X06074774v1.
  - Catbas, F.N., S. K. Ciloglu, O. Hasancebi, K. Grimmelsman, A. E. Aktan, “Limitations In Structural Identification of Large Constructed Structures,” *Journal of Structural Engineering*, Vol. 133, No. 8, August 1, 2007, pp. 1051-1066.
  - F. Necati Catbas and A. Emin Aktan, Development of a Monitoring System for a Long-Span Cantilever Truss Bridge, Encyclopedia of Structural Health Monitoring, John Wiley & Sons Ltd, Great Britain, 2007.

- Moon, F.M., Aktan, A.E., Furuta, H. and Dogaki, Masahiro, "Governing Issues and Alternate Resolutions for a Highway Transportation Agency's Transition to Asset Management," Paper invited for a special issue of the SIE Journal, Taylor and Francis, Nov 2008, Vol. 5 (1), 2009.
- P.L. Gurian, A.E. Aktan, F. Montalto, and F. Moon (2009) "Research Priorities for Infrastructure Asset Management", *COMMONWEALTH: A Journal of Political Science*.
- Moon, F., A.E. Aktan, F. Jalinoos, S. Jin, "Leveraging Technology for Performance Based Bridge Engineering," *Materials Evaluation, Journal of ASNT*, Sep 2009.
- Pan, Q, K. Grimmelsman, F.L. Moon and A.E. Aktan (2010) "Mitigating Epistemic Uncertainty in Structural Identification," *Journal of Structural Engineering*, Vol. 137, No. 1, January 1, 2011
- Ciloglu, K., Y. Zhou, F.L. Moon and A.E. Aktan (2010), "Impacts of Epistemic Uncertainty in Operational Modal Analysis", Paper accepted for publication by the *ASCE Journal of Engineering Mechanics*, 2012.
- Zhang, J., J. Prader, K.A. Grimmelsman, F. Moon and A.E. Aktan; with, Shama, A." (2010) "Experimental Vibration Analysis for Structural Identification of a Long Span Suspension Bridge," paper accepted for Publication by *the ASCE Journal of Engineering Mechanics*.
- Zhou, Y., Prader, J., Weidner, J., Dubbs, N., Moon, F. and Aktan, AE. (2010), 'Structural Identification of a Deteriorated Reinforced Concrete Bridge,' "Paper accepted for Publication by *ASCE Journal of Bridge Engineering*.
- Mota, M., Moon, F. and Aktan A.E., "Shake Table Acceleration Tracking Performance Impact on Dynamic Similitude," Paper Submitted to *ASCE Journal of Structural Engineering* for review, 2012.
- Aktan, A.E. and Brownjohn, J.M.W., Structural Identification: Opportunities and Challenges, Forum Paper accepted by *ASCE Journal of Structural Engineering* for a special issue on Structural identification, 2012.
- Spatari, S. and Aktan, A.E., Asset Management in Civil Engineering, Guest Editorial, Special Issue of *Structure and Infrastructure Engineering on Infrastructure Asset Management*, Taylor and Francis, Vol. 00, No. 0, Month 2012, 1–2.

### **Invited Papers and Presentations**

- Bertero, V. V. and Aktan, A. E., "Seismic Resistant Design of Frame-Wall Reinforced Concrete Building," Paper invited for presentation, Annual Convention of the ACI, San Juan, September 1980.
- Aktan, A. E., Hogue, T. and Hoyos, A., "Identification of Civil Engineering Structures," Paper invited for presentation at and published in the Proceedings of the 1987 SEM Spring conference on Experimental Mechanics, Houston, June 14-15, 1987, pp: 385-400.
- Aktan, A.E., "Predicting Lateral Displacement and Drift in RC Frame-Wall Building," Paper invited for presentation, ACI Annual Convention, March 14, 1988, Orlando.
- Aktan, A. E., "An Evaluation of the Turkish Seismic Code in the Light of the Recent Research Results," Paper invited for presentation and published in the Proceedings of the 9th Meeting of the Chamber of Civil Engineers, Ankara, Turkey, November 1987 (sponsored by UNESCO).
- Aktan, A. E. and Ho, I.-K, "Evaluating Reliability of Constructed Facilities," Paper invited for presentation at and published in the Proceedings of the NSF- Sponsored Workshop: Rescue of America's Infrastructure, University of Puerto- Rico at Mayaguez, July 18-22, 1989.



