ANCER Newsletter

No.1

Secretary of ANCER **February 27th, 2009**

Introduction to the First ANCER Newsletter

The Asian-Pacific Network of Centers of Earthquake Engineering Research (ANCER) was established in 2001 by 7 centers from Korea, China mainland, USA, Japan and Chinese Taipei. Its vision is to integrate knowledge from different regions, especially those subjected to infrequent high-consequence earthquakes, towards deriving innovative mitigation solutions as well as help educate young professionals. ANCER has since expanded and has developed an international presence through its workshops and student exchange programs. Today, ANCER has membership and affiliations all over the world, including Australia, Hong Kong, New Zealand and Peru, amongst others. The major event in the ANCER calendar is its nearly biennial workshop; four have been held already in Harbin, China (2002), Hawaii, USA (2004), Jeju, Korea (2005), and Hong Kong, China (2007). The next ANCER Workshop will be held in Urbana, USA in August 2009. Most of the ANCER Workshops have the underlying themes of 'contributions from your researchers' and 'seismic risk in medium-to-low risk regions'. After 8 years of its establishment by the founding centers, ANCER is launching this newsletter to create and inform an international readership interested in its scope and contribution, to establish closer links between its member centers and to encourage more centers of earthquake engineering to seek alliances with ANCER. The format of the ANCER Newsletter will evolve though the thought process of its leadership and will be published initially once a year. This issue is unique, and provides brief overviews of the members of ANCER, alongside highlights of their current interests and activities. We sincerely hope that you will find the ANCER Newsletter useful, and we welcome your comments and advice.

Amr Elnashai

President of ANCER

Members of ANCER

Korea Earthquake Engineering Research Center

Institute of Engineering Mechanics, China Earthquake Administration

Multidisciplinary Center for Earthquake Engineering Research of USA

Mid-America Earthquake Center of USA

Pacific Earthquake Engineering Research Center of USA

Disaster Prevention Research Institute, Kyoto University of Japan

Center for Research on Earthquake Engineering, Chinese Taipei

Center for Civil Engineering Earthquake Research, University of Nevada Reno.

Research Center for Urban Hazards Mitigation, The Hong Kong Polytechnic University.

The Earthquake Engineering Research Test Center of Guangzhou University.

Earthquake Disaster Prevention and Mitigation Research Center, Harbin Institute of Technology, China.

University of Auckland Centre for Earthquake Engineering Research

Civil and Environmental Engineering, The University of Melbourne

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ANCER with 14WCEE

As one of the Gold Sponsors of the 14th World Conference on Earthquake Engineering, ANCER logo was on all materials of 14WCEE. ANCER presence and contribution to the 14WCEE was successful, with one Special Session (S03) that was very well attended. ANCER also held the board meeting during the conference.

2009 ANCER Workshop

The 2009 ANCER Meeting will be held in Illinois, US. The main objective of this series of meetings is to provide a medium for integration of various approaches to studying and managing earthquake risk, with an emphasis on low and medium seismicity regions, The focus of the August 2009 workshop will be the encouragement of young researchers to present their own work and have an opportunity to receive feedback from international experts in a collegiate environment. From the technical perspective, the workshop main theme is learning from recent earthquakes, especially related to field reconnaissance and back-analysis. For more information please visit:
http://www.conferences.uiuc.edu/conferences/conference.asp?ID=435

The Korea Earthquake Engineering Research Center (KEERC)

The Korea Earthquake Engineering Research Center (KEERC) was founded in 1997 at Seoul National University, Seoul, Korea. It was designated as an Engineering Research Center by the Korea Science and Engineering Foundation and funded by the government from 1997 to 2006. Professor Sung Pil Chang served as director of the center for 9 years. During this period, KEERC engaged in research on earthquake engineering with strong emphasis on the application to regions of moderate seismic risk.

Professor Chang retired in August 2008 and was appointed professor emeritus of Seoul National University and a Chair Professor at the University of Inchon. He is currently participating in a policy development project aimed at renovating Korea's construction industry and is playing an important role as advisor to many institutions and organizations.

