

Report of Task Committee A
GEOTECHNICAL ENGINEERING AND GROUND MOTION

Date: 14 May 2007

Place: National Institute for Land and Infrastructure Management, Tsukuba, Japan

Attendees:	U.S. Side --	Mehmet Celebi (Chair)	USGS
		Michael Sharp (Chair)	USACE
	Japan Side --	Keiichi Tamura (Chair)	NILIM
		Shojiro Kataoka	NILIM
		Shin Koyama	BRI
		Yasuhiro Shoji	NILIM

1. Objective and Scope of Work

The objectives of work include:

- (1) To promote sharing of strong motion earthquake data among researchers and practicing engineers, and enhance the availability of technology for evaluating the destructive effects of earthquake motion, and
- (2) To promote research on the dynamic behavior of soils, foundations and earth structures during earthquakes.

The scope of work includes:

- (1) Exchange strong motion data regularly and identify significant issues.
- (2) Exchange information on technological developments, state-of-the-art and practice related to strong motion recording, hazard mapping, soil-structure interaction, soil behavior and stability during earthquakes,
- (3) Exchange field data related to geotechnical engineering, and
- (4) Plan and conduct programs of cooperative research and/or workshops in coordination with the proposed or ongoing programs.
- (5) Plan and form a cooperative post-earthquake survey team after a major event.
- (6) Exchange information and conduct studies related to correlation of damage with ground motion.

2. Accomplishments

- (1) The Fourth US-Japan Workshop on Soil-Structure Interaction was held in Tsukuba, Japan during March 28-30, 2007. This workshop was sponsored and hosted by BRI, and was also financially supported by USGS, USC and NSF. The work proceedings will be completed by the end of June 2007 and widely distributed. The workshop organizers were Dr. Okawa (BRI), Dr. Iiba (BRI), Dr. Todorovska (USC) and Dr. Celebi (USGS).
- (2) The Japan-side Task Committee contributed to the issuing the Guidelines on Seismic Performance Verification of River Facilities (Draft), which include geotechnical works.

3. Future Plans

The future plans include:

- (1) Plan a workshop on Real-Time Instrumentation of Densely Urbanized Areas and Instrumentation of Civil Engineered Structures including health monitoring. Temporary committee will include Dr. Fujiwara of NIED, Dr. Okawa of BRI, Mr. Shoji of NILIM, Dr. Borchardt, Dr. Wald and Dr. Celebi of USGS. The committee will explore cooperation with other Task Committees.
- (2) Explore the possibility of joint research and/or workshop on damage detection techniques. The responsible members will be Dr. Sugano (PARI), Dr. Todorovska and Dr. Celebi. Cooperation with

Task Committee B to have joint workshops will be explored.

4. Related Activities

- (1) Dr. Eiji Kohama, Senior Research Engineer of the Port and Airport Research Institute (PARI) continues the research activities as a visiting researcher at the University of California, Berkeley (UCB).
- (2) The Japan-side Task Committee members participated in the reconnaissance team organized by NILIM, PWRI, BRI and PARI in order to investigate damage to geotechnical works induced by the 2007 Noto Hanto Earthquake.
- (3) Task Committee members and other invited seismologists and engineers will participate in a workshop on "Rotational Seismology and Engineering Applications" sponsored by USGS and to be held in Menlo Park, California during September 18-19, 2007.

Report of Task Committee B
NEXT-GENERATION BUILDING AND INFRASTRUCTURE SYSTEMS

Date: 14 May 2007

Place: National Institute for Land and Infrastructure Management, Tsukuba, Japan

Attendees:	U.S. Side -	Douglas Foutch (Co-Chair)	NSF
		Noël Raufaste (Acting Co-Chair)	NIST
		William Roper	GMU
		Josephne Malilay	CDC
		Fuyuen Yip	CDC
		Jennifer Rice	UI
	Japan-side -	Takashi Kaminosono (Acting Co-Chair)	BRI
		Hiroshi Fukuyama (Co-Chair)	BRI
		Hitoshi Shiohara	Tokyo Univ.
		Taiki Saito	BRI
		Koichi Morita	BRI

1. Objective and Scope of Work

(1) Objective

The objectives of the Task Committee are to enhance the development and implementation of innovative and new 1) structural and non-structural materials; 2) enabling technologies such as structural health monitoring and multi-hazard performance based engineering; 3) evaluation, analysis, design, construction, and maintenance methods through cooperative individual and organized and networked analytical and experimental approaches for the next-generation building and infrastructure systems.

