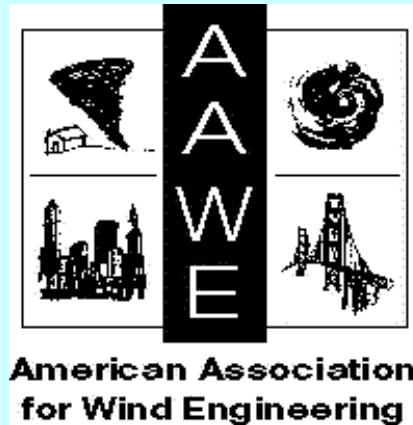


The Wind Engineer

Newsletter of the American Association for Wind Engineering
Nov 1999



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Presidents Message

In spite of a relative lack of resources there has been quite a bit of activity in the field of wind engineering this year. The year 1999 has followed the historic pattern with the U.S. being struck by a number of storms involving extreme winds, which have caused widespread physical and economic impacts. One difference that has been highlighted by Hurricane Floyd has been the large amount of water damage associated with this storm. Although some in the wind engineering community might take the attitude that water is someone else's business I am afraid we cannot enjoy such a luxury and must consider the combined effects of wind and water in our studies and designs. Water problems may be due to water rise, flooding and storm surge, or to water penetration in a structure after the outer envelope is compromised in some way.

Although there are many unsolved problems in wind engineering the ones most visible to the public are the dramatic failures of low-rise or non-engineered construction. This class of structures is also the source of the largest level of economic losses in windstorms. Some advances have been made in developing improved analysis, design and construction for this class of structures but overall the performance of this class of structures is very poor. A large part of the problem is the large number of structures that have been built over a number of years without adequate lateral load resistance for either wind or earthquakes. In spite of the serious nature of this problem there is very little research being carried out to address the existing structure problem with respect to wind.

Windstorms in the United States, such as hurricanes, tornadoes, frontal winds and downbursts continue to cause unacceptably high levels of injuries, deaths, business interruption, property damage and other negative societal impacts. Unfortunately the level of losses is increasing each year and will continue to escalate unless technology generation, education and public policies are improved.

Industry groups, professional organizations, government agencies and building code organizations have only taken limited actions to help reduce these dreadful losses. In response to this continuing threat, the American Association for Wind Engineering in cooperation with other organizations is holding a special no-registration fee Symposium in Washington, DC on Nov. 18 & 19. The purpose is to examine new approaches to reducing wind losses and to lay the foundation for the development of an integrated national plan for wind hazard mitigation. This Symposium will start 9:00 AM on Thursday, November 18 and will end at 1:00 PM on Friday, November 19.

It is the opinion of many in the design, construction and wind engineering communities that vast improvements could be achieved in the performance of new and existing structures through improvements in knowledge, policies and practices. A better understanding of wind characteristics, and how structures and components interact with and resist wind forces is needed. Also a better understanding of factors in public and private policy issues involved in facilitating the implementation of wind hazard measures is needed. At the present time few consensus-based standards exist which define all of the wind hazards found throughout the United States on a common basis. In addition the resources devoted toward the generation of an improved knowledge and database to better define such standards are inadequate to achieve needed progress. As a result the response to wind impacts is primarily one of great attention after a disaster without strong actions to assure that facilities are constructed or retrofitted to reduce the impacts of future windstorms.

I hope that you will be able to participate in this symposium which is intended to provide a

comprehensive look at the nature of our present wind hazard problems and why the wind engineering side of the picture seems to be so sadly neglected. A full page announcement for the conference and an outline program are included at the back of this newsletter. If you cannot participate directly you can provide input for the symposium and offer suggestions on how wind engineering can be made more effective by using the forms on the AAWE web pages located at www.civil.buffalo.edu/aawe.

There are many issues I would like to bring to the attention of AAWE members but these will have to wait until future issues of the Wind Engineer, which I hope we can produce on a more regular basis. Volunteers to achieve this would be welcome.

Next American Conference on Wind Engineering

The Wind Engineering Group at Clemson University has volunteered to be the organizers and host for the next American Conference on Wind Engineering. The conference will be held on June 4- 6, 2001. The area around Clemson University offers many recreational opportunities and for adventurous souls there will be white water rafting and other outdoor adventures available on sat. June 2. Pre-registration and a reception will take place on Sunday, June 3. There will be two full-day sessions on June 4 & 5 and a half-day session on June 6. The theme of the first part of the conference will focus on low-rise construction, which has been responsible for the largest amount of losses from windstorms in many countries. The remainder of the conference will consider general topics in wind engineering.

For further information contact Prof. Scott Schiff, Department of Civil Engineering, Clemson University, Clemson, SC, 29634-0911, (864) 656-0456, scott.schiff@ces.clemson.edu .

The Disaster Time Line: Selected Events and Outcomes 1965-2000

The *Disaster Time Line*, provides a unique, graphic depiction of major disasters and Outcomes 1965-2000, both natural and technological, that have affected emergency management policies in the U.S. Using colorful computer graphics, the *Disaster Time Line* chart (roughly 11"x32") shows not only major events and the year they occurred, but also the influence each event had on major after-action reports and analyses, federal statutes, federal regulations and executive orders, federal response plans, and major federal organizational changes. The *Disaster Time Line* costs \$20.00, including postage within the U.S. Orders must be prepaid by check or money order and should be directed to Disaster Time Line, Claire B. Rubin and Associates, P.O. Box 2208, Arlington, VA 22202; (703) 920-7176; e-mail: info@disaster-timeline.com or cbrubin@aol.com. For more information, see <http://www.disaster-timeline.com>.

WindNet

A recent addition to the AAWE web pages is WindNet. This feature is intended to promote communication between wind engineers, to assist organizations in locating sites, which may provide wind-engineering solutions, and to identify government organizations which may play an important role in wind engineering. The WindNet pages are set up so that an e-mail contact may be established by simply clicking on organizations or names, which are underlined. Web pages for many of these organizations may be found under Wind Info and Links.

Suggestions for additions, improvements or other information, which may be included, would be welcome. Send comments to www.civil.buffalo.edu/aawe .

Recent Extreme Wind occurrences

Oklahoma, Kansas Tornadoes--May 1999

Devastating tornadoes hit portions of Oklahoma and Kansas on Monday evening May 3rd, 1999. The estimated death toll stands at 49 people, 44 of the fatalities in Oklahoma and five in the Wichita, Kansas area. Additionally, the same storm system resulted in one death in Texas and four deaths in Tennessee, bringing its total to 54. The largest tornado (F-5) on the Fujita-Pearson Tornado Scale formed about 45 miles southwest of Oklahoma City and cut a path at least a half-mile wide as it moved north and east across the Oklahoma City area, staying on the ground for about 4 hours. Oklahoma officials now estimate that 8093 homes or businesses were damaged or destroyed; while Kansas estimates 1109 homes or businesses were destroyed. The insurance industry expects insured losses to reach or exceed \$1 billion.

Hurricane Mitch of Oct 26 - Nov 4, 1998

In an awesome display of power and destruction, Hurricane Mitch will be remembered as the most deadly hurricane to strike the Western Hemisphere in the last two centuries! Not since the Great Hurricane of 1780, which killed approximately 22,000 people in the eastern Caribbean, was there a more deadly hurricane. Mitch struck Central America with such viciousness that it was nearly a week before the magnitude of the disaster began to reach the outside world. The death toll currently is reported as 11,000 with thousands of others missing. Though the final death toll will never be known, it is quite likely that Mitch directly killed more people than any Atlantic hurricane in over 200 years. More than three million people were either homeless or severely affected. In this extremely poor third world region of the globe, estimates of the total damage from the storm are at \$5 billion and rising. The President of Honduras, Carlos Flores Facusse, claimed the storm destroyed 50 years of progress. Mitch is ranked number 2 in a list of the top seven most deadly hurricanes ever witnessed in the Western Hemisphere.

Southeastern U.S. Tornadoes of April 8-9, 1998

During the afternoon of April 8, severe thunderstorms developed over Mississippi, Arkansas, and Southwestern Tennessee. As the storms swept through Alabama and western Georgia that evening and night, the storms produced at least 9 tornadoes. The tornadoes resulted in 36 fatalities and 273 injuries. One of these tornadoes, which struck Tuscaloosa and Jefferson Counties Alabama, was rated F5 on the Fujita scale and destroyed over 1,100 permanent homes. Local offices and national centers provided advance notification of the event, with over 300 county warnings issued as the thunderstorms moved through.