In 2006 the directorship of KEERC was passed on to Professor Jae Kwan Kim who has also been serving as Director of the KOCED Program. Initiated in 2003, the KOCED Program, a large and very ambitious project, is to construct 6 large scale testing facilities and network them to constitute a cyberinfrastructure. The program is expected to be completed successfully this year. Experimental facilities and CI services will be available to the users. In 2006 Professor Kim also served as Director of Earthquake Hazard Mitigation Task Force of National Emergency Management Agency (NEMA) Korea. The task force drafted the earthquake hazard mitigation bill which was passed by the National Assembly and promulgated into an act. This act is expected to become a cornerstone not only for the enhancement of national seismic safety but the development of earthquake engineering and related research activities in Korea.

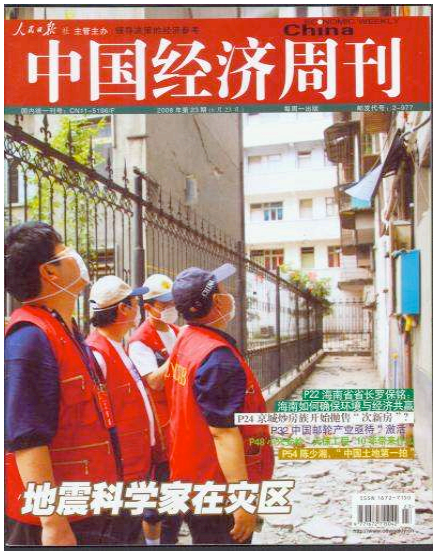
Engineering Damage Investigation of the Wenchuan Earthquake Phase One Completed

Shanyou Li, Professor & Ph.D., Institute of Engineering Mechanics (IEM)

After the great Wenchuan earthquake (magnitude 8.0) on May 12, 2008, the Institute of Engineering Mechanics (IEM), China Earthquake Administration (CEA) sent over 60 experts and graduate students to the disaster area to work with the experts from other institutions. Prof. Yuan Yifan from IEM was the head for assessment of the disaster impact, and Prof. Sun Baitao from IEM was the head for engineering damage investigations, appointed by the field CEA headquarters.

Prof. Yuan Yifan (in the middle) assigning investigation tasks

After the emergency period was over, in the support of China Earthquake Administration, IEM organized more than 100 experts from 10 institutions and universities to conduct systematic scientific investigations of the earthquake. The investigation tasks, amongst others, included: seismic intensity, earthquake liquefaction and site conditions, building damage, and lifeline engineering damage.



The damage investigation by IEM experts was reported by China Economic Weekly

After 3 months of hard work, we collected a lot of data and information about the Wenchuan earthquake. The preliminary investigation report titled 'General Introduction to Engineering Damage during Wenchuan Earthquake' was published in October, 2008. In addition, digital strong motion records of the Wenchuan main shock from 420 stations have been processed by the National Center for Strong Motion Network (NCSMN) located in the Beijing Campus of IEM. The data may be downloaded from the website of NCSMN after submitting an application.

Several major research projects related to Wenchuan earthquake damage proposed by IEM have also been approved. IEM is planning to organize experts from research institutions and universities to write a monograph about the engineering damage caused by the great Wenchuan earthquake.

IEM welcomes the centers and experts from ANCER to cooperate with us on research projects.

A Communication to Professional Colleagues from the New Director, Professor Andre Filiatrault

Dear Colleagues:

Now that MCEER has successfully transitioned from an NSF-sponsored Earthquake Engineering Research Center (EERC) into a Multiple Hazard Engineering Research Center, it is a good time to reflect on past accomplishments and embrace future opportunities.

Led by visionary academics, students, industry partners and sponsors for the last twenty-two years, the innovative research at MCEER in many ways, has revolutionized the field of earthquake engineering worldwide. From the development and implementation of supplemental damping and seismic isolation systems for buildings and bridges to the development of pre- and post-disaster decision-support systems for public and private organizations, MCEER has been successful in integrating the talents of engineers and social scientists to develop complete solutions to earthquake engineering problems.