Opportunities during the next five years include topics on multi-hazard resilient buildings, embedded systems for the health and productivity of occupants, and collaborations with other researchers and practitioners.

(2) Scope-of-Work

- a) Conduct joint workshops and joint meetings to identify research opportunities, new projects including multi-hazard risk reduction strategies and measures, and make recommendations for the UJNR Panel.
- b) Encourage the development and application of new technologies, smart sensors, and intelligent materials to improve the health, safety, and productivity of construction workers and building occupants as well as reducing building impact on the environment.
- c) Develop new materials and technologies for condition assessment, retrofit of existing buildings, and design of new buildings.
- d) Coordinate development of databases, test procedures, and guidelines for interpretation of test results and their applications.
- e) Coordinate joint research including the utilization of experimental facilities.
- f) Enhance the exchange of information and personnel.

2. Accomplishments

- (1) The key accomplishment was the Workshop on Technologies for Next Generation Buildings that initiated the Panel's charge for TCs to cluster with TC D, Wind Engineering, and TC I, Structural Fire Performance, and with other experts to improve productivity and reduce workshop costs (February 25-27, 2007).
- (2) The Workshop resulted in a process to develop a five-year strategic research plan that addresses high-performance buildings' abilities to better resist the effects from extreme wind, earthquakes, and fire

loads and to effect informed decisions about design procedures that incorporate environmental quality and sustainability of occupant health and life cycle systems.

3. Future Plans

- (1) Create an action plan (based on Figure 1) with targeted research activities, together with estimated schedule, milestones, and needed resources by fall of 2007. The plan will encourage cooperative research on infrastructure systems by partnering with TC G, Transportation Systems and other TCs.

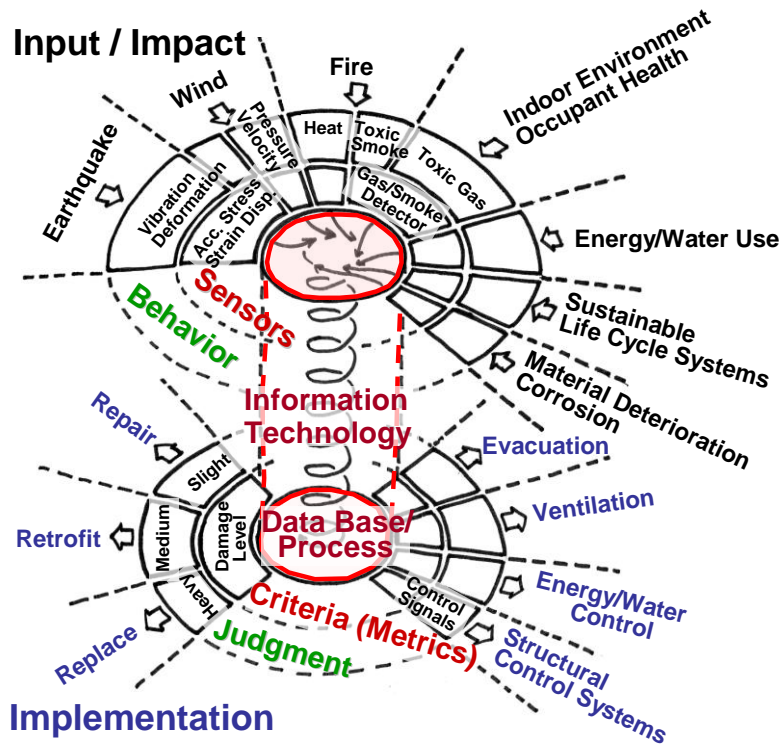


Figure 1

Diagram for creating high-performance buildings that better resist extreme winds, earthquakes, and fire loads resulting in informed decisions about design procedure incorporate environmental quality and sustainability of occupant health and life cycle systems. The initial TC focus is on sensors followed by subsequent actions to be determined during the next six months.

- (1) Seek expanded membership from both sides with knowledge of sensors, information technology, and sustainability related expertise to collectively address technology for next generation buildings.
- (2) Plan 2nd workshop with TC G, Transportation Systems, and other TCs as appropriate. Co-Chairs for TC B will contact Co-Chairs of other TCs to see if they are interested in partnering in this activity.