Arkansas/Tennessee Tornadoes of April 16, 1998

On the early morning of April 16, a line of strong thunderstorms moved through eastern Arkansas and extreme western Tennessee. These storms produced killer tornadoes in Mississippi County, Arkansas and Dyer County, Tennessee. Later in the day, the same system produced several supercells over middle Tennessee. Strong to violent tornadoes was reported in Davidson and Wayne Counties in Tennessee. Five fatalities and numerous injuries were reported, along with extensive damage including the downtown Nashville vicinity. All of the significant tornadoes were preceded by warnings with lead times of at least 20 minutes.

Florida Tornadoes - February 1998

During the late evening of February 22 and early morning of February 23, 1998, a series of tornadoes ripped across central Florida. At least one of the tornadoes reached an estimated F4 intensity. Forty-two fatalities occurred, over 800 residences were destroyed, another 700 were left uninhabitable, over 3500 were damaged to some extent, and 135,000 utility customers lost power at the height of the storms. Damages from the tornado outbreak exceeded \$60 million, and overall storm damage total since last fall is approximately \$500 million. Hardest hit locations in the tornado outbreak were Winter Garden, Altamonte Springs, Sanford, and Campbell. Overall, 54 of Florida's 67 counties were declared federal disaster areas due to storms over the past few months.

FEMA BPAT Report on Oklahoma-Kansas Tornadoes

The report on the Midwest Tornadoes of May 3, 1999 prepared by the FEMA Building Performance Assessment Team has been published and is available on the web in Adobe format. This is an excellent report and can be found at www.fema.gov/mit/bpat/. Paper copies of the report will be available in the near future. The FEMA/Mitigation page also contains other information which should be of great interest to the wind engineering community.

Anchoring of Manufactured Homes

A serious problem, which has existed in connection with Manufactured Housing, has been the anchorage and support of the units. Although many states have passed laws requiring that manufactured homes be anchored there has been great inconsistency in the ability to enforce these requirements and insufficient knowledge regarding the capacity of tie down systems. Unfortunately the tie-down is often made the responsibility of the local installer who may not have sufficient information regarding what type of installation to use or the proper way to install and proof-test a system if it is installed.

In order to improve the tie-down situation the Manufactured Housing Institute (MHI) has launched a research program to improve foundation design and tie-down installation for manufactured housing. The program is being carried out with joint support from the Manufactured Housing Institute and from FEMA.

The manufactured housing industry has set a goal of improving the current methods used in the design and installation of ground anchors and, in a broader sense, developing a new generation of high performance, low cost foundation systems. Several organizations have initiated efforts related to improving foundation systems, including MHI's Technical Activities Committee (TAC) and several of the major anchor manufacturers and suppliers. At the same time, the US Department of Housing and Urban Development has expressed an interest in advancing foundation system technologies. The Manufactured Housing Research Alliance (MHRA) has been asked to tie these efforts together, leveraging resources toward common goals, conducting related research and testing, and disseminating the results through publications, training and other educational channels.

Program Scope:

The MHRA Foundations Committee has established a three-phase foundations program as follows:

Phase I will provide a near term solution for installers that need better guidance on effective anchoring installation methods. A product of Phase 1 will be a set of guidelines for anchor installers (contained on a single laminated card) offering prescriptive recommendations for selecting anchor sizes and spacing and making other design decisions in the field.

Phase 2 will examine new and more effective foundation systems, which will be developed, demonstrated and the first steps taken toward full commercialization.

Phase 3 will develop new or adapt current foundation technologies for the existing housing stock.

10th International Conference on Wind Engineering

The 10th International Conference on Wind Engineering was held in Copenhagen Denmark during the period from June 21 to 24, 1999. The conference had an excellent attendance from many countries including the U.S. and Canada with a broad cross-section of topics. A three-volume set of Proceedings was published and distributed at the Conference. A. Larsen of COWI Consulting Engineers and Planners Lyngby, Denmark and G. L. Larose & F. M. Livesey of the Danish Maritime Institute, Lyngby, Denmark, edited the Proceedings. Copies of the Proceedings can be ordered from A. A. Balkema, P.O. Box 1675, 3000 BR Rotterdam, Netherlands. The ISBN number for the 3-volume set is ISBN 90 5809 059 0.

CONSTRUCTION OF SUPER WIND TEST FACILITY NOT RECOMMENDED

(Contributed by Prof. Jack Cermak)

In an effort to evaluate a proposal for development of a large-scale wind-test facility (LSWTF) to study effects of extreme winds (65 to 90 m/s) in full-scale low-rise buildings, the Idaho Operations Office of the U.S. Department of Energy (DOE) requested that the National Research Council (NRC) perform an independent assessment of the need for and potential benefits of the proposed facility. A committee* was organized and facilitated by the NRC Study Director, Richard G. Little, and Consultant, Michelle Porterfield, to perform the review.

Based on deliberations of the Committee during two meetings and comments from 21 respondents to a questionnaire, key findings of the Committee are summarized as follows:

1. Wind-structure interactions should be investigated at as close to full scale as possible.
2. A variety of investigative methods are available.
3. An LSWTF would have the potential for performance of experiments under controlled and repeatable conditions.

Alternatives to an LSWTF are available that could potentially provide the same data.

An LSWTF should only be built if it is part of a national wind-hazard reduction program.

An LSWTF would be costly in terms of present investments in wind engineering (200 to 300 million dollars construction cost and 5 to 25 million dollars operating costs.)

Construction of an LSWTF is premature.

No coordinated national program for wind-hazard reduction currently exists.

The foregoing findings resulted in the following two recommendations of the Committee:

1. The DOE should not proceed with a LSWTF.
2. The federal government should coordinate existing federal activities and develop, in conjunction with state and local governments, private industry, the research community, and other interested stakeholder groups, a national wind-hazard reduction program.

A copy of the committee report "Review of the Need for a Large-scale Test Facility for Research on the Effects of Extreme Winds on Structures" can be obtained from the Board on Infrastructure and the Constructed Environment, NRC, 2101 Constitution Avenue, N.W. Washington, DC 20418 (call 800-624-6242). The report is also available on line at <http://www.nap.edu>.

* J. E. Cermak (chair), A. G. Davenport, M. P. Gaus, S. R. Hoover, N. P. Jones, A. Kareem, R. J. Kristie, W. F. Marcuson, III, J. E. Minor, J. Penzien, M. D. Powell, T. A. Reinhold, E. Sabadell and E. Simiu.

ENGINEERING NEWS-RECORD CITES ENGINEERING INNOVATION AT COLORADO STATE UNIVERSITY

The Engineering News-Record in celebration of its 125th anniversary has selected 125 innovations that have significantly impacted the construction industry in the period 1874 - 1999. The selections, announced in the October 18, 1999 issue of ENR, include an innovation resulting from research at Colorado State University. In the category of Design Analysis, Testing and Information Technology CSU's contribution designated as Wind-Tunnel Analysis is described by ENR as follows:

"Short wind tunnels had been used for testing almost from the first days of aviation, but simulating structural loads imposed by turbulent flows close to the earth's surface didn't begin in earnest until the 1960s. The first comprehensive tests on a skyscraper were made at the Fluid Dynamics and Diffusion Laboratory at Colorado State University in Fort Collins, where civil engineering professor Jack E. Cermak developed the first true boundary layer wind tunnel. He was part of a team that tested models of the future World Trade Center Towers in New York City. Boundary layer wind tunnel tests now provide data for major structures and help improve wind codes."

Wind Engineering Research at Texas Tech University

Oklahoma City Tornado Damage

Texas Tech sent seven individuals to document damage from the tornadoes of May 3, 1999 in Oklahoma City,
[1]

OK. The tornadoes killed 42 persons, 23 of whom died in their homes. The objectives of the documentation were to record damage to houses, to assess performance of shelters and to characterize projectiles. One above-ground shelter protected a family of two even though the home and many surrounding houses were destroyed. The construction of this above-ground shelter was similar to the one developed by Texas Tech and published in the FEMA booklet, Taking Shelter from the Storm (a free copy can be obtained from FEMA by calling 888-565-3896 or can be downloaded from their web site at <http://www.fema.gov/MIT/tsfs01.htm>). The OKC shelter had stronger walls but a weaker door than recommended by TTU. Several families took shelter in underground cellars but most of the shelters had weak doors some of which failed allowing debris to enter (fortunately these were not occupied).