By way of the vision and leadership of past directors George Lee and Michel Bruneau, and the contributions of countless center researchers, MCEER has also redefined the field of multiple hazard engineering through the development and quantification of the disaster resilience concept. MCEER's resilience framework paves the way for further development of specific multiple hazard engineering solutions for years to come. Anchored by the long-term support of its various sponsors, including the State of New York and the Federal Highway Administration (FHWA), the future of MCEER is bright indeed.

Going forward, MCEER's research plan will concentrate on the discovery and development of new knowledge, tools and technologies for the intelligent renewal of infrastructure that also equip communities to become more resilient in the face of extreme events arising from multiple natural and man-made hazards. The program will continue to leverage MCEER's many years of earthquake engineering expertise, and it will revolve around three complementary research thrusts on 1) Infrastructure and public policy, 2) Sustainable and resilient buildings, and 3) Innovative technologies. It will expand on NSF-sponsored research on lifelines, hospitals, and response and recovery, and build on the strength of on-going high-profile research activities at UB, as well as those of researchers at other collaborating institutions both in the US and abroad. Given MCEER's longstanding record of success, and many latest successful developments that point toward continuing achievement ahead, I feel thoroughly privileged to accept the torch passed on by Michel Bruneau – and I look forward to the opportunity to contribute in maintaining the long tradition of excellence at MCEER.

Sincerely,
Andre Filiatrault,
Director, MCEER

The Mid-America Earthquake Center (MAE Center)

Introduction

The Mid-America Earthquake Center (MAE Center), headquartered at the University of Illinois, was one of the three US national centers for earthquake engineering research that were founded by the National Science Foundation (NSF). It has emerged as the source of advanced knowledge on integrated earthquake risk assessment and mitigation and one of the leading organizations on impact of earthquakes on the Central USA. The developer of *Consequence-based Risk Management (CRM)*, a new framework for assessment and mitigation of earthquake risk, the Center is recognized worldwide as a leader in mitigation of low probability-high consequence (infrequent but devastating) earthquakes and in analyzing the physical, social, and economic impacts from these earthquakes. MAE Center reports are posted at http://mae.cee.uiuc.edu/publications/research_reports.html. More information about the Center can be found at http://mae.cee.uiuc.edu/

Current Research Projects

The main thrust of the Center is currently the regional and national impact of earthquakes on the physical infrastructure, with special emphasis on the Central USA. Specific research topics that serve that latter thrust are: fragility relationships based on testing and analysis for RC, wood and masonry structures, fragility of bridges including soil-structure interaction, assessment of cumulative damage due to multiple earthquakes and vulnerability of transportation and utility systems. The Center is also working on new cementitious materials for seismic design, semi-rigid steel frames, integration of sensor measurements and impact assessment and response of irregular high-rise buildings. For further information, see the web site above or email Jessica Vlna at vlna@illinois.edu.

Recent News

New Comprehensive Report on Impact of Earthquakes in the Central USA

The Mid-America Earthquake (MAE) Center at the University of Illinois announces the release of its report entitled 'Impact of Earthquakes on the Central USA'. The report is the outcome of one of the largest and most comprehensive earthquake consequence assessment projects funded by the Federal Emergency Management Agency (FEMA). The report contains earthquake impact assessments for the 8 central US (CUSEC) states, and lists damage and other consequences to the built environment as well as social and economic impacts. The earth quake scenarios used represent the New Madrid, the Wabash Valley and the East Tennessee seismic zones. The analysis employs new and more reliable hazard and inventory data that has not been used before. The project is managed by the US Army Corps of Engineers' Construction Engineering Research Laboratory, and the work was undertaken in partnership with the Institute for Crisis, Disaster and Risk Management at the George Washington University, with contributions for the 8 State Geological Surveys, IEM, FEMA, US Geological Survey and CUSEC. The report is available for download at http://mae.cee.uiuc.edu/.