Report of Task Committee C DAMS

Date: 14 May 2007

Place: National Institute for Land and Infrastructure Management, Tsukuba, Japan

Attendees:	U.S. Side --	Robert Hall (Chair)	USACE
		Anjana Chudgar	USACE
		Michael Sharp	USACE
		Victor Saouma	CU-Boulder
		Yusof Ghanaat	QUEST Structures
	Japan Side --	Yoshikazu Yamaguchi (Chair)	PWRI
		Hitoshi Yoshida	PWRI
		Tomoya Iwashita	PWRI
		Hiroyuki Satoh	PWRI
		Kazuhito Shimamoto	NILIM

1. Objective and Scope of Work

To develop technical insights into better understanding of the response of dams to seismic effects, the T/C will plan, promote, and develop research initiatives to assist in assuring seismic safety and economical protective countermeasures against earthquake loading for these critical structures.

The scope of work includes:

- (1) Develop methods of analysis for seismic design of dams including outlet works.
 - a) Comparative analysis of design methods and evaluation criteria used by U.S. and Japan.
 - b) Development of "Design Earthquake Ground Motions" for analysis and evaluation of dams.
 - c) Assessment of models and numerical procedures used for seismic dynamic analysis.
- (2) Perform research to better understand the dynamic characteristics of dam construction materials and site conditions.
 - a) Strength and deformation characteristics of concrete, soil and rock materials during earthquakes.
- (3) Evaluate observed performance of dams and outlet works during earthquakes.
 - a) Develop a database that contains measured ground accelerations and dynamic response of dams and outlet works during earthquakes, and other related information necessary to evaluate their seismic behavior, such as experimental and/or analytical data with description of test and analysis procedures used.
 - b) Investigation of damage mechanisms due to earthquake loading.
 - c) Application of the analysis of the observed dynamic behavior to the improvement of design criteria.

2. Accomplishments

- (1) Technical exchange and collaborative research on "*Non-linear response analysis of concrete dams*" has been conducted between the U.S. (U.S. Army Engineer Research and Development Center) and Japan (Public Works Research Institute). The non-linear response analyses were made using the results of the shaking table experiments for concrete dam models at PWRI in 2006. Both the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation have recently conducted similar tests at different scales and non-linear response analyses, and the joint comparison and evaluation of test and analysis results will be extremely beneficial to advance the state of the art in constitutive modeling of mass concrete structures.

- (2) Technical exchange and collaborative research on “*Experimental characterization of non-linear tensile behavior of mass concrete*” has been conducted between U.S. (U.S. Army Engineer Research and Development Center & U.S. Bureau of Reclamation) and Japan (Public Works Research Institute).

3. Future Plans

- (1) The Task Committee will hold the “*4th U.S.-Japan Workshop on Advanced Research on Dams*” on May 17, 2007 in Tsukuba, Japan. The main themes for the Workshop are non-linear response analyses and shaking table tests for concrete dams.
- (2) The Task Committee will continue the current efforts focused on the development of improved mechanisms to facilitate the continuous exchange of results of research activities and general technical information related to dam earthquake engineering.
- (3) The Task Committee will coordinate exchange visits of scientists and engineers from the U.S. and Japan. A series of case histories of mutual interest will be identified and prioritized and they will serve as the focus for this exchange program.
- (4) The Task Committee will promote the development of joint research programs. The following topics have been identified as areas for future collaborative research:
 - a) ***Non-linear response analysis of concrete dams:***
The Task Committee will continue their collaboration in this research to include both analytical and experimental data.
 - b) ***Global stability analysis of concrete dams:***
The Task Committee will conduct a review of the minimum requirements for sliding and overturning stability currently in use in the U.S. and Japan. The Task Committee recognizes the importance of this collaborative effort, as the corresponding guidelines are currently subject to revision and update both in the U.S. and Japan. The results of this effort will be summarized and published. “*Engineer Manual No. 1110-2-2100: Stability Analysis of Concrete Structures*” published by The U.S. Army Corps of Engineers in December 2005 (4. (2)) contains this problem.
 - c) ***Criteria for seismic analysis progression:***
The Task Committee will review and compare the state of practice in the U.S. and Japan regarding current recommendations for progression of seismic analysis based on stages of increasing complexity. The results of this effort will be summarized and published.
 - d) ***Seismic evaluation of embankment dams:***
The Task Committee will review criteria and guidelines for post-earthquake stability and deformation analysis of embankment dams. The results of this effort will be summarized and published.
 - e) ***Dam-foundation interaction:***
The Task Committee will develop collaborating research efforts to review and develop improved numerical models for dam-foundation interaction.