According to the National Weather Service seven supercell storms generated 51 tornadoes in the State of Oklahoma that day. The most intense damage paths were in Moore and Del City, suburbs of Oklahoma City. Jeff Wurman, Atmospheric Science professor of the University of Oklahoma, reported measuring a wind speed of 318 mph using portable Doppler radar. Analysis of this measurement is continuing to determine height of measurement (currently estimated about 100m) and error band in measurement. The damage investigation by TTU teams suggest that destruction of the houses could have occurred at wind speeds of roughly 160 mph; engineered building damage indicates that the maximum wind speeds at ground level were probably less than 200 mph (Dr. Michael Riley of the National Institute of Standards and Technology is looking into the possibility of establishing wind speed bounds based on damage to a couple commercial/industrial buildings.) Even though the appearance of damage suggests category F5 intensity Fujita scale, wind speeds of more than 200 miles are not needed to cause this damage.

A critical review of the tornado damage intensity scale developed by Dr. Ted Fujita and associated wind speed ranges is planned as one of the tasks under NIST/TTU Agreement's Windstorm Mitigation Initiative.

Tim Marshall of Haag Engineering joined TTU teams to document Oklahoma City damage. With masters degrees in Atmospheric Sciences and Structural Engineering as well as several years of experience, he provided an invaluable addition to the effort. TTU teams included a research associate, graduate students and undergraduate students representing the disciplines of civil engineering, atmospheric sciences, architecture and mathematics.

Information/Outreach Center (IOC)

An IOC has been established at the WInd Science and Engineering(WISE) Research Center at Texas Tech with initial funding from the NIST/TTU Cooperative Agreement for a Windstorm Mitigation Initiative and maintenance funding from the Federal Emergency Management Agency (FEMA). The IOC responds to inquiries from professionals, contractors and the public as well as develops educational material for K-12 students. The Center has established a toll-free number 1-888-WINDCTR and a web site www.wind.ttu.edu. The web site houses the wind engineering library catalog of the WISE center, a sample of full-scale data from the field site and other information as well as links to other web sites. During January-June of this year IOC staff responded to 1115

inquiries received by phone, FAX and e-mail; the web site received 8408 hits in the months of May-June. April MacDowell (teaching certified) and Larry Tanner, P.E., A.I.A. respond to inquiries with the assistance of faculty as needed.

NIST/TTU Cooperative Agreement

National Institute of Standards and Technology/Texas Tech University Cooperative Agreement for a Wind Mitigation Initiative is reaching the end of the first year. One of the exciting and long-term impact thrusts is the development of an experimental database for a future electronic standard. Dr. Emil Simiu of NIST developed this concept and explained it in the paper "The use of aerodynamic databases for the effective estimation of wind effects in main wind-force resisting systems: Application to low buildings," (Whalen et al, JWEIA, 1998, 77&78: 685-693). This thrust involves wind tunnel testing by Dave Surry at the University of Western Ontario and Jack Cermak at Colorado State University as well as full-scale and wind tunnel testing at Texas Tech. The time-history of pressure coefficients will be saved and archived. The Advisory Group for this effort includes Ted Stathopoulos, Gill Harris, Jim Delahay and Peter Irwin. Individuals involved in developing analytical procedures to use these data are Tim Whalen of Purdue, Mircea Grigoriu of Cornell and Le-Wu Lu of Lehigh. Texas Tech's Doug Smith will conduct full-scale data, Partha Sarkar will pursue wind tunnel tests while Kishor Mehta coordinates the research thrust.

The NIST/TTU Agreement's other research thrusts are shelter from extreme winds; debris in windstorms; integrated atmospheric, aerodynamic and soil erosion testing; building performance; retrofitting and wind damage economics. Sixteen faculty members pursuing research represent the disciplines of civil and chemical engineering, atmospheric sciences, architecture, mathematics and economics. Tim Reinhold of Clemson and Jon Peterka of CPP Inc. are providing significant contribution to the thrusts of retrofitting and building performance respectively. Enhancement of experimental facilities including a new debris launcher, 200 m meteorological tower (funded by the State of Texas), a 28-10m tower meteorological mesonet (State of Texas), new field test building platform and improved wind tunnel instrumentation will have a long-term impact on wind engineering research.

Dr. Richard Marshall

Dr. Richard D. Marshall received the first Walter P. Moore, Jr. Award for "his contribution to and technical excellence in the development of structural engineering codes and standards". The award was established by the Structural Engineering Institute (SEI) of the American Society of Civil Engineers in honor of Walter P. Moore, Jr. The award was presented at the annual meeting of ASCE in October of last year and again announced at the 1999 Structures Congress. Dr. Marshall directed research activities concerned with the effects of wind on structures in his position as leader of the Structural Evaluation Group at the National Bureau of Standards (later NIST) from 1968-1997. He was involved in development of the wind load standards for ANSI A58 and ASCE 7-95.

In accepting the award Dr. Marshall, shining the limelight away from his own accomplishments, stated, "this award presented to me today must, at least in spirit, include my wind engineering colleagues because so much of what has been accomplished has been a joint effort."

As you may know, Dr. Marshall has been undergoing treatment for a number of brain tumors. Kishor Mehta saw him recently and said that Dick is doing well. Please keep him in your thoughts and prayers.

Proceedings of U.S. National Wind Engineering Conferences

(Contributed by April McDowell, Texas Tech Univ.)

Since 1972 there have been eight U.S. National Wind Engineering Conferences. The proceedings of these conferences contain a large amount of valuable technical information, which may not be available elsewhere.

Because of this, April McDowell who is associated with the Texas Tech Wind Engineering Research Center, compiled a list of the proceedings of these conferences which is presented below:

The Proceedings of the U.S. National Conferences of Wind Engineering are listed below. Most are available from the National Technical Information Service (NTIS); some are also available from other sources. NTIS adds a \$5 per order handling charge, \$10 per order outside of North America. Orders can be sent to NTIS, 5285 Port Royal Road, Springfield, VA 22161, or by fax to (703) 605-6900. You can order online from <http://www.ntis.gov/ordering.htm>. Prices given are as of June 1999.

Proceedings of the 1st U.S. National Conference on Wind Engineering, 18-19 December, 1970, California Institute of Technology, Pasadena, CA, edited by A. Roshko. Available from NTIS as PB87-144135 for \$41.

Proceedings of 2nd U.S. National Conference on Wind Engineering, 22-25 June, 1975, Colorado State University, Fort Collins, CO, edited by J.E. Cermak. Available from Jack E. Cermak for \$25 which includes shipping and handling. Make checks payable to Colorado State University. Available from NTIS as PB87-148995 for \$96.

Proceedings of the 3rd U.S. National Conference on Wind Engineering, 26 February - 1 March, 1978, University of Florida, Gainesville, FL, edited by B.M. Leadon. Proceedings available from NTIS as PB87-149001 for \$81.50.

Proceedings of the 4th U.S. National Conference on Wind Engineering, 26-29 July 1981, University of Washington, Seattle, WA, edited by B.J. Hartz. Proceedings and Preprints must be obtained in order to have a complete set of the papers presented. Proceedings are available from NTIS as PB87-148987 for \$75. Preprints are available from NTIS as PB87-149019 for \$86.50.

Proceedings of the 5th U.S. National Conference on Wind Engineering, 6-8 November, 1985, Texas Tech University, Lubbock, TX, edited by Kishor C. Mehta and Richard A. Dillingham. Available for \$25 (includes postage) and \$2 tax from the Wind Engineering Research Center, Box 41023, Lubbock, TX 79409-1023. Make checks payable to Texas Tech University. Available from NTIS as PB86-130671/LL for \$133.

Proceedings of the 6th U.S. National Conference on Wind Engineering, 2 vols., 8-10 March, 1989, University of Houston, Houston, TX, edited by Ahsan Kareem. Not available from NTIS at this time.

Proceedings of the 7th U.S. National Conference on Wind Engineering, 2 vols., 27-30 June, 1993, University of California, Los Angeles, edited by Gary C. Hart. Not available from NTIS at this time.