MAE Center Hosts Indonesian Delegation, to Assess Earthquake Impact on Jakarta Transportation System

A delegation of Indonesian engineering researchers and practitioners were hosted by the MAE Center on May 22 – 23, 2008 to participate in a workshop aimed at developing a proposal to assess the earthquake impact on the transportation system and high-rise buildings of Jakarta using the MAEviz loss assessment and visualization software (open source software, available at http://rcp.ncsa.uiuc.edu/maeviz/index.html). The Indonesian guests included representatives from the Offices of the Deputy Minister of Science and Technology, the Secretary of Director General of Railways, Ministry of Transportation, the Secretary for Research and Development Agency, Ministry of Transportation, as well as the Department of Civil and Environmental Engineering and the Center for Earthquake Resistant Infrastructure Studies at Institut Teknologi Bandung. A first draft of the proposal was developed and the MAE Center and the Indonesian delegation are working to identify possible funding organizations within the Indonesian government as well as international aid agencies.

Wenchuan Earthquake Reconnaissance

The M7.9 Wenchuan Earthquake that occurred May 12, 2008 damaged thousands of building and bridge structures and resulted in many casualties. MAE Center students Hussam Mahmoud and Curtis Holub recently traveled to the area to collect information on the disaster. The two visited Dujiangyan and the surrounding area documenting damage and recovery. Holub later returned to the area to join another field reconnaissance mission led by the United States Federal Highway Administration (FHWA). The FHWA was invited by the Ministry of Communications in China to investigate and collect information specifically on the performance of bridge structures. This mission was guided by the Ministry of Communications and the Sichuan Province Communications Department Highway Planning, Survey, and Research Institute.

Pacific Earthquake Engineering Research Center of USA (PEER)

PEER
PACIFIC EARTHQUAKE ENGINEERING RESEARCH CENTER

UC Berkeley ▪ Caltech ▪ Stanford ▪ UC Davis ▪ UC Irvine ▪ UC Los Angeles ▪ UC San Diego ▪ USC ▪ U Washington

The Pacific Earthquake Engineering Research Center (PEER) is a multi-disciplinary, multi-institutional research and education center. Investigators from over 20 universities and several consulting companies conduct research in earthquake-related fields including structural and geotechnical engineering, geology/ seismology, lifelines, transportation, risk management, and public policy. PEER's mission is to develop and disseminate technologies to support performance-based earthquake engineering (PBEE).

NEW DIRECTOR APPOINTED

Professor **Stephen Mahin** has been appointed as the new PEER Director effective January 1, 2009. Steve has been a key active member of PEER since day one, serving as member of PEER Research Committee, Thrust Area Leader on Transportation Systems, and member of PEER Institutional Board. Steve received his BS, MS, and Ph.D. degrees from UC Berkeley, and has been on the faculty of the Department of Civil and Environmental Engineering at Berkeley for three decades. His expertise ranges from engineering characterization of ground motion to seismic performance of buildings and transportation systems. Steve is an internationally renowned expert in earthquake engineering.

This change in management thus ends the long tenure of PEER's founding Director Professor **Jack Moehle** (1996-2008). During Jack Moehle's successful tenure, PEER expanded to one of the most prominent earthquake engineering research centers in the world. Under his leadership, PEER research projects expanded to almost all aspects of earthquake science and engineering, ranging from geology to seismology to geotechnical and structural engineering and to the socio-economical impacts of earthquakes. The earthquake community in general, and PEER in particular, gratefully appreciate Jack's world-class leadership at PEER.

This is an exciting era for the new PEER in which several research programs are continuing while major new research initiatives are emerging. PEER's vision under the new leadership is to continue its tradition of excellence in earthquake engineering through broad participation of the PEER community.

NEW RESEARCH: NGA-EAST

PEER is coordinating a new major multi-disciplinary multi-year research program to develop the Next Generation Attenuation Models for the Central & Eastern US (NGA-East) with support from the US Nuclear Regulatory Commission (NRC), United States Geological Survey (USGS), U.S. Department of Energy (DOE), and Electric Power Research Institute (EPRI).

For the central & eastern US, the existing earthquake ground motion models constitute a major source of uncertainty for seismic hazard calculations and seismic design. During the NGA-East project, PEER and numerous researchers from across the US will collaborate to collect relevant international seismic data and coordinate numerous supporting research projects to develop the next generation ground motion models for the central & eastern US that will update and greatly improve the current models.