The activities corresponding to the four areas indicated above will be addressed sequentially and the corresponding schedule will depend on the progress of the corresponding guidance documents, some of which are currently under discussion, development and/or review in the U.S. and Japan.
- (5) Following large earthquakes in the U.S. or Japan, the Task Committee will assemble a joint reconnaissance team to investigate the performance of concrete dams, earth and rockfill dams, and outlet works.

4. Related Activities

- (1) The Ministry of Land, Infrastructure and Transport, Japanese Government completed the “*Guidelines for Seismic Safety Evaluation of Dams (Draft)*” in March 2005. This document was applied to four existing dams during the fiscal year of 2005 and three other existing dams during the fiscal year of 2006 in order to verify and revise it.
- (2) The U.S. Army Corps of Engineers has published the “*Engineer Manual No. 1110-2-2100: Stability*

- Analysis of Concrete Structures*” in December 2005. This document contains new criteria for stability analysis of concrete gravity structures.
- (3) The U.S. Bureau of Reclamation published the “*Research Topics to Validate the Seismic Response of Dams*”, whose object is to compile and independent list of research topics to validate the seismic response of dams, in January 2007.

Report of Task Committee D
WIND ENGINEERING

Date: 14 May 2007

Place: National Institute for Land and Infrastructure Management, Tsukuba, Japan

Attendees:	U.S. Side --	Joseph Main (Acting Co-Chair)	NIST
		Partha Sarkar	Iowa State University
		Luca Caracoglia	Northeastern University
	Japan Side --	Yasuo Okuda (Co-Chair)	BRI
		Jun Murakoshi (Co-Chair)	PWRI
		Masaaki Togashi	MRI
		Hitomitsu Kikitsu	BRI
		Yasushi Josen	PWRI

1. Objective and Scope of Work

To exchange technical information and to jointly plan, promote, and foster research and dissemination, in order to improve understanding of wind and its effects on structures, to establish more rational wind-resistant design procedures for structures, and to contribute collaboratively and synergistically to wind hazard mitigation. Specific objectives for the Task Committee include:

- (1) Strategically and collaboratively, identify research needs in wind hazard mitigation in the areas of new technology, basic and applied research in wind and structural engineering, and in social and economic impacts of wind events.
- (2) Facilitate cooperation and collaborative research between U.S. and Japanese researchers in wind engineering.
- (3) Identify and exchange successes in wind engineering and wind hazard mitigation.

The scope of the US-Japan collaboration includes:

- (1) Characterization of strong wind, especially boundary layer extreme winds.
- (2) The study of wind effects including wind loading on and wind-induced response of structures.
- (3) Performance of experimental and analytical research to predict wind effects.
- (4) Performance of damage surveys, and wind hazard and risk assessments.
- (5) Development of new technologies for wind hazard mitigation.

2. Accomplishments

- (1) The 4th US-Japan Workshop titled as “New Challenges for Reduction of High-Wind Disasters” was held in Tsukuba on July 20-22, 2006. In the workshop, 29 researchers and engineers (U.S.:12, Japan:17) participated and 21 technical papers were presented on the issues of the prediction of disaster from wind, the influence of strong wind on buildings and bridges, and so on. The proceedings of the workshop were printed by BRI and PWRI in March 2007.
- (2) A second phase of comparative analysis in the inter laboratory study of wind loading on low industrial buildings was initiated by Prof. Bogusz Bienkiewicz of Colorado State University following the 4th US-Japan Workshop. It was observed that different target empirical models for turbulence intensity were used by the participating laboratories, resulting in significant variability in the turbulence intensity, particularly for suburban terrain. This helps to account for the previously observed variability in point pressures and bending moments. These results are being presented by Joseph Main of NIST at the 39th UJNR Panel Meeting.
- (3) A second phase of wind tunnel tests on streamlined and rectangular bridge deck sections were completed recently at Iowa State University (ISU) as part of the benchmark study on flutter

derivatives that was initiated at the 3rd U.S.-Japan workshop on wind engineering in 2002. Both free and forced-vibration tests were performed. Participants included Prof. Partha Sarkar and Prof. Fred Haan (ISU) and Prof. Luca Caracoglia (Northeastern University). Results were compared with those from PWRI (Dr. Hiroshi Sato) and Kyoto University (Prof. Masaru Matsumoto) and were presented at the 39th UJNR Panel Meeting.