Proceedings of the 8th U.S. National Conference on Wind Engineering, 5-7 June 1997, The John Hopkins University, Baltimore, MD, edited by Nicholas P. Jones. A book of Proceedings abstracts and a CD-ROM available for \$30, CD-ROM only for \$10 (includes postage) from Dr. Nicholas P. Jones, Dept. Of Civil Engineering, The Johns Hopkins University, 3400 N. Charles St., Baltimore, MD 21218-2686. Selected papers available as *Journal of Wind Engineering and Industrial Aerodynamics*, vols. 77-78. Not available from NTIS at this time.

News from SEI/ASCE Structures Congress 2001.

The Structural Engineering Institute of the American Society of Civil Engineers issued a Call for Papers and Sessions for its Structures Congress 2001: A Structural Engineering Odyssey, to be held May 21–23, 2001 in Washington, DC. The National Institute of Standards and Technology, formerly the National Bureau of Standards, will co-host the Congress as part of its centennial celebration.

Structures Congress 2001 will focus on a diverse range of topics, critical issues, and technological changes that are rapidly shaping the future of the profession. It will feature technical sessions, short courses, tours,

demonstrations, technical exhibits, and more. A number of the sessions will include wind engineering topics and structural resistance to wind loads. AAWE members have been encouraged to submit papers to this Congress meeting.

The Congress will include both individual papers, suitable for a 20-25 minute presentation, and programs suitable for an entire 90-minute session. Non-traditional session formats, such as: audience participation forums, expert panel discussions and debates, common theme case studies, computer and software demonstrations, and multi-media presentations will be included. Papers and sessions on the following themes will be given priority: professional practice, dealing with aging structures, codes and standards, disaster mitigation, on-going construction projects, innovative construction methods, and technology and computers.

For more information and special highlights, visit the conference web site at <http://www.asce.org/conferences/structures2001>.

Interesting Web Links

WindData on the World Wide Web

[Http://www.winddata.com/](http://www.winddata.com/)
Email: winddata@et.dtu.dk

The Aerodynamics Lab of Turner-Fairbank Highway Research Center

[Http://www.tfhrc.gov](http://www.tfhrc.gov)
Email: harold.bosch@fhwa.dot.gov

Wind Engineering at Halcrow Group Ltd.

[Http://www.halcrow.com](http://www.halcrow.com)
Email: beithj@Halcrow.com

Dantec Measurement Technology

[Http://www.dantechmt.com](http://www.dantechmt.com)

World Map of Natural Hazards by Munich Re

[Http://www.munichre.com](http://www.munichre.com)
E-mail: info@munichre.com

N3S-AERO

[Http://www.edf.fr/inh-env](http://www.edf.fr/inh-env)
E-mail: yvan.fournier@edf.fr

Wind Power Monthly

[Http://www.windpower-monthly.com](http://www.windpower-monthly.com)

Meetings of Interest

Fourth International Colloquium on Bluff Body Aerodynamics & Application

September 11 - 14, 2000
Ruhr-University of Bochum, Germany
Contact: Conference Secretariat BBAA IV
Ruhr-University of Bochum AIB D-44780 Bochum Germany
Tel: +49 (0) 234 700-5757
Fax: +49 (0) 234 7049-631
E-mail: bbaa4@aib.ruhr-uni-bochum.de
[Http://www.aib.ruhr-uni-bochum.de/bbaa4](http://www.aib.ruhr-uni-bochum.de/bbaa4)

Third European & African Conference on Wind Engineering

July 2 - 6, 2001
Eindhoven University of Technology, Netherlands
Contact: 3EACWE Congress Office
Eindhoven University of Technology

P O Box 513
5600 MB Eindhoven
The Netherlands
Fax: +31 -40-2458195
E-mail: congressoffice@tue.nl
[Http://www.bwk.tue.nl/bwk/events/3eacwe](http://www.bwk.tue.nl/bwk/events/3eacwe)

International Symposium on Wind and Structure for 21st Century

January 26 - 28, 2000
Seogwipo KAL Hotel, Chejudo of Korea
Contact: Secretariat, WAS-2000
Department of Civil Engineering
Korea Advanced Institute of Science & Technology
Taejon 305-701, Korea
Tel: +82 42 869-8451/3621
Fax: +82 42 869-8450
E-mail: was2k@kaist.ac.kr
[Http://was2k.kaist.ac.kr](http://was2k.kaist.ac.kr)

Third International Symposium on Computational Wind Engineering

September 4 - 7, 2000
University of Birmingham, England
Contact: CWE 2000 Secretariat
PF Consultants
14 The Chestnuts
Hemel Hempstead
Herts HP3 0DZ, England
Tel: +44 (0) 1442 211204
Fax: +44 (0) 1442 256155
E-mail: cwe2000@pfconsultants.co.uk
[Http://www.pfconsultants.co.uk/cwe2000](http://www.pfconsultants.co.uk/cwe2000)

International Advanced School on Wind-Excited and Aeroelastic Vibrations of Structures

June 12 -16, 2000
Genova, Italy
Contact: Sonia Aulicino
Department of Structural and Geotechnical Engineering
University of Genova
Via Montallegro, 1
16145 Genova, Italy
Tel: +39 010 353-2292
Fax: +39 010 353-2534
E-mail: wind-school@diseg.unige.it
[Http://www.diseg.unige.it/wind-school](http://www.diseg.unige.it/wind-school)

Second Wind Engineering Winter Meeting

February 13 - 20, 2000
Moscow, Russia
Contact: Prof. S.Ya.Gertsenshtein
Institute of Mechanics, Moscow State University
1, Michurinsky prospect
117192 Moscow, Russia
Tel: +007 095 9395136
Fax: +007 095 9390165
E-mail: gertsens@inmech.msu.su
[Http://jan.inmech.msu.su/~gertsens](http://jan.inmech.msu.su/~gertsens)

Sixth Italian Conference on Wind Engineering

June 18 - 21, 2000
Genova, Italy
Contact: Sonia Aulicino
Department of Structural and Geotechnical Engineering
University of Genova

Via Montallegro, 1
16145 Genova, Italy
Tel: +39 010 353-2292
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E-mail: in-vento-2000@diseg.unige.it
Http://www.diseg.unige.it/in-vento-2000

New Wind Engineering Web Site

A new web site of the European and African Region (EAR) of the International Association for Wind Engineering has been officially opened as of 10-18-99. This web site can be visited by using the URL <http://www.ear-iawe.org>. This site can also be accessed from the WindNet page of the AAWE web, www.civil.buffalo.edu/aawe under "contact wind engineering associations".

Special Public Policy Symposium Reducing Losses From Windstorms: Hidden Dangers in New and Existing Construction

Current Situation

1959-1989

- 3,550 lives lost just from Tornadoes

Hurricane Andrew, 1992

- 136,000 Homes Destroyed or Made Uninhabitable
- Losses exceeding 30 Billion Dollars

1998 Wind Losses

- 186 Killed
- Thousands injured
- \$5.85 Billion Direct Damage

1999

Oklahoma-Kansas -May

- 12,000 Homes Destroyed
- 47 killed

The Future

- ????????

1969-1992

- Over \$100 Billion Direct Loss from Hurricanes
- Economic Losses approaching \$1 Billion a week due to natural disasters (70% wind)

Average Yearly Impact

- On the average, over 30,000 homes are destroyed or made uninhabitable due to wind and related impacts

Symposium Sponsors

AAWE and Dept. of Civil Eng., Univ. at Buffalo
Wind Eng. Res. Ctr. Texas Tech Univ.
Wind Eng. Res. Ctr , Colo. State Univ.
and other organizations