The NGA-East project is a follow up of a successful multi-institution, multi-investigator, multi-sponsor collaborative project called the Next Generation Attenuation Relationship for the western US (NGA-West) project which was coordinated over five years by PEER. The newly developed ground motion models for the western US have successfully met their objectives and have been adopted by the United States Geological Survey for the development of the latest version of the US National Seismic Hazard Maps.

The NGA-East project started on October 1, 2008 and will continue for six years.

UPCOMING: TRANSPORTATION SEMINAR

Caltrans

PEER

PEER and California Department of Transportation are jointly hosting this seismic research seminar to highlight recent transportation research projects sponsored by the two organizations. The purpose of the seminar is to distill the research findings into practical applications, design procedures and lessons that are useful to practicing engineers.

WHEN: March 20, 2009
WHERE: Cal/EPA Building, Sacramento, CA

Headquarters at: University of California, Berkeley, 325 Davis Hall, Berkeley, CA 94720-1792
Phone: (510) 642-3437 ▪ Fax: (510) 642-1655 ▪ http://peer.berkeley.edu ▪ peer_center@berkeley.edu

Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS 2008)

Yuan-Sen Yang, Chu-Chieh J. Lin, Associate Research Fellow, NCREE
Mu-Hsuan Li, Assistant Research Fellow, NCREE

The eighth annual session of Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS) was held on September 26-28, 2008 thanks to the efforts by the NSC, the Applied Research Laboratories (NARL), the Center for Research on Earthquake Engineering (NCREE), Asia-Pacific Network of Centers for Earthquake Engineering Research (ANCER), Center for Disaster Reduction (NCDR), the British Council and the Bristol University. A total of 16 graduate teams, 39 undergraduate teams, and 42 high school teams participated in the IDEERS modeling and testing this year (see Fig. 1).

Based on the professional structural analysis PISA3D developed by NCREE, a simple graphical user interface was developed for high school students to design their building models for the IDEERS competition in 2007. This year the software was enhanced to improve the efficiency and functionality. The software allowed the students to design their model, check the dynamic analysis results, compare and learn the effectiveness of different types of components and structural systems for seismic resistance. Rules in IDEERS 2008 were slightly modified from those in 2007. Each high school team constructed a model, mainly made of timbers, to resist strong ground motions up to 800 cm/sec2 while carrying up to 18 kg of loads. Each undergraduate team was requested to build an L-shape building that could resist the torsion vibration mode. Each post-graduate team was requested to build a model using the concepts of energy dissipation and/or seismic isolation. Participating students brought their creativity into full play, and presented diverse types of structural designs. More information and award winner lists of this event are available at http://w3.ncree.org.tw/ideers/2008. (Yuan-Sen Yang, ysyang@ncree.org.tw)

Fig. 1 IDEERS testing in 2008

Fig. 2 Overview of the MATS

Brief Introduction on Construction of the MATS

Ker-Chun Lin, Associate Research Fellow, NCREE
Te-Hung Lin, Mu-Hsuen Li, Assistant Research Fellow, NCREE

In recent years, seismically resistant and isolated structural systems have been rapidly developed in Taiwan. They are being increasingly applied to building or bridge structures. Therefore, there is an urgent need to construct a general purpose testing facility with high loading and large displacement capacity to test full scale resistant or isolated elements or devices. The center for research on earthquake engineering (NCREE) in Taiwan understood this requirement and has launched a project to establish a multi-axial testing system (MATS) in early 2006. The establishment of the MATS does not only enhance the experimental research capacity of the NCREE' lab but also solves qualification issues of engineering practices for seismically resistant or isolated elements or devices. Construction of the MATS started in September 2007 and was completed in February 2008 (see Fig. 2).