- Aktan, A. E., Reporter on Discussions of Group on Masonry and Timber, National Science Foundation Workshop on Vulnerability of Construction to Earthquake Hazard in Regions of Low to Moderate Seismicity, 9-10 November, University of Illinois, Urbana, Illinois.
- Aktan, A. E., "Building Response During the 1989 Loma Prieta, California Earthquake," Paper invited for presentation at the Loma Prieta Earthquake Briefing, National Center for Earthquake Engineering Research, SUNY, Buffalo, NY, November 27, 1989.
- Aktan, A. E., "Evaluating Seismic Vulnerability of Important Facilities," Paper invited for presentation by the National Center for Earthquake Engineering Research for Seminars on Earthquakes, Buffalo, Dec. 14, 1990.
- Aktan, A.E., "Generic Problems: Beams," and "Specific Applications," Papers presented at the International Workshop on Finite Element Analysis of RC Structures, June, 1991; Published in the Proceedings: "Finite Element Analysis of Reinforced Concrete Structures II", Edited by J. Isenberg, ASCE, 1993, pp: 490-691.
- Aktan, A.E., "Relation between RC Material Durability vs. Bridge Durability," paper invited for presentation at the 1991 Annual Convention of ASCE, October 1991, Florida.
- Aktan, A.E., "Preserving Historic Buildings of Major Importance: Structural Engineering Aspects," Proceedings of the Joint U.S.-Turkey Workshop, sponsored by NSF and NATO on Preserving Historic Buildings of Major Importance, Istanbul, May 1992.
- Zwick, M., Aktan, A.E., Shahrooz, B. and Miller, R., "Nondestructive and Destructive Testing Of a Decommissioned RC Slab Highway Bridge and Associated Analytical Studies," Paper invited for presentation at the Annual International Bridge Conference and Exhibition, and published in the Proceedings as Paper IBC-92-8, June 1992, Pittsburgh.
- Aktan, A.E. and Somaprasad, H., "Seismic Vulnerability of RC Midrise Flat Slab-Core Buildings," Paper invited for presentation at the Session on Concrete Buildings in Zones of Low to Moderate Seismicity, 1992 Spring Convention, ACI, March 1992, Washington, D.C.
- Aktan, A.E., "Constructed Facility Identification Research at the Cincinnati Infrastructure Institute," Presentation invited by the US Army Corps of Engineers, WES, Str. Mec. Div., Vicksburg, MS Nov. 1992.
- Aktan, A.E., "A Summary of Important Findings Resulting From University of Cincinnati's Bridge Research for ODOT," presentation invited by the AASHTO Bridge Committee, 1993 AASHTO Meeting, Denver, May 1993.
- Aktan, A.E., "Structural Identification of Constructed Facilities," Paper invited for presentation at the joint U.S.-Japan Workshop on Experimental Methods, Honolulu, Hawaii, sponsored by NSF, June, 1993.
- Aktan, A.E. and Zoghi, M., "Technological Innovation Needs For Infrastructure Assessment," Keynote address invited by the Ohio River Valley Soils Seminar XXIV, Cincinnati, 1993.
- Aktan, A.E., "Report on Destructive Testing of Two Truss Bridges," Paper invited for presentation at the 47th Annual Ohio Transportation Conference, Columbus, 1993.
- Aktan, A.E., Lee, K.L. and Dalal, V., "Multireference Modal Testing For Bridge Diagnostics," Paper invited for the Structural Materials Technology, An NDT Conference Sponsored By NJDOT and FHWA, Atlantic City, NJ, and published in the proceedings, February, 1994.
- Aktan, A.E., "Issues in Health-Monitoring of Steel-Stringer Bridges," Presentation invited by Committee A2C02, Steel Bridge Committee of the TRB, NRC, January 25, 1995.
- Helmicki, A.J., Aktan, A.E. and Hunt, V.J., "Issues in the Implementation of Structural Monitoring to Constructed Facilities," Paper invited for presentation at and published in the Proceedings of 1995 American Control Conference, Seattle, WA, June 21-23, 1995.
- Aktan, A.E., "Bridge Condition Assessment Using Instrumentation and/or Modal testing," Presentation invited by CALTRANS, Division of Structures, August 21, 1995.

- Aktan, A.E., "Challenges in Diagnosing and Characterizing Common Defects, Deterioration and Damage in Highway Bridges," Presentation invited for the Damage Workshop, Los Alamos National Laboratory, September 13-15, 1995.
- Aktan, A.E., "Measured Behavior of Steel-Stringer Bridges," Presentation Invited by Ohio-FHWA for the Ohio Transportation Engineering Conference, Columbus, November 25, 1995.
- Aktan, A.E., "Progress report On Instrumented Monitoring of Bridges," Presentation invited by the Transportation Research Board Com. A2C02, Concrete Bridges, 1996 TRB Meeting, D.C., Jan. 8, 1996.
- Aktan A.E. and Dalal, V., "Objective Bridge Condition Assessment," Paper invited for presentation and published in the Proceedings of the 1996 Structural materials Technology and Nondestructive Testing Conference, Sponsored by CALTRANS and FHWA, San Diego, Feb. 20-23, 1996.
- Aktan, A.E., "Modal Testing and Monitoring of Bridges," Tutorial Invited for the Second International Conference on NDE of Concrete in the Infrastructure, Sponsored by SEM, Nashville, June 13, 1996.
- Aktan, A.E. and Dalal, V., "Bridge Superload Monitoring," Presentation invited by TRB Committee A2C05, Dynamics and Bridge Testing, 1997 TRB Meeting, Washington, D.C., Jan. 15, 1997.
- Aktan, A.E., "Issues In Bridge Health-Monitoring," Presentation Invited by The Wilson Forum - West, Sponsored by Caltrans, Martin Marietta Materials and Wilson Composite Group, April 7-8, San Diego, 1997.
- Aktan, A.E., "Issues In Civil Infrastructure Systems Engineering," Paper Invited for Presentation and Published in the Proceedings of the Architectural Surety Conference, Sandia National Laboratories, May 14-15, 1997.
- Aktan, A.E., "Condition Assessment and Capacity Evaluation of Historic Steel Bridges," Poster invited for presentation at the NSF/CERF Industry/University Innovation Workshop, Oct. 19-20, 1997, VA
- Aktan, A.E., "Bridge Health-Monitoring System Demonstration," Presentation and demonstration invited by FHWA for North Atlantic Region Bridge Engineers Meeting, Philadelphia, March 26, 1998.
- Aktan, A.E., "Issues in Bridge Monitor Design by Fiber-Optics," Presentation invited for the International Workshop on Fiber-Optic Sensors for Construction, Sponsored by NSF and FHWA, NJIT, May 4, 1998.
- Aktan, A.E., "Challenges and Opportunities in Bridge Health-Monitoring," Presentation Invited by the Johns Hopkins University, College of Engineering Seminar, September 15, 1998.
- Aktan, A.E., "Challenges and Opportunities in Health-Monitoring of Constructed Facilities," Paper invited for and Published in the Proceedings of the 5th International Workshop on Material Properties and Design, Oct 29-30, 1998, Bauhaus-Universitat, Weimar, Germany.
- Aktan, A.E., "Security Issues," Plenary Panel Presentation invited for the Conference on Limitations to Data Access for Disaster Management, GDIN Program of USGS and FEMA, National Academy of Public Administration, Jan 26, 99.
- Aktan, A.E., "Role of NDE in Bridge Health-Monitoring," Paper invited for presentation and published in the Proceedings of "Nondestructive Evaluation Techniques for Aging Infrastructure & Manufacturing," SPIE, 3-5 March, 99, Newport Beach, CA.
- Aktan, A.E., "Health-Monitoring as a New Paradigm in Civil Infrastructure Systems Engineering," Presentation Invited by the Columbia University at New York, Department of Civil Engineering Seminar, December 7, 1999.