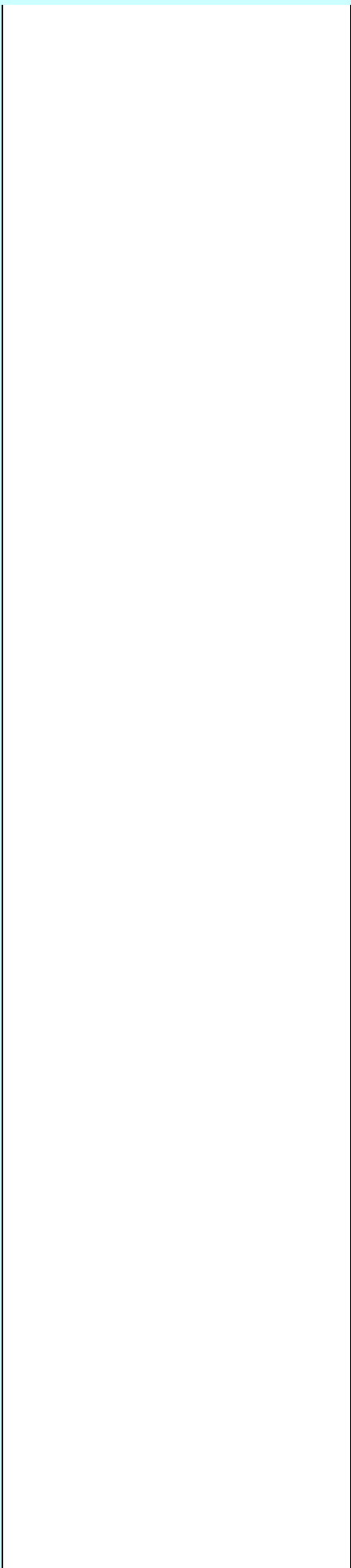




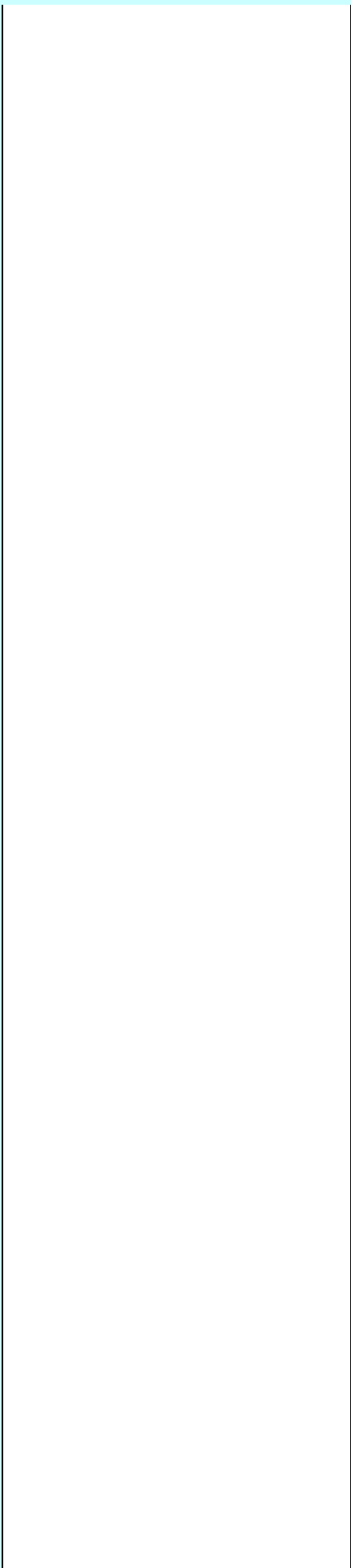
















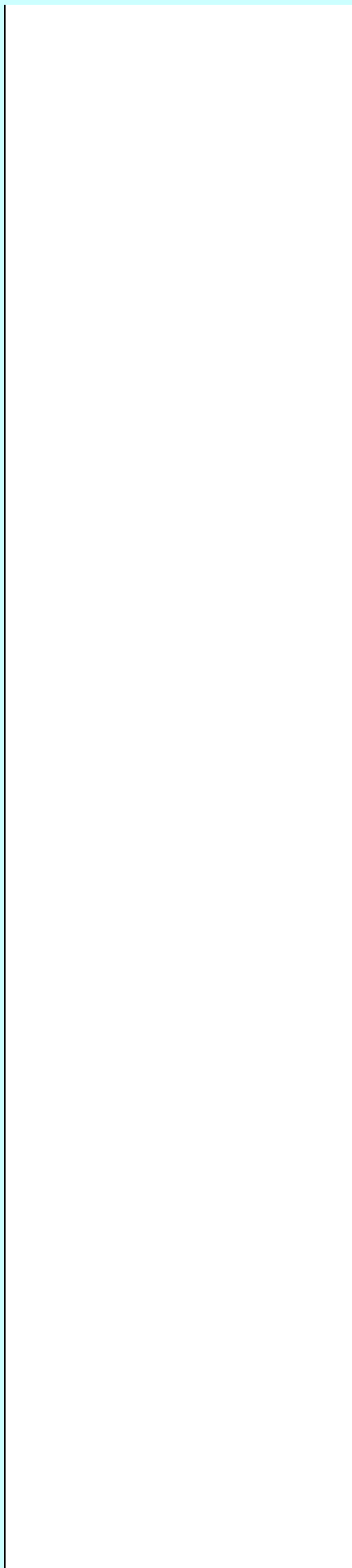








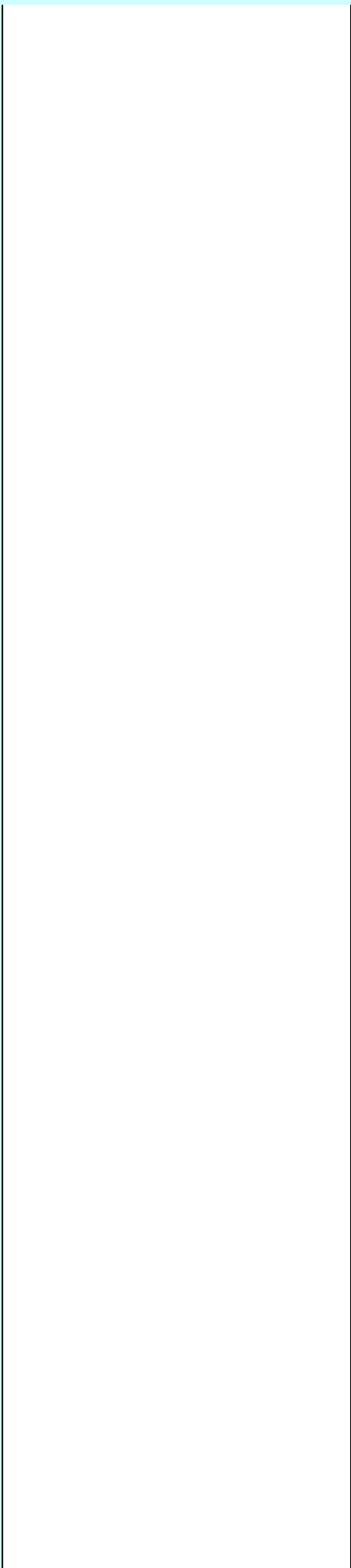


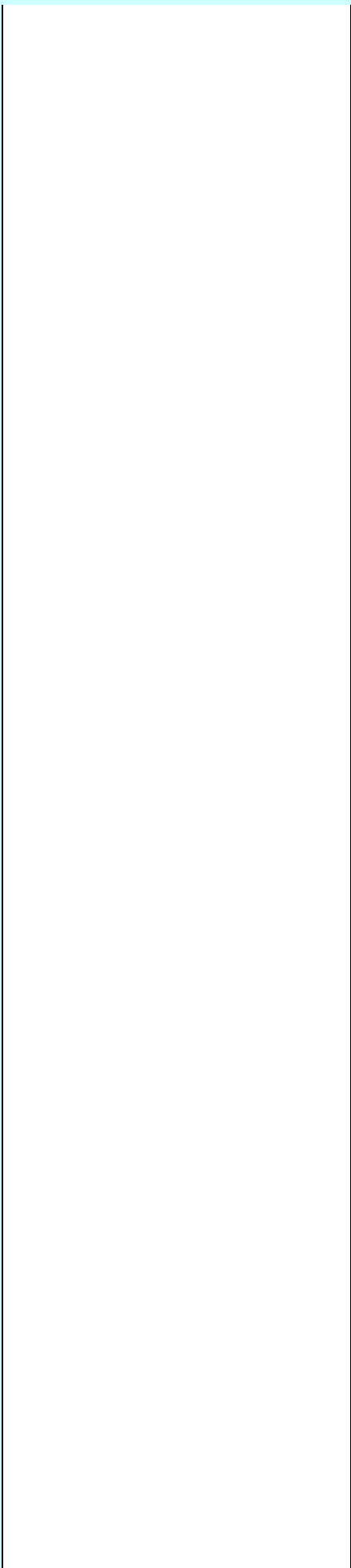
















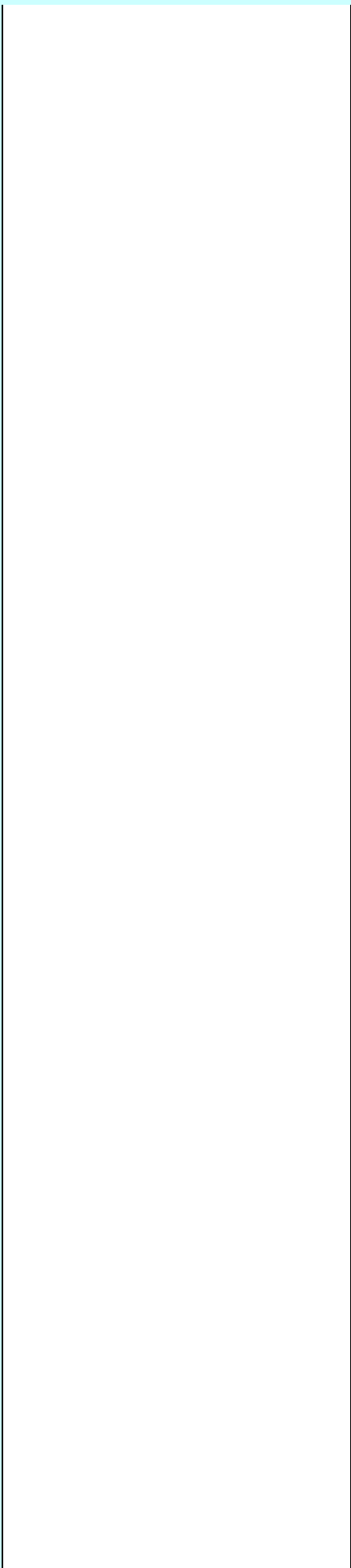








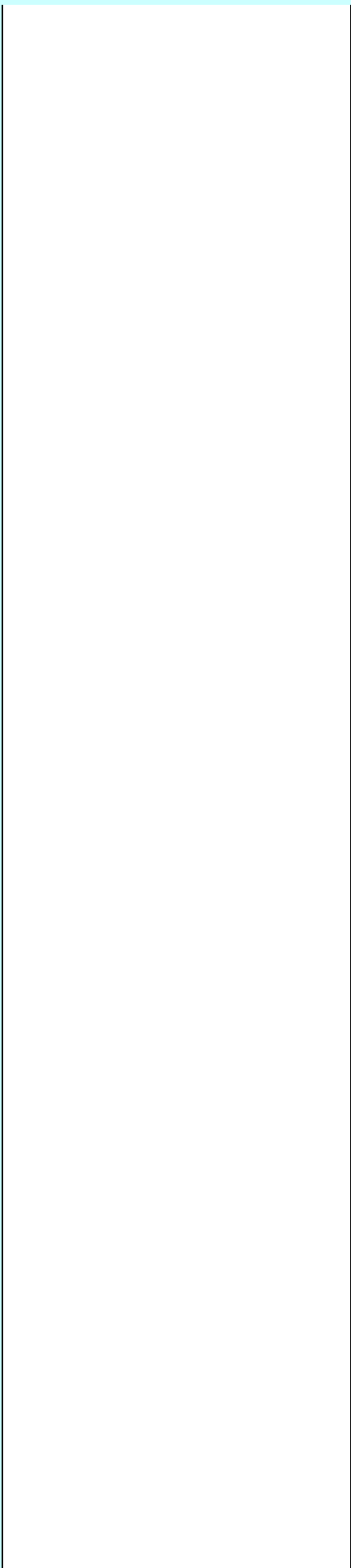


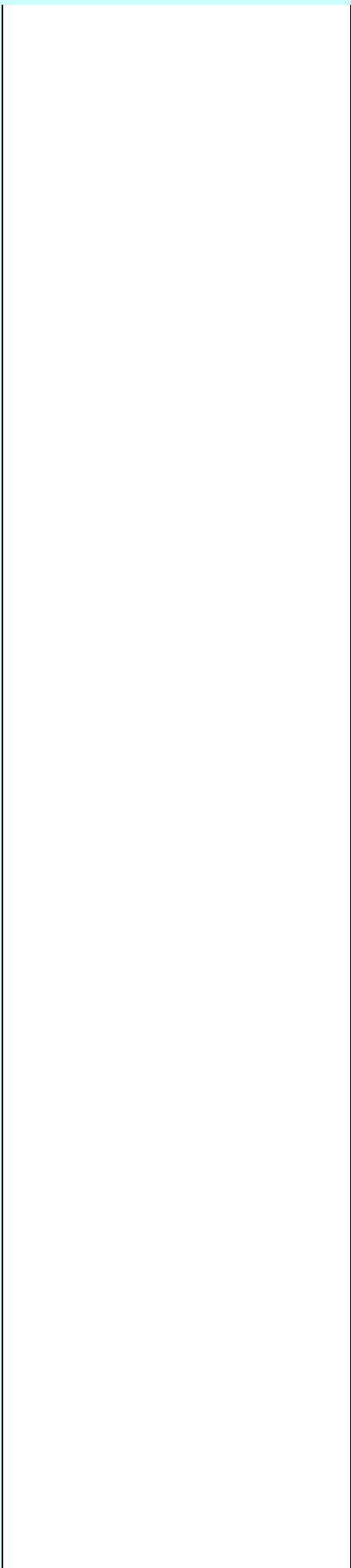




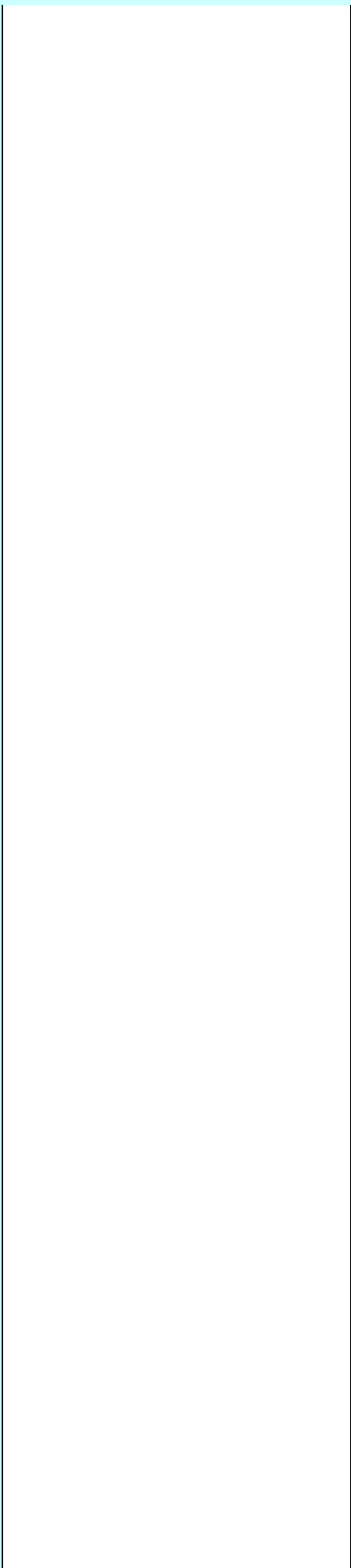




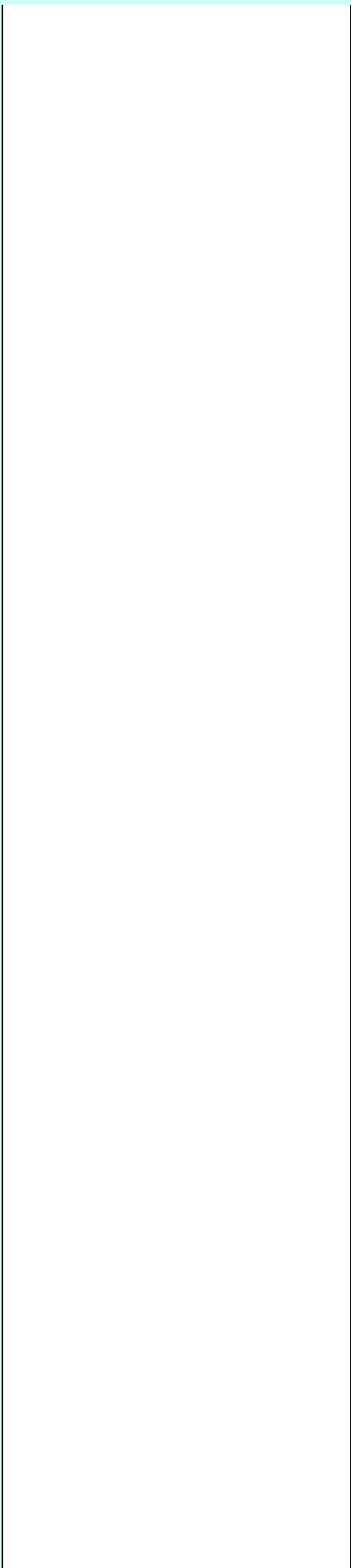


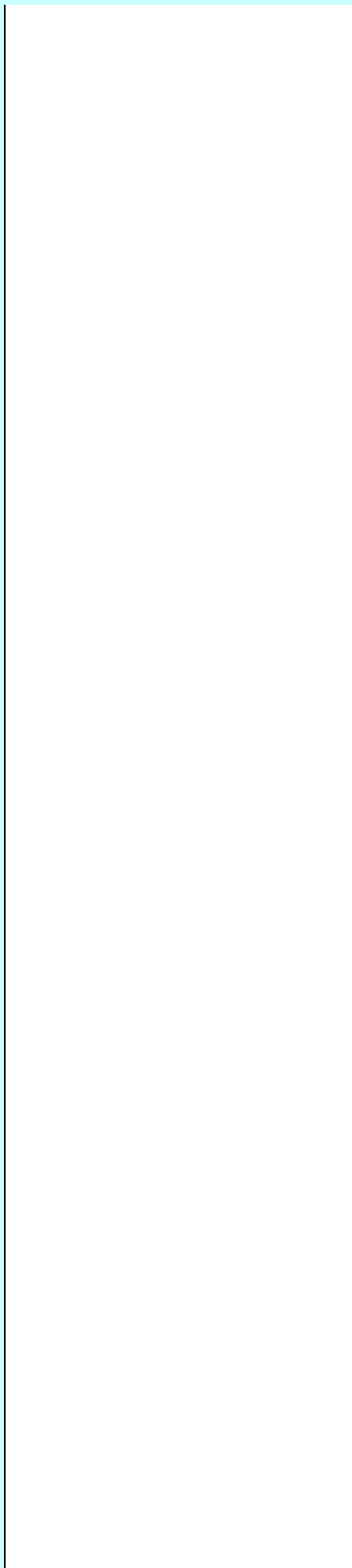




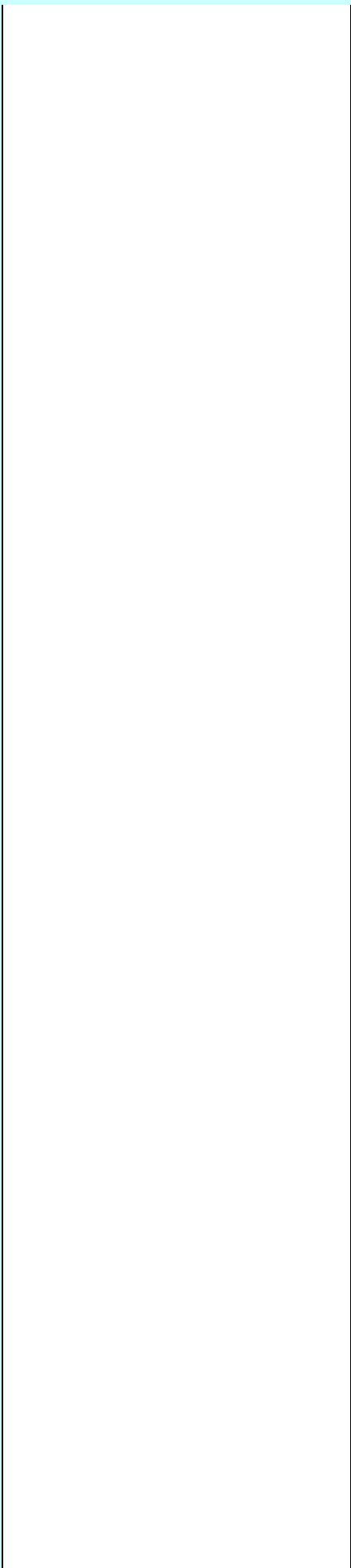










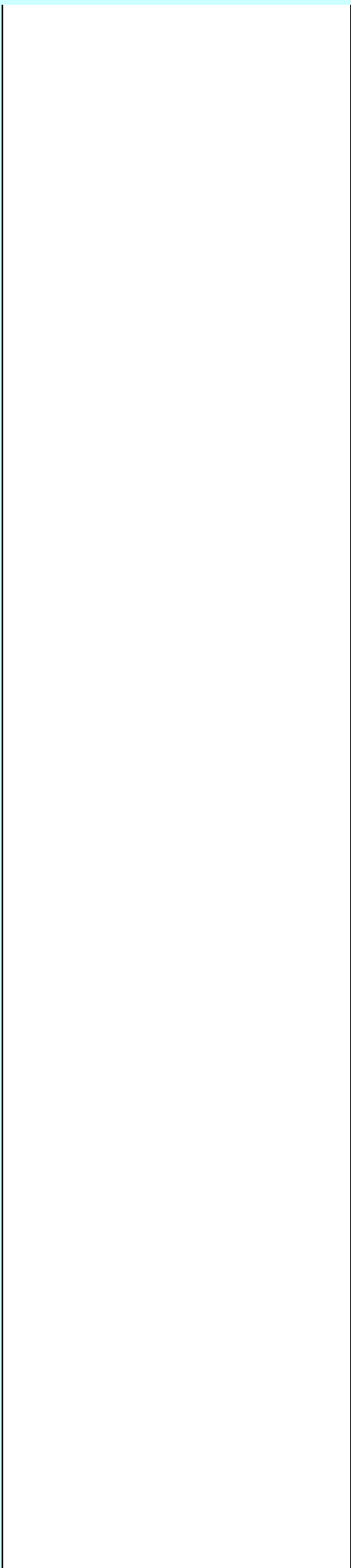






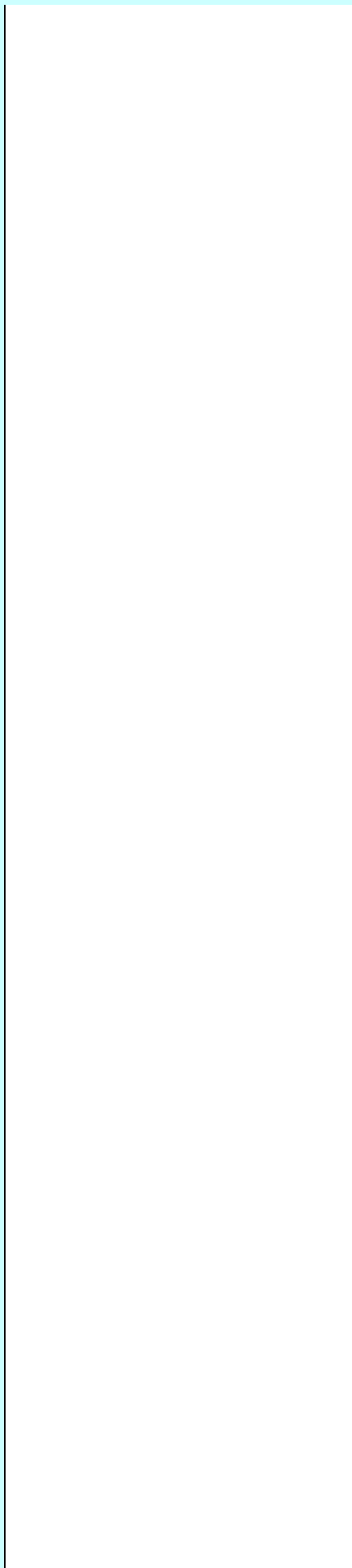








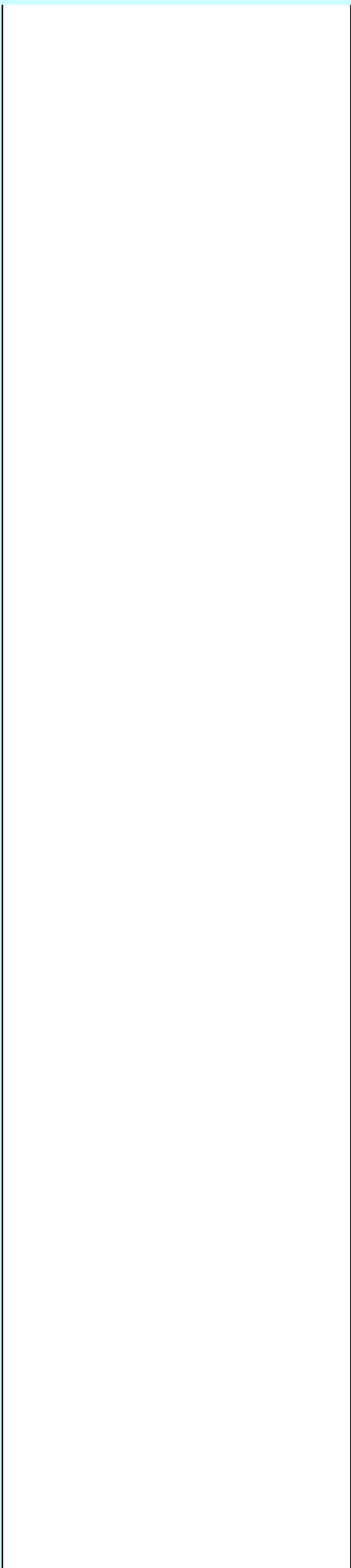


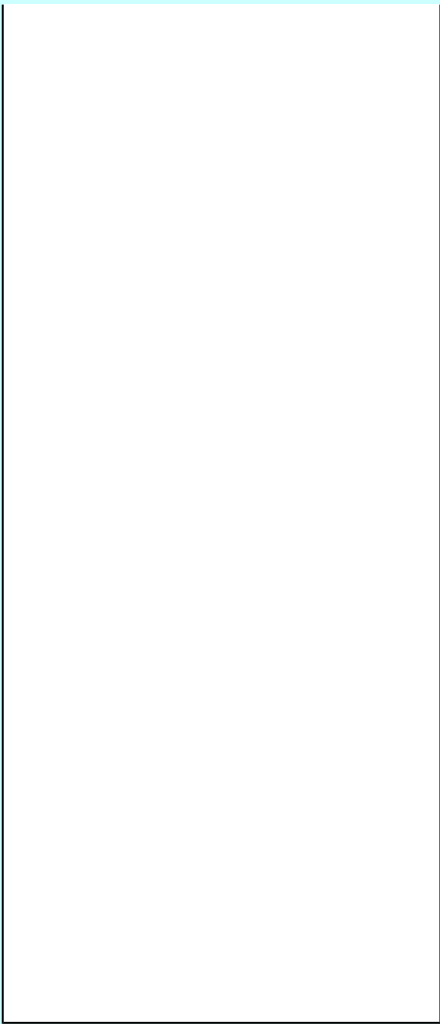












**November 18 & 19, 1999
Reagan Office Building Auditorium
1300 Pennsylvania Avenue
Washington, DC**

**Homes, Businesses, Schools, Hospitals, Nursing Homes, Day Care Centers,
Family Security, Community Security – All in Danger**

Windstorms in the United States, such as hurricanes, tornadoes, frontal winds and downbursts continue to cause unacceptably high levels of injuries, deaths, business interruption, property damage and other negative societal impacts. Unfortunately the level of losses is increasing each year and will continue to escalate unless technology generation, education and public policies are improved.

Industry groups, professional organizations, government agencies and building code organizations have only taken limited actions to help reduce these dreadful losses. In response to this continuing threat, the American Association for Wind Engineering in cooperation with