3. Future Plans

- (1) As a follow-up to the 4th U.S.-Japan Workshop on "New Challenges for Reduction of High-Wind Disasters" held in Tsukuba in July 2006, the 5th U.S.-Japan Workshop on Wind Engineering will be held in U.S. in fall 2009 or on January or February 2010.
- (2) Seek additional opportunities to pursue collaborative research on the following topics:
 - a) Wind characteristics and wind hazard mitigation.
 - i) Wind characteristics in complex terrains.
 - ii) Validation of wind models with full-scale data (opportunities for joint field studies).
 - iii) Arrange for the hosting of colleagues interested in participating in quick-response post-storm damage assessments.
 - b) Wind effects on buildings.
 - i) Development of reliable and consistent aerodynamic loads and probabilistic methodologies for performance-based structural design.
 - ii) Comparison of wind tunnel data sets and CFD results to full-scale measurements.
 - c) Wind effects on bridges
 - i) Prediction and mitigation of wind-induced vibration of stay cables.
 - ii) Establish guidelines, criteria, and formats for sharing data from full-scale measurements, and identify potential collaborative instrumentation opportunities.
 - d) Evolving Technologies
 - i) Jointly evaluate need and costs, and to share preliminary investigation results relative to next-generation wind tunnels for the simulation of non-stationary winds (straight-line, tornado and microburst).
 - ii) Structural control
- (3) Exchange technical information on the following topics
 - a) Wind characteristics and wind hazards
 - b) Wind pressures, loadings and performance of buildings
 - c) Wind-induced response of flexible, cable-suspended bridges and their components
 - d) New prediction and mitigation techniques for wind effects
- (4) Investigate opportunities for technical collaboration on the following topics
 - a) Distribution of airborne chemical and biological agents
 - b) Development of a distribution model for volcanic gas and dust
 - c) Collaboration with fire engineering researchers by making use of unique facilities: Fire Research Wind Tunnel and Wind and Rain Test Laboratory
 - d) Consider development of a compendium listing of relevant resources and facilities for wind engineering research
- (3) Engage in more regular interaction and communication among Task Committee members. Use email (e.g., bi-monthly updates on activities) and exchange visits between full Panel meetings was suggested as a means of facilitating and coordinating collaborative activities.
- (4) Continue to improve process, mechanisms, and funding for interaction on reconnaissance teams after future hurricane/typhoon impacts.
- (5) Strategically and collaboratively construct a vision and plan for wind engineering research needs for the next decade, and formulate collaborative activities around those plans.

Report of Task Committee G TRANSPORTATION SYSTEMS

Date: 14 May 2007

Place: National Institute for Land and Infrastructure Management, Tsukuba, Japan

Attendees:	U.S. Side --	W. Phillip Yen (Chair) David Sanders	FHWA University of Nevada, Reno
	Japan Side --	Jiro Fukui (Chair) Kazuhiko Kawashima Shoichi Nakatani Takashi Tamakoshi Shigeki Unjoh	PWRI Tokyo Institute of Technology PWRI NILIM PWRI

1. Objective and Scope of Work

The objectives of work include:

- (1) To plan, promote and foster research on the behavior of transportation facilities when subjected to wind and seismic forces, and
- (2) To disseminate research results and provide specifications and guidelines based on the Task Committee's findings.

The scope of work includes:

- (1) To investigate existing and new bridges design, the behavior of whole bridge systems and/or single component of a bridge without limitation on their size and function.

2. Accomplishments

- (1) The 22nd US-Japan Bridge Engineering Workshop was held during 23 - 25 October 2006, at Seattle, WA, US. 24 U.S. and 24 Japanese participants attended the workshop. 41 technical papers were presented and discussed on the following main topics: a) Geotechnical Engineering, b) Health Monitoring and c) Advanced Seismic Technologies.
- (2) The proceedings of the 22nd US-Japan Bridge Engineering Workshop were printed and will be distributed in May 2007. The program and papers of the workshop will be posted on the web-site of the UJNR at the PWRI (http://www.pwri.go.jp/eng/ujnr/tc/g/tc_g.htm)
- (3) Both side conducted post earthquake damage evaluation studies, and the information has been exchanged.