- Aktan, A.E., "Health-Monitoring of Civil Infrastructure Systems," Presentation Invited by ISIS Canada and Dalhousie University, Halifax, Nova Scotia, Canada, May 22, 2000.
- Aktan, A.E., Catbas, F.N., Pervizpour, M., Kulcu, E., Grimmelsman, K., Barrish, R. and Qin, X., "Real-Time Bridge Health-Monitoring for Management," Paper invited for presentation and published in the Proceedings of The Second Workshop on Advanced Technologies in Urban Earthquake Disaster Mitigation, DPRI, Kyoto University, Uji, Kyoto 611-0011, Japan, July 11-13, 2000.
- Aktan, A.E., "Bridge Characterization and Health-Monitoring," Presentation invited by the Federal Highway Administration, USDOT for Workshop on Earthquakes in Turkey, 1999, Ankara, Turkey, Nov 2000.
- Aktan, A.E., Pervizpour, M., Catbas, F.N., Barrish, R., Grimmelsman, K., Qin, X., "Integrated Field, Theoretical and Laboratory Research for Solving Large Systems Identification Problems," Keynote address invited for presentation and published in the Proceedings of Advances in Structural Dynamics, Hong Kong, Dec. 2000.
- Aktan, A.E., "CIS Health Monitoring Research and Development," Presentation Invited For the ATP Workshop on Structural Health Monitoring, Organized for NIST at Stanford University, CA, Dec. 2000.
- Aktan, A.E., Pines, D., Inman, D., "The Woodrow Wilson Bridge Project", Presentation at the Workshop on Health Monitoring of Long-Span Bridges, Sponsored by NSF and FHWA, Irvine, 9 March 2001.
- Aktan, A.E., "Monitoring The Health of Constructed Systems," Presentation invited for the NSF Workshop on Advanced Sensor Technology for Civil Engineering Systems, Austin, 19 April 2001.
- Aktan, A.E., "Health Monitoring of Transportation Infrastructure," Keynote Luncheon Speech Invited for the ISIS-Canada 2001 Conference, Edmonton, Alberta, May 2, 2001.
- Aktan, A.E., et al, "Health Monitoring of Major Bridges by SCADA Systems," Presentation Invited for the IABSE Conference, Seoul, 2001, Cable-Supported Bridges, Challenging Technical Limits, and Published in The Proceedings, IABSE Reports, Volume 84, June 12-14, 2001, Seoul, Korea.
- Aktan, A.E. and Meystel, Alexander, "Exploring Real Time Intelligent Control Systems (RICS) For Monitoring and Managing Transportation Networks," Presentation invited for NSF-Institute for Civil Infrastructure Systems (ICIS) Workshop: "Bringing Information Technology to Infrastructure", June 25-27th, Arlington, VA.
- Aktan, A.E., "Information Technology Research Needs for Infrastructure Systems Protection and Management," Presentation Invited for the Meeting on US-UK Exchange Experience in Civil Infrastructures, supported by NSF, London, July 6, 2001.
- Catbas, F. N., Ciloglu, S. K., Hasancebi, O., and Aktan, A.E., "Fleet Strategy for Condition Assessment & Its Application For Re-Qualification of Pennsylvania's Aged T-Beam Bridges", Presentation invited at the TRB-A2C05 Committee's 2002 Meeting, Washington, D.C., 2002.
- Grimmelsman, K. and Aktan, A.E., "Overview of a Health Monitoring System for the Commodore Barry Bridge", Presentation invited by TRB Committee A2C05, Dynamics and Bridge Testing, Washington, D.C., January 2002.
- Aktan, A.E., "Multi-Hazards Risk Management In Metropolitan USA", Presentation invited by the Architectural Surety Group at the Sandia NL, Albuquerque, February 2002.
- Aktan, A.E., Catbas, M. Pervizpour And K. Grimmelsman, Pro-Active Management Of Highway Bridges By Health Monitoring," Paper Invited For Presentation At The Session: Lifetime Performance Prediction Of Structural Systems And Optimal Maintenance Planning, Organized By Dan M. Frangopol, ASCE-SEI Structures Congress, Denver April 2002.