other organizations is holding a special no-registration fee Symposium. The purpose is to examine new approaches to reducing wind losses and to lay the foundation for the development of an integrated national plan for wind hazard mitigation. This Symposium will start 9:00 AM on Thursday, November 18 and will end at 1:00 PM on Friday, November 19.

It is the opinion of many in the design, construction and wind engineering communities that vast improvements could be achieved in the performance of new and existing structures through improvements in knowledge, policies and practices. A better understanding of wind characteristics, and how structures and components interact with and resist wind forces is needed. Also a better understanding of factors in public and private policy issues involved in facilitating the implementation of wind hazard measures is needed. At the present time few consensus-based

standards exist which define all of the wind hazards found throughout the United States on a common basis. In addition the resources devoted toward the generation of an improved knowledge and database to better define such standards are inadequate to achieve needed progress. As a result the response to wind impacts is primarily one of great attention after a disaster without strong actions to assure that facilities are constructed or retrofitted to reduce the impacts of future windstorms.

For information concerning the Symposium, contact:

Dr. Michael P. Gaus, President of AAWA at, Dept. of Civil Engineering, Univ. at Buffalo, gaus@eng.buffalo.edu, (716) 645-2114, X-2410

or: Prof. Kishor Mehta, Director Wind Engineering Research Center, Texas Tech Univ, kmehta@coe.ttu.edu, (806) 742-3479, X-323