3. Future Plans

- (1) The 23rd US-Japan Bridge Engineering Workshop will be held in fall of 2007 in Japan. Specific program and itinerary will be proposed by the Japan-side Task Committee G with the concurrence of the US-side Task Committee. Main topics will be a) Seismic engineering, including damage assessment and prediction, b) Codes for new design and retrofit, including long term performance objectives and c) Multiple hazards, including design concepts and extreme events.
- (2) Both sides agreed to develop and publish an accomplishment report of the past activities of Task Committee G.
- (3) Following a devastating earthquake or hurricane (typhoon) in the US or Japan, the committee will form a joint reconnaissance team to investigate the performance of transportation systems.
- (4) Exchange technical information on the following topics:

- a) Seismic design and retrofit of highway bridges including the development of seismic response modification devices, smart materials, seismic retrofit for long-span bridges, and the development of damage evaluation methods using sensor systems.
 - b) Seismic and aerodynamic response of long-span bridges including suspension and cable stayed bridges, with emphasis on behavior of composite materials, cable inspection, vibration control, and corrosion protection.
- (5) Both sides agreed to pursue the following two research topics as cooperative studies.
- a) Performance Criteria – Limit States
 - Relationship between performance criteria and structural response
 - Relationship between damage and loss of function
 - Realistic performance criteria
 - Philosophical framework for Performance-based design and assessment
 - b) Three Dimensional Effects
 - Effect of multi-dimensional input on superstructure and substructure
 - Simplified, effective 3D modeling
 - Total failure analytical modeling

And encourage the following research themes and share information:

- a) High-performance materials
- b) Input ground motion
- c) Foundation – soil –structure systems
- d) Assessment of component and system uncertainty
- e) Seismic intervention
- f) Size effects testing
- g) Sequential failure of bridge systems

4. Related Activities

- (1) Both side's committee members are participating NIED/NEES cooperative experimental research in full scale Bridge Column shaking table tests.
- (2) FHWA will conduct a workshop on " Accelerated Bridge Construction Technology in Seismic Area" in spring, 2008.

Report of Task Committee H
STORM SURGE AND TSUNAMI

Date: 14 May 2007

Place: National Institute for Land and Infrastructure Management, Tsukuba, Japan

Attendees:	U.S. Side --	Solomon Yim (Chair)	OSU
	Japan Side --	Takashi Tomita (Chair)	PARI
		Masaya Fukuhama	NILIM
		Katsuya Oda	NILIM
		Nadao Kohno	MRI

1. Objective and Scope of Work

The objectives of work include:

- (1) To exchange scientific and technical information
- (2) To jointly plan, promote and foster research and dissemination of knowledge
- (3) To develop measures to prevent and mitigate damages from storm surges and tsunamis

The scope of work includes:

- (1) Perform joint research on storm surge and tsunami occurrences, generation, propagation, and coastal effects. Develop database on storm surge, tsunami and wave measurements.
- (2) Improve coordination of strategies and systems for observations of tsunamis and storm surges by field surveys, satellites, and in-situ measurements.
- (3) Exchange results and status of storm surge and tsunami mitigation activities including analysis of the problem, planning, warning, and engineering approaches.
- (4) Exchange information on development of technologies such as numerical models to predict propagation processes, land-fall locations, inundation and run-up heights, and wave characteristics, improved instrumentation, and use of satellite communication for detection and warning.
- (5) Facilitate research result and technology development disseminations through exchange of literature, technical reports at joint meetings, special workshops, joint projects, and direct interaction among participants.
- (6) Develop planning, design and construction guidelines in storm surge and tsunami flooding zones to serve as a model for international standards.
- (7) Provide technical support to develop storm surge and tsunami mitigation programs worldwide.
- (8) Encourage conduct of joint investigation following storm surge and tsunami events.

2. Accomplishments

- (1) The 3rd International Workshop on Coastal Disaster Prevention was held on February 12-13, 2007 in Colombo, Sri Lanka organized by Port and Airport Research Institute (PARI), Coastal Development Institute of Technology (CDIT) and Ministry of Land Infrastructure and Transport (MLIT) in the Japan side, and University of Moratuwa, National Science Foundation and Disaster Management Centre in the Sri Lanka side. The Panel on Wind and Seismic Effects of UJNR supported the workshop together with the Japanese Section of International Navigation Association. Researchers and practitioners attended the workshop including the following: John R. Headland (Moffatt & Nichol Engineers, USA), Solomon Yim (Oregon State University, USA), Taro Arikawa (PARI, Japan), Koji Fujima (National Defense Academy, Japan), Yoshiyuki Kaneda (Japan Agency for Marine-Earth Science and Technology, Japan), Kentaro Kumagai (National Institute for Land and Infrastructure Management, Japan), Susumu Murata (CDIT, Japan), Yuji Nishimae (JMA, Japan), Shigeo Takahashi (PARI, Japan), Takashi Tomita (PARI, Japan), Subandono Diposaptono

(Ministry of Marine Affairs and Fisheries, Indonesia), Jose Miguel Montoya Rodriguez (Mexican Institute of Transport, Mexico), W.P.S. Dias (University of Moratuwa, Sri Lanka), S.S.L. Hettiarachchi (University of Moratuwa, Sri Lanka), Saman P. Samarawickrama (University of Moratuwa, Sri Lanka), and Ahmet C. Yalciner (Middle East Technical University, Turkey). Participants of 273 gathered from 13 countries: Greece, Indonesia, Japan, Malaysia, Maldives, Mexico, Myanmar, Philippine, Sri Lanka, Thailand, Turkey, USA, and Vietnam. After the workshop, Tsunami Hazard Map Seminar was continuously held in the same place.