- Aktan, A. E., Catbas, F. N., Grimmelsman, K., Pervizpour, M., Curtis, J., Shen, K., and Qin, X. "A Theory Of Health Monitoring For Highway Bridges", Paper invited for presentation and published in the Proceedings of the First International Conference on Bridge Maintenance, Safety and Management by the International Association for Bridge Maintenance and Safety (IABMAS) Conference at Barcelona, July 2002.
- "Issues In Designing Research on Sensing for Intelligent Constructed Systems," discussion invited for the National Workshop on Future Sensing Systems for "Living, Nonliving, and Energy Systems," Sponsored by NSF, Lake Tahoe, August 2002.
- Aktan, A.E., "Model Health Monitoring Guide For Major Bridges", Presentation invited for a Special Session for Introducing the Model Health Monitoring Guide at the FHWA Topical Conference on Structural Materials Technology (SMT): NDE / NDT for Highways and Bridges, September 10-13, 2002, Cincinnati, OH.
- Aktan, A.E., "Development of a Model Health Monitoring Guide for Major Bridges", Keynote address invited for presentation at the First International Workshop on Structural Health Monitoring of Innovative Civil Engineering Structures, organized by ISIS-Canada, Winnipeg, September 19-20, 2002.
- Aktan, A.E. and Comfort, L., "Managing Multi-Hazards Risk For Metropolitan Regions," Paper invited for presentation at and published in the Proceedings of the 2nd SEWC at Yokohama, October 2002.
- Aktan, A.E. "Load Capacity Evaluation of Pennsylvania's T-Beam Bridges," Presentation invited for the meeting of the NAS-TRB Committee A2C03, Concrete Bridges, January 2003.
- Aktan, A.E., "Research Needs for Intelligent Infrastructure Systems," Seminar invited for presentation at the University of California at Irvine, February 2003.
- Aktan, A.E., "The Health Monitoring Paradigm for Infrastructure Systems," Paper invited for presentation and for publication in the Proceedings of a Workshop on Structural Health Monitoring and Diagnostics of Bridge Infrastructure, University of California San Diego/Caltrans, 7 March 2003.
- Aktan, A.E., "An Effective Integrated Approach to the Operational Efficiency, Structural Preservation and Security of Transportation and Other Infrastructure Systems," Presentation to CMS Division of the National Science Foundation, VA, April 23, 2003.
- Oguzhan Hasancebi, Necati Catbas, Kirk Grimmelsman, Mesut Pervizpour and Emin Aktan, "Finite Element Model Development and Calibration for a Long-Span Bridge," Presentation invited for A National Workshop on Innovative Applications of Finite Element Modeling in Highway Structures, Aug 20, 2003, NY City, NY
- F. N. Catbas, S. K. Ciloglu, K. Grimmelsman, Q. Pan, M. Pervizpour and A. E. Aktan, "Limitations in the Structural Identification of Long-Span Bridges," Keynote Paper invited for Presentation and Published in the Proceedings of the International Workshop on Structural Health Monitoring of Bridges and Colloquium on Bridge Vibration, Task Committee of Japan Society of Civil Engineers, September 1-2, 2003, Kitami, Japan.
- E. Aktan and D. Faust, "A holistic integrated systems approach to assure the mobility, efficiency, safety and integrity of highway transportation," Keynote Paper invited for Presentation and Published in the Proceedings of SHMII-1'2003, Tokyo, Japan, November 13-15, 2003.
- Haldar, A., Feng, M. and Aktan, A.E., "Issues in Performance Based Engineering for Buildings and Bridges" Invited presentation for Session: Performance Based Engineering, ASCE SEI 04 Structures Congress, 2004.

- Aktan, A.E., "The Integrated Asset Management Paradigm for the Highway Transportation Infrastructure," Presentation invited for the Session: Life-Cycle Design is More Than Minimum Costing," ASCE SEI 04 Structures Congress, 2004.
- Ciloglu, K., Grimmelsman, K., Pan, Q., Aktan, A.E., "Evaluation Of Structural Health-Monitoring Techniques For Damage Assessment Through A Benchmark Physical Model," Invited Sectional Keynote Paper, Third European Conference on Structural Control, 12-15 July 2004, Vienna, Austria
- Aktan, A.E., "Intelligent Systems and Homeland Security," Presentation Invited By PERMIS'04, Performance Metrics for Intelligent Systems, 25 August, 2004, NIST Campus, Gaithersburg, MD.
- Aktan, A.E., "Health Monitoring for Post-Hazard Highway Bridge Reliability," Presentation invited by FHWA and Paper Published in the Proceedings of the 2nd Turkey-US Workshop on Seismic Design and Retrofit of Highway Bridges, Sponsored by NSF, Ankara, 20-23 September 2004.
- Aktan, A.E., "Research at Field Laboratories for Advancing the Engineering and Management of the Highway Transportation Infrastructure," Lecture invited for the International Seminar on Next Generation of Bridge Design Technology, Commemorating the Establishment of Korea Bridge Research Center, Seoul National University, October 25-26, 2004, Seoul, Korea.
- Zhang, R. and Aktan, A.E., "Design Considerations for Sensing Systems to Ensure Data Quality," Paper invited for Presentation at an International NSF-Supported Workshop at Hawaii, and Published in the Proceedings: "Sensing Issues in Civil Structural Health Monitoring, pp: 281-291, Springer, 2005.
- Aktan, A.E., "Overview of Health Monitoring Technologies, TRB Workshop 107, Sunday, January 09, 2005, 8:30 AM - 12:00 PM, Shoreham, Application of Health Monitoring for Bridges, Lecture Invited by: *Dynamics and Field Testing of Bridges Committee (AFF40)*, TRB, NAE.
- Aktan, A.E. and Moon, F.L., "The Health Monitoring Paradigm For Infrastructure Management," Keynote Paper invited by and Published in the Proceedings of International Colloquium on Structural and Geotechnical Engineering, Ain Shams University, Cairo May 17-19, 2005.
- A.E. Aktan, "Research on Experimental tools for Infrastructure Health Monitoring," Presentation invited for the SAMCO Summer Workshop at Zel-Am-Zee Austria, September 6-9, 2005.
- Grimmelsman, K.A. and Aktan, A.E., "Uncertainty in Field Testing and Monitoring Applications," Tutorial Invited for Presentation on Real Time Monitoring of Cable Structures and Related Decision Planning, Sixth International Symposium on Cable Dynamics, Charleston, S.C., September 2005.
- A.E. Aktan, S.K. Ciloglu, K.A. Grimmelsman, Q.Pan, F.N. Catbas, "Opportunities and challenges in health monitoring of constructed systems by modal analysis," Keynote paper presented at and published in the Proceedings of EVACES 2005, Experimental Vibration Analysis for Civil Engineering Structures 26-28 October 2005, Bordeaux, France.
- A.E. Aktan, P. Balaguru, H. Ghasemi, A. Mufti and S. McCabe, "Reforming Civil Engineering Education Given the Challenges Related to Infrastructure Engineering and Management," Keynote Paper Presented at and Published in the Proceedings of the Workshop on SHM of Intelligent Infrastructures, SHMII'05, Nov 2005, China.