The construction of the MATS had to overcome the problems of limited construction space, a non-orthogonal shape of the A-shaped prestressed reinforced concrete frames, and limited hoisting capacity of the lab's crane etc. Therefore, a temporary and heavily supported frame was designed and built to bear the heavy cross beam located above the A-shaped RC frames. The primary construction items and their procedures are listed as follows: (1) lay out the plane center lines of the MATS, (2) build the temporary heavily supported frame, (3) move the components of the steel cross beam on the temporary heavily supported frame and weld them, (4) construct the A-shaped prestressed RC frame, (5) pour concrete in the steel cross beam, and (6) manufacture a platen and moving it in the MATS. The MATS is a unique and complex experimental system. Its multi-ability characteristic enhances the NCREE research capacities. (Ker-Chun Lin. kclin@ncree.org.tw)

Center for Civil Engineering Earthquake Research, University of Nevada, Reno

Established in 1983, the Center for Civil Engineering Earthquake Research (CCEER) at the University of Nevada, Reno (UNR), was one of the first earthquake centers in the United States to focus on improving the seismic performance of highway bridges. It has since broadened its scope to include research in other structural and geotechnical systems such as piping systems, nonstructural components, protective systems for buildings, liquefaction studies, and pile modeling.

Located within the Department of Civil and Environmental Engineering, the Center has ten research-active faculty drawn from the structural and geotechnical engineering disciplines. About 25 masters and doctoral students are currently conducting research for CCEER. Principal research facilities include the James E. Rogers and Louis Wiener Jr. Large Scale Structures Laboratory, the Geotechnical Laboratory, the Bridge Research Information Center, and the DeLaMare Library.

The Large-Scale Structures Laboratory is a $15 million state-of-the-art dynamic testing facility. The main floor of the laboratory is a heavily reinforced concrete slab providing 8400 sq ft (780 sq m) of usable test area. The laboratory has three 50 ton (450 kN) biaxial shake tables with the capability of simulating large earthquakes. A fourth 20 ton (225 kN) 6-degree-of-freedom shake table was added to the laboratory in the summer of 2008. All four shake tables can be relocated anywhere on the strong floor, enabling a wide variety of structural systems to be studied. In addition, the shake tables may be operated simultaneously or individually, making the facility ideal for advanced highway bridge research. This Laboratory is one of the 15 Equipment Sites in the National Science Foundation-funded George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES).

In addition to faculty research, CCEER hosts a service-to-industry program. This entails seismic qualification testing for companies specializing in hospital equipment, computer systems, generators, water heaters, and other components. The service-to-industry program is a growing part of the Center and is helping to improve the design of nonstructural systems.

Recent research at the CCEER includes the seismic testing of highway bridges, research on innovative materials, seismic analysis of piping systems, and unique building research. In December 2008, a four-span bridge was tested utilizing three shake tables and two abutment actuators, to determine the effect of large earthquakes on a bridge with different column details. Several columns incorporated innovative materials and the results will dictate the practicality of such materials in highway bridges. Prior to the four-span bridge experiment, a full-scale hospital piping system had been built and tested. Currently, a full-scale straw bale house is being constructed and will be tested using one of the shake tables in 2009. This innovative material may be used to construct durable, inexpensive homes in seismically active areas. A three-span, half-scale, curved bridge is under design at the present time and will be tested in the second half of 2009 using all four shake tables. Through such research projects, CCEER aims to reduce the impact of earthquakes and enhance the safety and security of the people in Nevada, the United States, and around the world.

Introduction of Research Centre of Urban Hazards Mitigation (RCUHM) The Hong Kong Polytechnic University

The Research Centre for Urban Hazards Mitigation of The Hong Kong Polytechnic University has been established in Hong Kong since 2002, striving to be an important contributor to human's ability of preparedness, response, recovery, and prevention action in face of natural and man-made hazard risks. The mission of the Centre is:

(a) To investigate the risk and potential consequence of natural and man-made hazards in urban areas, and to pursue a sustainable development of urban areas with a rational hazard mitigation planning;
(b) To develop innovative technologies and state-of-the-art engineering solutions for monitoring and mitigating damages to urban infrastructures, and reducing the physical, economic and social losses due to catastrophic hazardous events;
(c) To offer efficient and effective measures to various post-hazard actions including hazard assessment, rescue control and management and structural retrofitting; and
(d) To facilitate knowledge dissemination and technology transfer to the Government and the related industries through specialist consultancy, continuing professional training as well as undergraduate and postgraduate education.