- (2) A US National Workshop on Tsunami Research Plan was held on July 25-26, 2006 in Corvallis, OR, USA organized by the US side co-chairs, Eddie Bernard of National Oceanographic and Atmospheric Administration (NOAA) and Solomon Yim of Oregon State University. It was co-sponsored by NOAA and the US National Science Foundation (NSF). Participants include all US side Storm Surge and Tsunami Task Committee members, Solomon Yim (OSU), Eddie Bernard (NOAA), Michael Briggs (USACE), Frank Gonzalez (NOAA), Laura Kong (ITIC), Philip Liu (Cornell University), and Harry Yeh (OSU). The Japan side chair, Takashi Tomita (PARI), was invited as a special participant (but was unable to attend due to prior a commitment).

3. Future Plans

- (1) Create joint research between the US and Japan to develop and improve numerical models of storm surge and tsunami dynamics and to exchange experimental and field data. The following topics have been identified as areas of future research collaboration on storm surges and tsunamis:
 - (a) field observation
 - (b) characterization
 - (c) physical experiment models
 - (d) numerical simulation models
 - (e) effects on coastal structures and damage estimations
 - (f) design of protective structures for different levels
 - (g) hazard maps development and warning system design
 - (h) tsunami and storm surge information communication and warning systems development
 - (i) risk assessment including hazard beyond designed levels
- (2) Develop database for existing and planned experiments including description and parameters of experiments to maximize overall available experimental data for understanding of physical behavior, numerical model validation and structural design.
- (3) Include the effects of global warming on atmospheric and oceanographic environmental conditions leading to changes in the probability of occurrence and intensity of typhoons, cyclones and hurricanes, and sea level rise. These changes in typhoon and sea level characteristics will directly influence the characteristics and induced damages of future storm surges and tsunamis.
- (4) Hold the 4th International Workshop on Coastal Disaster Prevention in Japan, in fall 2007.
- (5) The US side co-chair, Dr. Solomon Yim, will contact the co-chair, Dr. Eddie Bernard and the US side co-chair of T/C D, Mr. John Gaynor, regarding the study of storm surge, and the US side chair of T/C G, Dr. Phillip Yen, regarding storm surge and tsunami effects on bridges.

4. Related Activities

- (1) Drs. Tomita and Yim participated in the UJNR post workshop technical tour of New Orleans and visited hurricane and storm surge damaged levees and residential areas on May 18-20, 2006.
- (2) Drs. Tomita and Yim jointed the PIANC (International Navigation Association), MarCom Working Group 53 on "Recommendations with regard to the design and construction of maritime structures in tsunami prone areas." Dr. Yim participated in the 2nd meeting of the working group held on February 14, 2007 in Colombo, Sri Lanka.
- (3) Drs. Tomita and Yim jointed the Tsunami Hazard Map Seminar which was held on February 14, 2007 in Colombo, Sri Lanka and which was organized by Ministry of Land, Infrastructure, and