Other information can be found on the AAWA Website at:

www.civil.buffalo.edu/aawe

Symposium Schedule

Thursday Nov. 18, 1999

- 9:00 – 9:45 AM Keynote Speaker
To be announced (Representatives of Congressional Caucus on Wind Hazard Reduction Invited)
- 9:45 – 10:00 Break
- 10:00 – 11:45 Panel Session 1 (Hazard Identification and Risk Assessment)
Moderator
Prof. James McDonald, Chair, Dept of Civil Eng., Texas Tech University
- 11:45 – 1:00 Lunch
- 1:00 – 1:45 Keynote Speaker 2
Michael Armstrong, Deputy Administrator, FEMA
- 1:45 – 3:15 Panel Session 2 (Current and needed knowledge)
Moderator
Dr. Michael P. Gaus, AAWA & Dept. of Civil Eng., University at Buffalo
Wind characterization and wind structure interaction
Prof. Ahsan Kareem, University of Notre Dame
- Structural resistance, shelters, missiles
Prof. Ernie Kiesling, Texas Tech. University

Components, water penetration
Tom Smith, AIA, Tom Smith Consulting

Education, information transfer
Prof. Nick Jones), the John Hopkins University

3:15 – 3:30 Break

3:30 – 5:00 Panel Session 3 (Implementation)
Moderator
Margaret Lawless, Director, Program Assessment and Outreach Division, FEMA

Friday Nov. 19, 1999

8:30 – 10:00 AM Panel Session 4 (Understanding Losses)
Moderator
Prof. Jamie Cruz, Texas Tech University

10:00 - 10:15 Break

10:00 - 10:30 Keynote Speaker 3
Mr. Bob Ryan, NBC Television

10:30 – 12:00 Panel Session 5 (Mobilizing Resources to Achieve Effective Wind Hazard Mitigation)
Moderator
Dr. Richard Wright, Former Director of Building and Fire Research Division, NIST
Tim Reinhold, Clemson University
Bill Hooke, NOAA