The Centre has been conducting focused but multi-disciplinary research on the effects of windstorms, earthquakes and landslides on urban infrastructures, as well as a variety of other research activities related to hazards mitigation that are important to Hong Kong and Mainland China. The Hong Kong Polytechnic University provides strong support to the development of the Centre. In 2002, the Centre was selected as one of the University's Strategic Development Areas (ASD). It has become one of the Areas of Strength of the University since 2005. In 2007, the Centre was identified as one of Niche Areas of the University to enhance its further development.

The Centre has been admitted as a full member of the ANCER and a member of the Shenzhen Network of National Key Laboratories. The 4th Bi-annual Workshop of ANCER was hosted by the Centre in 2007; more than 150 participants attended the conference from all over the world, including USA, Korea, Hong Kong, Taiwan, Mainland China, New Zealand and Greece.

The Centre has carried out many activities in the field of earthquake engineering. The reconnaissance trip to Thailand after the 2005 Sumatra earthquake and tsunami was organized, and the earthquake engineering group investigated sites of tsunami in Oahu Island. The earthquake engineering group also carried out studies on potential seismic hazard of Dangan Island in Hong Kong. The group is particularly active in involving the post-disaster investigations of 2008 Wenchuan earthquake. Three separate field excursions to affected sites were made immediately after the Wenchuan earthquake. The Centre worked together with Sichuan University and China Earthquake Administration for the 2008 Wenchuan earthquake to explore the reasons behind some school collapses during the Wenchuan earthquake. The members of the seismic research group also gave invited talk to the public on the Webnchuan earthquake in order to enhance public awareness of earthquake prevention.

Earthquake Disaster Prevention and Mitigation Research Center

Harbin Institute of Technology

Introduction

The Earthquake Disaster Prevention and Mitigation Research Center headquartered at Harbin Institute of Technology (EDPMRC-HIT) was founded in 1950s. Since then, it has been one of the leading organizations for earthquake engineering research in China. EDPMRC-HIT dedicates to the understanding of behaviors of civil structures subject to hazard events, and to the development of emerging technologies for hazard mitigation, such as damage and loss prevention via multi-disciplinary research. Currently there are 18 faculties within EDPMRC-HIT and Prof. Jinping OU, member of China Academy of Engineering, is the director of the center.

Introduction

Main research areas and unique topics from EDPMRC-HIT are briefly summarized in the following:

(1) Structural vibration control for the vibration suppression of civil engineering structures, such as buildings, bridges and offshore platforms, subjected to various environmental excitations, such as earthquake, wind, ocean waves and ice etc. Theory, analysis and design methods, innovative devices and engineering practices are systematically investigated, from passive energy dissipation, semi-active and active control, to smart material and intelligent algorithm based structural control.

(2) Structural health monitoring for highway systems, bridges, buildings, offshore platforms and spatial structures. Following aspects are involved: advanced sensors and sensing technologies; methods of damage detection, parameter identification, model updating, data mining, structural reliability analysis, safety evaluation and hazard pre-warning technologies; module software for structural health monitoring systems, data management, integrated structural control system; design and implementation of structural health monitoring systems in practical engineering.

(3) Performance based seismic design theory, in particular seismic damage-based design methods for buildings and bridges, failure modes control of structures during strong earthquakes, life-cycle performance based design methods and etc. are unique topics for earthquake engineering research in EDPMRC-HIT.

(4) Smart materials and structures technologies by integrating multidisciplinary research for enhancing structural ability and performance against natural hazards.

(5) Seismic performance and evaluation of deteriorated and aged urban infrastructures and lifeline systems.

(6) Advanced experimental technologies in earthquake engineering, such as real time substructure test etc.

(7) Performance based design for city scale seismic mitigation is one of the most innovative and leading research trend in the future.

(8) Structural dynamics and random vibration, stochastic fatigue and reliability.