- Transport, Japan and Port and Airport Research Institute. In the Seminar, Dr. Tomita had a presentation on “Hazard Map to Build the Understandings and Awareness of Tsunami Disasters.”
- (4) Japan side T/C members have cooperative research activities in Technical Committee on Technologies to Estimate and Reduce Tsunami Damages, Japan Society of Civil Engineers.
 - (5) Drs. Yim and Yeh participated in a *NEES Training and Tsunami Modeling Workshop* hosted at Oregon State University, Corvallis, OR, on July 27-28, 2006.
 - (6) Dr. Tomita hosted the Workshop on Tsunami Disaster Mitigation on August 1-11, 2006 under the auspices of the Ministry of Land, Infrastructure and Transport, Japan and Port and Airport Research Institute. Researchers and practitioners participated including those from India, Indonesia, Maldives, Sri Lanka and Thailand, countries that suffered major damages from the 2004 Indian Ocean Tsunami.
 - (7) Dr. Yim conducted a survey of the damages of the Port of Crescent City and the Del Norte County, CA, on November 17-19, 2006.
 - (8) Dr. Yeh hosted and Drs. Yim and Philip Liu attended the *NSF Tsunami Workshop*, Hilo, HI, on December 26-28, 2006.
 - (9) Dr. Tomita participated in the 4th meeting of ASEAN-Japan Port Technology Group (PTG) on February 14, 2007 in Colombo, Sri Lanka, in order to discuss on tsunami hazard mapping in the affected countries by the 2004 Indian Ocean Tsunami and ASEAN countries, The PTG is in the ASEAN+Japan Transport Partnership Program of ASEAN+Japan Comprehensive Economic Partnership.
 - (10) Japan side T/C members contributed to the amendment of the technical standards for port and harbor facilities in which tsunami and storm surge protection function of breakwater was introduced and required performance were prescribed (the Ministerial Ordinance, the Notification and commentaries on them, enforced on April 1, 2007).
 - (11) Dr. Yim gave an invited presentation at the *Oregon Department of Transportation Bridge Design Conference*, in Salem, OR, on May 9, 2007 on “Tsunami Loads on Coastal Structures: A Case Study of Spencer Creek Bridge.”

Report of Task Committee I
FIRE PERFORMANCE OF STRUCTURES

Date: 14 May 2007

Place: National Institute for Land and Infrastructure Management, Tsukuba, Japan

Attendees:

U.S. Side --	H. S. Lew (Acting Co-Chair)	NIST
	Stephen A. Cauffman (Acting Co-Chair)	NIST
Japan Side --	Mamoru Kohno (Co-Chair)	NILIM
	Tomohiro Naruse	NILIM

1. Objective and Scope of Work

The objectives of work include:

- (1) Increase the availability of technology for evaluating the methods of fire/structural interaction that will be used to improve the performance of structures under fire loads.
- (2) Promote post disaster investigations of fires following natural and technological disasters that enhance the Panel's core competencies in structural fire technologies.
- (3) Encourage the development and sharing of research findings among the world's researchers and practitioners on the behavior of structural systems to fires.

The scope of work includes:

- (1) Plan and conduct workshops and cooperative research on topics that improve the understanding of fire growth and service life predictions of the performance of structural components to fire loading.
- (2) Exchange data on the performance of structural systems and components to fires and related modeling and simulation analyses.
- (3) Exchange information on technological developments, state-of-art and practice related to the control of fire spread in buildings.
- (4) Exchange information on technological developments related to the performance of structures exposed to fires.
- (5) Exchange data on large fire analysis from natural and technological disasters to accurately simulate fire initiation and growth in urban environments.
- (6) Develop the technical bases to revise structural-fire related codes, standards, and practice.

2. Accomplishments

- (1) Added new members to the U.S. side: Prof. Paul Des Jardin Department of Mechanical Engineering State University of New York at Buffalo, Prof. Jay Gore Associate Dean of Engineering for Research and Entrepreneurship Purdue University West Lafayette.
- (2) Planning for a TC workshop continued. Dr. Gross and Dr. Kohno have exchanged information for holding a workshop

3. Future Plans

The future plans include:

- (1) Hold a workshop on Fire Performance of Structures in Japan during next 12 months. TC-I will explore a feasible mode of the workshop from such as physical meeting, web-based cyber meeting, or telecommunication. Possible topics for the workshop include:
 - Current status of performance-based fire safety engineering. Japanese and U.S. experiences.

- Next generation design requirements. Reconstruction of performance requirements, and available and needed performance verification techniques.
- Evaluation of fire performance of existing steel and reinforced concrete structures including reality of connections and their expected performance in fire.
- Validation of numerical analysis methods by detailed simulations or full-scale experiments.
- Simplified calculation methods for predicting fire performances.
- Egress requirements for people with disabilities.

- (2) Share Task Committee findings with the international research community.
- (3) Explore the feasibility of creating a bi-lateral survey team to investigate fire-structure damage after major natural/technological disaster.

4. Related Activities

Collaborations ongoing between U.S. (NIST) and Japan (BRI) in Fire Spread at the Wildland-Urban Interface. Several U.S. researchers visited BRI and conducted fire wind tunnel tests.

NIST leads the Proficiency Testing of gypsum/steel stud walls according to ASTM E 119/ISO 834. Four Japanese testing laboratories have joined the program. TC-I is interested in the program and is exchanging information with them.