

## **Workshop on International Training Program for Seismic Design of Structures and Hazard Mitigation 2008 (ITP2008)**

The 7th International Training Program for Seismic Design of Structures and Hazard Mitigation (ITP2008) will be held on October 20-24, 2008 at NCREE. This training program, with focus on promoting the seismic design technology of structures worldwide, is sponsored by the National Science Council of Taiwan, R. O. C. The workshop was first held in January of 2002. To date, a total of 192 participants from 17 different countries have attended the past four training programs. This training activity is designed in a form of a short-term workshop basically aimed to train government officials and engineers from nearby countries near the Pacific Rim. By this kind of activity, the disaster-preventing technology and the earthquake-resisting ability of participating countries can be improved gradually to reduce the impacts and losses caused by natural disasters. Important sessions in this program include:

- Earthquake Engineering and Seismic Hazard Analysis
- Lessons Learned from Past Earthquakes
- Seismic Evaluation and Loss Estimation
- Structural Design and Health Monitoring
- Introduction and Application of Seismic Passive Control

To attend the training program, the applicants are preferred to be researchers, government officials, or senior practical engineers with work related to seismic design. Doctorate individuals graduated less than 5 years and PhD candidates will be given priority in attending the training course. The ITP2008 will carefully review the applications, and then give admissions to successful applicants. Online applications are due on August 15, 2008. Prospective participants are encouraged to visit the ITP2008 website (<http://www.ncree.org/itp/2008/>) for further information.

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# ITP2008 Agenda

## Day1

2008, October 20 (Monday)			
Time	Program	Speaker	Chairman
09:00 ~ 09:30	Registration		
09:30 ~ 10:00	Recent Research Activities at National Center for Research on Earthquake Engineering (NCREE)	Prof. K. C. Tsai	
10:00 ~ 10:15	Coffee Break		Prof. L. L. Chung
10:15 ~ 11:15	Earthquake Engineering Research and Practice in Philippines, Vietnam, and Mongolian		
11:15 ~ 11:30	Coffee Break		
11:30 ~ 12:30	Earthquake Engineering Research and Practice in Thailand, Malaysia, and Indonesia		
12:30 ~ 13:30	Lunch Break		
13:30 ~ 14:30	Earthquake Engineering Research and Practice in India, Jordan, and Turkey		Dr. C. L. Wu
14:30 ~ 14:45	Coffee Break		
14:45 ~ 15:45	Earthquake Engineering Research and Practice in Mexico, Republic of Guatemala, and El Salvador		
15:45 ~ 16:00	Coffee Break		
16:00 ~ 17:00	Earthquake Engineering Research and Practice in Honduras, Republic of Dominica, and Bolivia		

## Day2

2008, October 21 (Tuesday)			
Time	Program	Speaker	Chairman
09:00 ~ 10:00	Strong Motion Observations and Geotechnical Database and Micro tremor Applications in Taiwan	Dr. T. M. Chang	Prof. C. H. Chen
10:00 ~ 10:15	Coffee Break		
10:15 ~ 11:15	Geotechnical Hazards During the Sep. 21, 1999, Chi-Chi Earthquake	Prof. C. H. Chen and Dr. J. S. Chiou	
11:15 ~ 11:30	Coffee Break		
11:30 ~ 12:30	A Study of Soil-Structure Interaction Using In-situ Forced Vibration Test on School Building  Seismic Evaluation of Caisson Type Harbor Structure	Prof. C. H. Chen and Dr. Y. Y. Ko  Prof. C. H. Chen and Dr. S. Y. Hsu	
12:30 ~ 13:30	Lunch Break		
13:30 ~ 14:30	Development of Seismic Force Requirements for Buildings in Taiwan	Dr. J. F. Chai	Prof. S. J. Hwang
14:30 ~ 14:45	Coffee Break		
14:45 ~ 15:45	Seismic Evaluation of Existing School Buildings	Dr. F. P. Hsiao	
15:45 ~ 16:00	Coffee Break		
16:00 ~ 17:00	Seismic Retrofit of Existing School Buildings	Dr. C. L. Wu	




## Day3

2008, October 22 (Wednesday)			
Time	Program	Speaker	Chairman
09:00 ~ 10:00	Lessons learned on the Highway Bridges in Chi-Chi Earthquake from Damage Investigation to Reconstruction	Dr. K. Y. Liu	Prof. K. C. Chang
10:00 ~ 10:15	Coffee Break		
10:15 ~ 11:15	Seismic Evaluation of Existing Bridges: Theory and Application	Prof. Y. C. Sung	
11:15 ~ 11:30	Coffee Break		
11:30 ~ 12:30	Seismic isolation design for bridges	Dr. H. H. Hung	
12:30 ~ 13:30	Lunch Break		
13:30 ~ 14:30	Introduction and Application of Seismic Passive Control	Dr. P. Y. Lin	Dr. Jay Lin
14:30 ~ 14:45	Coffee Break		
14:45 ~ 15:45	Nonlinear Analysis Techniques of Structures by PISA3D	Mr. B. Z. Lin Mr. M. C. Chuang	
15:45 ~ 16:00	Coffee Break		
16:00 ~ 17:00	Introduction of Taiwan Earthquake Loss Estimation System	Dr. C. H. Yeh	