- A.E. Aktan, ‘Towards Performance Based Civil Engineering,’ Paper invited for presentation at the 2005 Pennsylvania Transportation Engineering and Safety Conference, State College, Dec. 2005.
- Aktan, A.E. and Moon, F.L., “Governing Issues and Alternate Resolutions For A State Department of Transportations’ Transition to Asset Management,” Paper Invited for presentation at an IABMAS’06 Special Session entitled: "Politics and Perception in Life-Cycle Decisions," and Published in the Proceedings of IABMAS’06, Porto, Portugal, July, 2006.
- Moon, F.L. and Aktan, A.E., “Structural identification of constructed systems and the impact of epistemic uncertainty” Paper invited for presentation at a Special Session: Status and Findings of Current BHM Applications in the World, IABMAS 06, Porto, Portugal July 2006.
- Grimmelsman, K.A. and Aktan, A.E., “Challenges in Operational Modal Analysis of Suspension Bridges,” Paper invited for presentation at a Special Session on “Operational Modal Analysis in Presence of Deterministic Inputs” and published in the proceedings of ISMA, Noise and Vibration Engineering Conference, Leuven, September, 2006.
- Aktan, A.E., Paradigms and Technologies for Engineering and Management of Intelligent Infrastructure Systems, Paper presented at the World Forum on Smart Materials and Structures Technology, Nan Jing, China, May 2007.
- Qin Pan, John B. Prader, Franklin Moon and Emin Aktan, “Identification of Civil Engineering Structures and Uncertainty,” Paper presented at and published in the *Proceedings of the 6th International Workshop on Structural Health Monitoring, Stanford University, Destech Publications, September 2007.*
- Moon, F.L., Aktan, A.E., Gurian, P., Montalto, F., “Infrastructure Systems and Asset Management,” Keynote Presentation, International Workshop on Performance-Based Infrastructure Asset Management, Istanbul, July 7-9, 2008.
- Moon, F.L., P. Gurian, F. Montalto, and A.E. Aktan (2008) “Integrating human, natural and engineered systems and associated paradigms for infrastructure asset management,” Fourth International Conference on Bridge Maintenance, Safety and Management (IABMAS 08), Seoul, Korea, July 13-17
- Moon, F.L., A.E. Aktan, F. Jalinoos, and H. Ghasemi (2008) “Structure and infrastructure health monitoring as a key enabling paradigm for integrated asset management,” Fourth International Conference on Bridge Maintenance, Safety and Management (IABMAS 08), Seoul, Korea, July 13-17
- Weidner, J., J. Prader, F.L. Moon, and A.E. Aktan (2008) “Grounds for a rapid screening device – A case study,” IABSE Chicago Congress, September 17 - 19.
- Aktan, A.E., “Challenges in Geriatric Bridge Engineering,” Paper Invited for Presentation at and Published in the Proceedings of the European Commission Research Project: IRIS (Integrated European Industrial Risk Reduction System), Summer Academy, Zel am See, Austria, 1-4 September 2009.
- Zhang, J., Franklin L. Moon and A. Emin Aktan, Drexel University (2009) “Challenges in Experimental Vibration Analysis for St-Id and SHM Including Possible Mitigation Strategies,” Keynote Paper Invited for Presentation and Publication at the Proceedings of Experimental Vibration Analysis for Civil Engineering Structures (EVACES) October 14-16, 2009, Wroclaw, Poland
- Moon, F., A.E. Aktan, Yegian, M., Irfanoglu, A., Sozen, M., Hurlebaus, S., J. Roesset, “Reforming Civil Engineering Education in the USA,” Paper Invited for Presentation and Publication in the Proceedings of a European Symposium on Civil Engineering Education, 5-7 Nov 2009, Antalya, Turkey.

- A.E. Aktan and F.L. Moon, Risk of Infrastructure Performance Failures, Invited Presentation and SPIE Paper 7649-4, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security IV (Conference 7649), 7-11 March 2010, San Diego
- Aktan, A.E., F.L. Moon and Lowdermilk, D., **Five Lectures Invited for Presentation at the CISM** (International Centre for Mechanical Sciences) Professional Course on "Monitoring, Control and Identification of Bridges by Dynamic Methods," Udine, Italy, May 24-28, 2010
- Aktan, A.E., "Risk-Based Asset Management of Highway Infrastructure," Keynote Presentation Invited by IRIS Summer Academy, Zel am See, Austria, Sep 2010.
- Glisic, B., M. Yarnold, F. Moon, and A. E. Aktan, "Advanced visualization and accessibility to SHM results involving real-time and historic multi-parameter data and camera images," Paper invited for Presentation at and Published in the Proceedings of the 2012 ASCE Structures Congress, May 29-31, 2012, Chicago.