Since the establishment of EDPMRC-HIT research center, it continuously gains the financial supports from the National Natural Science Foundation of China (NSFC) and the Ministry of Science and Technology of the People's Republic of China. The faculties within this center are the Co-PI of Major project of NSFC, PIs of key projects and general projects of NSFC, PIs of sub-projects of National Major Fundamental 973 program, PIs of National Key Technology R&D Program, and PIs of National high-tech 863 program. The faculties are also active in International collaborations and academic exchanges. There are a number of advanced research facilities in this center, such as earthquake shaking tables, 15m high reaction wall test systems, MTS system with a 2500kN of loading capacity, a laboratory for structural health monitoring and advanced sensor technologies, a laboratory for the wind-wave coupled excitation tests (one of three labs in the world with wind tunnels and water tanks) and a laboratory for high performance parallel computing.

University of Auckland Centre for Earthquake Engineering Research

New equipments

A new online hybrid structural testing system has arrived from the U.S. and is awaiting system integration. The system consists of two new, 300 kN and 500 kN servo hydraulic actuators and a new controller. The new equipment enables new online collaborative research.

A new uniaxial shaking table will also become available in 2009.

Student Competition

In 2008, University of Auckland has again participated in the Asia Pacific Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS) seismic design competition organised by NCREE, Taiwan. For the first time, the University of Auckland sent an undergraduate and a graduate team to the competition. The undergraduate team recorded a respectable sixth placing in their division, while the postgraduate team was second amongst 20 other teams. The postgraduate team also received awards for most creative structural design, most creative architectural design, most preferable and best presentation at the accompanying conference.

New staff

The department has recently recruited several new staff with expertise in earthquake engineering. Associate Professor Nawawi Chouw has expertise in soil-structure interaction, Associate Professor Charles Clifton has expertise in the seismic response of steel structures, and Dr Rolando Orense has expertise in geotechnical earthquake engineering and soil dynamics.

Postgraduate student exchanges

PhD student Tom Algie has returned from UC Davis (Part of ANCER partner PEER) on a Fulbright exchange. Following a stint at NCREE (ANCER partner), PhD student Rick Henry is now being hosted at Iowa State University on a Fulbright Scholarship. Similarly, PhD student Aaron Wilson is at Drexel University on and EQC/Fulbright Scholarship.

Catherine Whyte from UC Berkeley (Part of ANCER partner PEER) is currently on a 3-month exchange in Auckland. Catherine will be assisting in the set up and validation of the new online hybrid testing equipment.

Awards

KC Voon and Jason Ingham received the 2008 ASTM Yorkdale Award for research associated with masonry.

Field Testing of a Soft-Storey Building in Melbourne

Infrastructure Protection & Management Group, The University of Melbourne,
VIC. 3010, Australia.
in collaboration with
Faculty of Engineering and Industrial Sciences, Swinburne University of Technology, Hawthorn, Victoria, Australia.
For further information, contact Nelson Lam (ntkl@unimelb.edu.au)

The **Infrastructure Protection Group** at the University of Melbourne (which has been expanded into the **Infrastructure Protection and Management Group**) has been undertaking research and knowledge transfer activities in the following topics:

1. Earthquake Engineering and Ground Motion Modelling.
2. Simulations of blast and impact.
3. Modelling of progressive collapse behaviour.
4. Blast and impact resistant capacity of panels made of glass, reinforced concrete and composite materials.
5. Structural joints in reinforced concrete and composite structures.
6. Damage detection and monitoring.
7. Vibration control and monitoring.
8. Project management and procurement of assets

This article forms part of the activities under item 1. Building structures possessing vertical stiffness irregularity with an open ground storey are common in areas of low and moderate seismicity. These types of structures translate back and forth like an inverted pendulum during earthquake shaking, with the columns in the open storey often susceptible to severe damage and collapse. A collaborative research project undertaken by the IPMG of the University of Melbourne in collaboration with Swinburne University of Technology is to study the load deflection behaviour of soft storey buildings when subjected to lateral loading and to assess its lateral drift capacity. This project involves field testing of buildings in a demolition site. More details will be provided in upcoming issues of the newsletter.