Mr. Jay Crandell, NAHB
Dr. Shyam Sundar, NIST

12:00 – 12:30 Closing Remarks and Summary

1:30 – 3:00 Extended Discussion Session for interested parties



Remains of approximately twenty homes in a subdivision where approximately sixty-seven homes were destroyed. FEMA photo by Lynne Keating.

Coming Attractions in Future Issues

- New wind sensors for measuring extreme winds
- Instrumented houses to measure wind force and structural reactions
- Portable tower programs to acquire engineering wind information during extreme wind storms
- Report on Wind Symposium

American Association for Wind Engineering

Membership Application

Dues * (Check appropriate category): (Membership year Aug 1 through July 31 of following year.)

Member \$40.00 _____

Student \$10.00 _____

Corporate \$500 or more _____

Corporate membership can include up to five individual members. Complete one form for each individual member

Please make checks or other payments (In U.S. Dollar equivalents only) payable to *American Association for Wind Engineering*, and mail to **Dr. Partha Sarkar, Box 41023, Texas Tech University, Lubbock TX 79409-1023.**

Name: _____

Title _____

Company/Organization _____

Address _____
City _____ State/Zip _____ Country (not US) _____
Phone _____ FAX _____ e-mail _____
Your Wind Engineering Interests _____

American Association for Wind Engineering
c/o Dept. of Civil Engineering, Room 212 Ketter Hall
University at Buffalo
Buffalo, NY 14260-4300



Stamp

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- Mr. Thomas L. Smith
T.L. Smith Consulting, Inc.
- Dr. Ahsan Kareem, Past President

- [1] Direct fatalities within the state of Oklahoma.