### **Selected Conference Presentations and Papers in Conference Proceedings:**

- Aktan, A. E., "Effects of History on Biaxial Resistance of a Reinforced Concrete Section," Proceedings, Chapter 5, Fifth European Conference on Earthquake Engineering, Istanbul, 1975.
- Aktan, A. E. and Ersoy, U., "Analytical Study of R/C Material Hysteresis," Paper presented at the AICAP-CEB Symposium on Structural Concrete Under Seismic Actions, Rome, and published in the CEB Bulletin No. 132, 1980.
- Bertero, V. V. and Aktan, A. E., "Seismic Behavior of R/C Coupled Walls," Paper presented at and published in the Proceedings of the Sixth National Meeting of the Universities Council for Earthquake Engineering Research, University of Illinois at Urbana, Illinois, May 1980.
- Aktan, A. E. and Bertero, V. V., "Experimental and Analytical Prediction of the Mechanical Characteristics for 7-Story R/C Frame-Wall Structure," Paper presented at and published in the Proceedings of the Fourth ASCE-EMD Specialty Conference, Purdue University, West Lafayette, Indiana, May, 1983.
- Aktan, A. E. and Bertero, V. V., "Earthquake Responses of a 7-Story 1/5 Scale R/C Frame-Wall Structural System," Paper presented at and published in the Proceedings of the Eighth World Conference on Earthquake Engineering, Earthquake Engineering Research Institute, Berkeley, California, 1984.
- Bertero, V. V., Aktan, A. E., Llopiz, C. and Wang, C. M., "Shaking Table Studies on a Moderate-Scale Model," Paper presented at the Symposium on US- Japan Cooperative Research Program for Steel Buildings, ASCE Annual Convention, October 1984, San Francisco.
- Aktan, A. E., "Building Identification: Needs and Means," Proceedings of the Third ASCE Engineering Mechanics Specialty Conference on Dynamics of Structures, Los Angeles, March 1986.
- Aktan, A. E. and Nelson, G., "Inelastic Analysis of RC Sections," Paper presented at and published in the Proceedings of the Third U.S. Nat'l Conf. on Earthquake Engineering, Charleston, Aug 1986.
- Aktan, A. E., Hogue, T. and Hoyos, A., "Identification of Civil Engineering Structures," Paper presented at the ASCE-EMD 6th Specialty Conference, May 20-22, 1987, Buffalo.
- Aktan, A. E. and Nam, D. H., "Inelastic Analysis for Vulnerability Assessment," Paper presented at and published in the Proceedings of the 6th ASCE Structures Congress, 1987,

Orlando.

- Aktan, A. E., Hogue, T. D. and Hoyos, A., "Regional Identification of Civil Structures," Paper presented at and published in the Proceedings of the NSF- Sponsored International Workshop on Nondestructive Evaluation for Performance of Civil Structures, 2-3 February 1988, University of Southern California, Los Angeles, pp: 135-180.
- Aktan, A. E., "Seismic Vulnerability Evaluation and Upgrading of RC Buildings," Paper presented at and published in the Proceedings of the 2nd U.S.-Japan Workshop on Urban Hazards Reduction, July 27-29, Shimizu, Japan, 1988.
- Aktan, A. E., "Present and Future in RC Building Analysis," Paper presented at and Published in the Proceedings of the 9th World Conference on Earthquake Engineering, Aug. 2-9, Tokyo and Kyoto, Japan, 1988.
- Raghavendrchar, M. and Aktan, A. E., "FE Analysis of RC Wall and Core Sections," Paper presented at and published in the Proceedings of the 8<sup>th</sup> ASCE Structures Congress, Baltimore, 1990.
- Aktan, A. E., Shahrooz, B. and Baseheart, M., "Vulnerability Evaluation of a 27-Story RC Building Based on Its Dynamic Testing and Identification," Paper presented and published in the Proceedings of the Fourth U.S. National Conference on Earthquake Engineering, 1990.
- Shahrooz, B., Aktan, A.E. and Chuntavan, C., "The Effect of Various Parameter's on Seismic Response of Structures," Proceedings of the Fourth U.S. National Conference on Earthquake Engineering, 1990.
- Aktan, A.E., Toksoy, T., and Hosahalli, S., "Implications of Modal Test and Structural Identification on Active Structural Control," Paper presented at and published in the Proceedings of the U.S. National Workshop on Structural Control Research, 25-26 October 1990, USC, CA.
- K.L. Lee and Aktan, A.E., "Three Dimensional Collapse Analysis of a RC Frame," Paper presented at and Published in the Proceedings of Structures Congress'92, San Antonio, April 1992.
- Barzegar, F., Isenberg, J., Aktan, A.E., Vecchio, F. and Yoshikawa, "Generic Problems in FE Analysis of RC Structures," Paper presented at and Published in the Proceedings, Structures Congress'92, San Antonio.
- Iding, R.H., Conley, C. and Aktan, A.E., "Applications of FE Analysis to Concrete Structures," Paper Presented at and Published in the Proceedings of Structures Congress'92, San Antonio, April 1992.
- Aktan, A.E., "Establishing a Seismic Safety Policy in Regions With Fuzzy Seismicity," Proceedings, 10th World Conference in Earthquake Engineering, Madrid, 1992.
- Aktan, A.E., Chuntavan, C. and Lee, K.L., "Seismic Vulnerability of Steel Stringer Bridge With Integral Abutments," Paper presented at the 1992 Fall Convention of the ACI, San Juan, Oct., 1992.
- Aktan, A.E., Toksoy, T., Chuntavan, C., Lee, K.L., "Bridge Nondestructive Evaluation by Structural Identification: 1. Description of the Methodology; and, 2. Applications," Papers presented at and published in the Proceedings of the Third NSF Workshop on Bridge Engineering Research in Progress, La Jolla, CA, 1992.
- Hosahalli, S., Chuntavan, C. and Aktan, A.E., "Fundamental Issues in the Seismic Safety of Midwestern U.S. Due To Hazard/Vulnerability Relation," Paper Presented at and Published in the Proceedings of the ASCE Structures Congress, Irvine, April, 1993.
- Hosahalli, H., Chuntavan, C., and Aktan, A.E., "Developing a Rational Seismic Safety Policy for Urban Areas With Fuzzy Seismicity," Paper presented at and Published in the Proceedings of the National Earthquake Conference, Memphis, May, 1993.