## Day4

2008, October 23 (Thursday)			
Time	Program	Speaker	Chairman
09:00 ~ 10:00	Structural Design of Taipei 101 Tower	Dr. S. S. Shieh Mr. C. C. Chang	Dr. T. K. Lin
10:00 ~ 10:15	Coffee Break		
10:15 ~ 11:15	The Repair and Monitoring of an Earthquake-Damaged Cable-Stayed Bridge	Dr. Z. K. Lee	
11:15 ~ 11:30	Coffee Break		
11:30 ~ 12:30	Tour of NCREE Laboratory Facilities	Dr. T. K. Lin	
12:30 ~ 13:30	Lunch Break		
13:30 ~ 14:30	Structural Design of the New Civil Engineering Building of NTU	Mr. W. S. Hwang	Prof. K. C. Chang
14:30 ~ 14:45	Coffee Break		
14:45 ~ 15:45	Tour of the New Civil Engineering Building of NTU	Mr. W. S. Hwang	
15:45 ~ 16:00	Coffee Break		
16:00 ~ 17:00	Closing Ceremony		Prof. K. C. Tsai

## Day5

2008, October 24 (Friday) – Field trip	
08:30 ~ 10:30	Go to Shih-Kang Dam from hotel by tour bus
10:30 ~ 12:00	Visit Shih-Kang Dam  <a href="http://www.wracb.gov.tw/eng/html/sitemap.php">http://www.wracb.gov.tw/eng/html/sitemap.php</a>
12:00 ~ 13:00	Go to 921 Earthquake museum from Shih-Kang Dam Using Lunch box on the bus
13:00 ~ 15:30	Visit 921 Earthquake museum  <a href="http://www.921emt.edu.tw/main.asp">http://www.921emt.edu.tw/main.asp</a>
15:30 ~ 16:00	Go to THSR Taichung station  <a href="http://www.thsrc.com.tw/en/index.htm">http://www.thsrc.com.tw/en/index.htm</a>
16:16 ~ 17:06	Come back to Taipei by THSR



# Earthquake



## Damages to the Shih-Gang Dam and Changes in Stratum

During the 921 Earthquake, the area adjacent to Shih-Gang Dam was almost completely bulged and shifted, which caused severe damages to the right wing of the gravity dam and to the Nos. 16, 17 and 18 Spillway Gates. In addition to spillway gates and sluiceway gates were distorted, the dam and gate piers were partially cracked and several gates were unable to open; the intake and south transmission tunnel was also broken; as a result, the Shih-Gang Dam had almost lost its function of water supply.

The Shih-Gang Dam, which regulates tail water from upstream hydraulic power plants in Tachia River, plays a crucial role of supplying domestic, industrial and irrigation water to the Taichung Region. The severe damage to the Dam, had resulted in the loss of its regulating and water intake functions, and caused severe water shortage for more than two million people in Taichung Region.



Spillways Nos. 16, 17 and 18 were severely damaged.



The wall at the right wing of the Dam was destroyed.



The pier of Spillway No.16, was broken.



Damage at the right wing downstream face of the Dam (Spillways Nos. 16, 17 and 18 were severely damaged).



### Pictures depicting the damages to the Shih-Gang Dam



The South transmission tunnel was broken.



Crack and leakage at right side of the gravity dam.



The retaining wall on the left wing of No. 1 sluiceway was damaged.



A big crack stretched through the Pifeng Bridge, forming a waterfall in the Tachia River.



impossible for the canal to convey into Tachia River.