- Shelley, S.J., Aktan, A.E. and Lee, K.L., "Active Vibration Control of a 250 Foot Span Steel Truss Highway Bridge," Paper presented at and Published in the Proceedings of the Ninth VPI&SU Symposium on Dynamics and Control of Large Structures, May 10-12, 1993, Blacksburg, Virginia.
- Toksoy, T. and Aktan, A.E., "Bridge Condition Assessment by Modal Flexibility," paper presented at and published in the Proceedings of the International Conference on Nondestructive Testing of Concrete in the Infrastructure, Sponsored by SEM, Dearborn, June 9-11, 1993.
- Aktan, A.E., Lee, K.L., Chuntavan, C. and Aksel, T., "Modal Testing for Structural Identification and Condition Assessment of Constructed Facilities," paper presented at and published in the Proceedings of the 12th International Modal Analysis Conference, Honolulu, February 1994.
- Shelley, S.J., Brown, D.L., Allemang, R.J. and Aktan, A.E., "Active Control of Vibration in Civil Engineering Structures," paper presented at and published in the Proceedings, 12th International Modal Analysis Conference, Honolulu, February 1994.
- Aksel, T., Lee, K.L. and Aktan, A.E., "Condition Assessment of Highway Bridges," paper presented at and published in the Proceedings of the ASCE Structures Congress XII, April 1994.
- Shelley, S., Aktan, A.E. and Lee, K.L., "Modal Filter Based Control of a Highway Bridge," Paper Presented at and Published in the Proceedings of the ASCE Structures Congress XII, April 1994.
- Hunt, V., Levi, A., Sobecks, B., Helmicki, A. and Aktan, A.E., "Issues In Bridge Instrumentation and Monitoring," Proceedings of the SEM Spring Conference, Baltimore, June 1994.
- Shelley, S.J., Aktan, A.E., Brown, D.L. and Helmicki, A.J., "University of Cincinnati Experience with Implementation of Active Structural Vibration Control," Paper Presented at and Published in the Proceedings of the First World Conference on Structural Control, Pasadena, CA August 1994.
- Aktan, A.E., et al, "Field Laboratory for Modal Analysis and Condition Assessment of Highway Bridges," paper presented at and published in the Proceedings of IMAC 13, pp718-727, 1995.
- Aktan, A.E., Dalal, V., Farhey, D.N., and Hunt, V., "Bridge Reliability Evaluation in the 21st Century," paper presented at and published in the Proceedings of the First National Conference and Workshop on Research Transformed Into Practice: Implementation of NSF Research, June 14-16, 1995, VA.
- Aktan, A.E., "Issues in Instrumented Health Monitoring," Proceedings of the IABSE Symposium, San Fransisco 1995, Extending the Life-span of Structures, pp: 911-916, Aug. 24, 1995.
- Aktan, A.E., Brown, D., Shelley, S. and Helmicki, A., "Objective Bridge Condition Assessment," Paper presented at and published in the Proceedings of the International Symposium on Non-Destructive Testing in Civil Engineering, pp:51-60, September 26-28, 1995, Berlin, Germany.
- Zhang, Z. and Aktan, A.E., "Damage Indices for Constructed Facilities," paper presented at and published in the Proceedings of IMAC 13, pp: 1520-1529, 1995.
- Aktan, A.E. and Yao, J.T.P., "On Structural Identification of Constructed Facilities," Paper presented at and Published in the Proceedings of Structures Congress XIV, ASCE, pp: 651-659, April 15-18, 1996, Chicago.
- Aktan, A.E., Helmicki, A.J., and Hunt, V.J., "Issues Related to Intelligent Bridge Monitoring,"

Paper Presented at and Published in the Proceedings of Structures Congress XIV, April 15-18, 1996, Chicago.

- Farhey, D.N., Aktan, A.E., Thakur, A.M., Buchanan, R.C., and Jayaraman, N., "Integration of Microscopic Material Level and Macroscopic NDE of Aged Steel Structures," Paper presented at and Published in the Proceedings of the VIII Congress on Experimental and Applied Mechanics, SEM, Nashville, June 10-13, 1996.
- Hunt, V.J., Levi, A., Barrish, R., Grimmelsman, K., Aktan, A.E. and Helmicki, A.J., "Instrumentation, Testing and Monitoring of the Construction and Service of a Steel-Stringer Bridge," Paper presented at and Published In the Proceedings of the VIII Congress on Experimental and Applied Mechanics, SEM, Nashville, June 10-13, 1996.
- Lenett, M., Catbas, F.N., Hunt, V.J., Aktan, A.E., Helmicki, A.J. and Shelley, S.J., "Bridge-Type Specific Management of Steel-Stringer Bridges in Ohio," Paper presented at and Published In the Proceedings of the VIII International Congress on Experimental and Applied Mechanics, SEM, Nashville, June 10-13, 1996.
- Aktan, E., Baseheart, M., Miller, R., Minkarah, I., Shahrooz, B., Brown, D., Buchanan, R., Jayaraman, N., Helmicki, A., Shelley, S. and Simitzes, G., "Bridge Research In Progress at the University of Cincinnati," Proceedings, Fourth National Workshop on Bridge Research in Progress, Buffalo, June 17-19, 1996.
- Aktan, A.E., Dalal, V., Helmicki, H., Hunt, V., Lenett, M., Catbas, N. and Levi, A., "Objective Bridge Condition Assessment for Serviceability," Paper presented at and published in the Proceedings of Nondestructive Evaluation of Civil Structures and Materials, pp: 183-198, Sponsored by NSF, Boulder, Sep. 9-11, 1996.
- Aktan, A.E., Brown, D.L, Farrar, C., Helmicki, A.J. and Hunt, V.J., "Objective Global Condition Assessment," Paper presented at and published in the Proceedings of the 15th International Modal Analysis Conference, pp: 364-373, Society for Experimental Mechanics, Feb. 3-6, 1997, Orlando.
- Lenett, M., Catbas, N., Hunt, V., Aktan, A.E., Helmicki, A. and Brown, D.L., "Issues In Multi-reference Impact Testing of Steel-Stringer Bridges," Paper presented at and published in the Proceedings of the 15th International Modal Analysis Conference, pp: 374-380, SEM, Feb. 3-6, 1997, Orlando.
- Levi, A., Hunt, V., Helmicki, A. and Aktan, A.E., "Instrumented Monitoring and Diagnostic Load Testing of Steel Stringer Bridges," Paper presented at and published in the Proceedings of the 15th International Modal Analysis Conference, pp: 392-399, SEM, Feb. 3-6, 1997, Orlando.
- Aktan, A.E., Helmicki, A.J., Hunt, V.J. and Dalal, V., "Instrumented Monitoring and Nondestructive Evaluation of Highway Bridges," Paper presented at and published in the Proceedings of the ASCE Structures Congress XV, Portland, April 13-16, 1997.
- Aktan, A.E., Helmicki, A.J. and Levi, A., "Type-Specific Management Strategy for Steel-Stringer Bridges," Proceedings of the US-Canada-Europe Workshop on Bridge Engineering, July 14-15, 1997, Zurich.
- Aktan, A.E., Helmicki, A.J. and Hunt, V.J., "Instrumented Monitoring and Nondestructive Evaluation of Highway Bridges," Paper Presented at and Published in the Proceedings of the Infrastructure Condition Assessment Conference, ASCE, August 25-27, 1997, Boston.
- Helmicki, A.J., Aktan, A.E., Comfort, L. and Kam, M., "Information technology in Civil Infrastructure System Monitoring: Opportunities and Issues," Paper Presented at and Published in the Proceedings of the International Workshop on Structural Health Monitoring, Stanford University, September, 1997.
- Aktan, A.E., Helmicki, A.J. and Hunt, V., "Sustainability of Civil Infrastructure Systems,"

- Paper Presented at and Published in the Proceedings of the International Workshop on Structural Health Monitoring, Stanford University, September, 1997.
- Aktan, A.E. and Helmicki, A.J., "Challenges and Opportunities in Health-Monitoring of Constructed Facilities," Paper presented at and accepted for Publication in the Proceedings of the Second World Conference on Structural Control, Kyoto, Japan, June 28-July, 1, 1998.
  - Helmicki, A.J. and Aktan, A.E., "On the Role Of Information technology In CIS Health-Monitoring and Condition Assessment," Paper presented at the Second World Conference on Structural Control, Kyoto, Japan, June 28-July, 1, 1998.
  - Wadia-Fascetti, S., Gunes, B., Aktan, A.E., et al, "Structural Identification: A Tool For Bridge Reliability Evaluation," Paper presented at and Published in the Proceedings of Structural Engineering World Congress, San Fransisco, July 19-23, 1988.
  - Aktan, A.E., et al, "Health-Monitoring for Intelligent Transportation Systems," Paper presented at and Published in the Proceedings of 6th International Symposium on Smart Materials and Structures, SPIE, 1-3 March 99, Newport Beach, CA 1999.
  - Aktan, A.E., et al, "Challenges and Opportunities in Bridge Health-Monitoring, Proceedings, Second International Workshop on Structural Health-Monitoring, Stanford, CA, Technomic Publishing, 1999
  - Catbas, N., Grimmelsman, K., Barrish, R., Tsikos, Gus and Aktan, A.E., "Structural Identification and Health-Monitoring of a Long-Span Bridge," Proceedings, Second International Workshop on Structural Health-Monitoring, Stanford, CA, Technomic Publishing, 1999
  - Catbas, F.N., Grimmelsman, K.A. and Aktan, A.E., "Bridge Health-Monitoring for Structural Performance," Structural Materials Technology IV, An NDT Conference, Edited by. S. Alampalli, Sponsored By NYDOT, NJDOT and FHWA, Atlantic City, NJ, Feb 28-March 3, 2000
  - Catbas, F.N., Grimmelsman, K.A., and Aktan, A.E., "Structural Identification of the Commodore Barry Bridge," Proceedings of the Fifth International Symposium on Nondestructive Evaluation and Health Monitoring of aging Infrastructure, The International Society for Optical Engineering, SPIE Vol 3995, CA, March 2000.
  - Kulcu, E., Qin, X., Barrish, R.A., and Aktan, A.E., "Information Technology Issues for Health Monitoring of the Commodore Barry Bridge," Proceedings of the Fifth International Symposium on Nondestructive Evaluation and Health Monitoring of Aging Infrastructure, The International Society for Optical Engineering, SPIE Vol 3995, Newport Beach, CA, March 2000.
  - Barrish, R.A., Grimmelsman, K.A., and Aktan, A.E., "Instrumented Monitoring of the Commodore Barry Bridge," Proceedings of the Fifth International Symposium on NDE and Health Monitoring of Aging Infrastructure, The ISOE, SPIE Vol 3995, Newport Beach, CA, March 2000.
  - Curtis, J., Pervizpour, M., Aktan, A.E. and Kam, M., "On the Controllability and Observability of Intelligent Infrastructure Systems," Paper Presented at and Published in the Proceedings of the 2000 American Control Conference, Chicago, June, 2000.
  - Aktan, A.E., "Phenomenological Physical Models for the Study of Uncertainty in Simulating Large Systems," Paper presented at the 3rd Inter. Workshop on Structural Control, Paris, July 7, 2000.
  - A. E. Aktan for the ASCE-SEI Technical Committee on Performance-Based Design and Evaluation of Constructed Facilities, "Performance Metrics for Constructed Systems", Paper presented at SPIE's 6th International Symposium on NDE for Health Monitoring and Diagnostics, Newport Beach, 2001, and published in the SPIE Proceedings, Vol 4337.

- N. Catbas, K. Ciloglu, A. Celebioglu, E. Aktan, "Fleet Health Monitoring of Large Populations: Aged Concrete T-Beam Bridges in Pennsylvania", Paper presented at SPIE's 6th International Symposium on NDE for Health Monitoring and Diagnostics, 2001, and published in the SPIE Proceedings, Vol 4337.
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