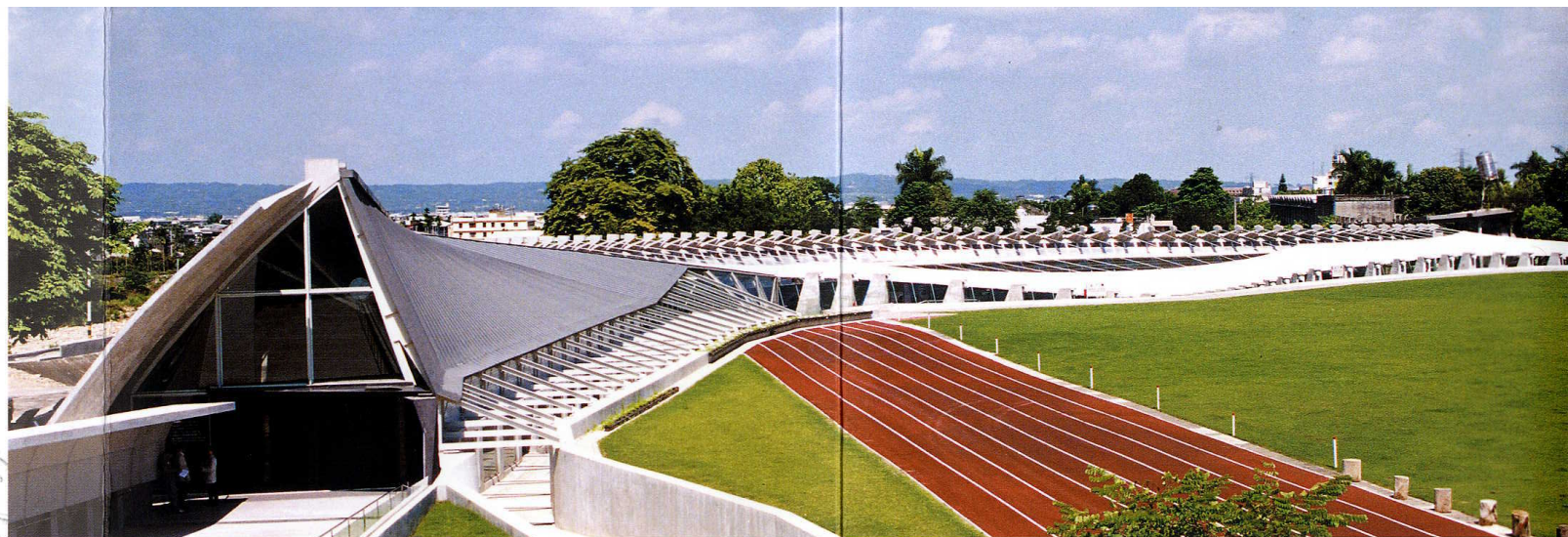
The cracks ran through Babao canal and caused downstream uplifting, making it



# THE ORIGIN



Space connects visible objects and invisible memories,  
people and things that are absent, desires, longings and fears.  
It can dictate our senses, our will, taking us away  
from the outside world and leading us into the world within.....  
The ability to imagine and to hope is the only solace we have  
when we face disappointment and sadness in life.  
It conjures up a Memo for the Next Millennium.....



■ The remained commanding stage converting into workshop.



■ 921 Memorial pool is re-established from swimming pool.



■ Installation art "why?"

The 921 Earthquake Museum belongs to the National Museum of Natural Science. It opened to the public on the 5th anniversary of the 921 earthquake on September 21 of 2004. The Chelungpu Fault Gallery and The Image Gallery were the first displays.

At 1:47 a.m. on September 21, 1999, a massive quake registering 7.3 on the Richter scale occurred in Central Taiwan. This calamity is still a vivid memory for all those who experienced it. The major goals of this museum are to serve as a memorial to honor those we loved and lost, as well as to renew the commitment of the government and the general public to take disaster prevention and relief measures seriously.

Later that same year, the Ministry of Education (MOE) and the 921 Earthquake Post-Disaster Recovery Commission of the Executive Yuan coordinated with local authorities and related environmental experts to visit each devastated area to investigate the severity of the disaster. After examining numerous sites, Kuang-Fu Junior High School in Wufong Township was regarded as the best candidate of several locations for viewing the fault displacement, the collapsed school buildings and the uplifted river beds. This environment best captured the real calamity and could best serve as a "living classroom" for the general public and visitors from

various educational institutions.

TVBS Taiwan Culture and the Education Foundation responded to the proposed construction with a pledge of assistance via the creation of an earthquake memorial hall. Through painstaking efforts, TVBS raised NTS150million 921 Earthquake Disaster Donation from sources all over Taiwan and the world to set up an earthquake memorial hall and assured continued support and cooperation. The Ministry of Education revealed the establishment's goal to build a commemorative hall with various educational facilities. The MOE officially named it The 921 Earthquake Museum, appointing The National Museum of Natural Science with the responsibility of building, operating and managing the new institution.

The fault line found in the sports field and the damaged classrooms were preserved for the purpose of demonstration, educational activities of natural sciences, disaster prevention and the humanities. This initial work was done to help understand natural phenomena, to better explore the effects of earthquakes on society, to increase awareness of disaster prevention and to preserve the lessons of this terrible experience.



■ Overlook Chelungpu fault crossing sport field.



■ Chelungpu fault crossing Kuang Fu Junior High School main door.



■ Devastated classroom in Kuang Fu Junior High School.