Tongji University

International Workshop on City Disaster Prevention

Tongji University is a comprehensive institution. Urban Planning, Geotechnique Engineering, Structural Engineering and Inorganic Non-metal Materials are among state key specialties in China and the studies in the field of earthquake engineering and wind engineering earn a good reputation. Over years, reserachers in Tongji University have devoted themselves to the research in earthquake resistance and disaster prevention and wind resistance for large-scale projects, catastrophic sliding prevention and flood prevention project, etc. Since 1989, the research projects undertaken by Tongji University fellowship on disaster mitigation account for 168 and total funds amount to thirty million yuan (RMB). The published papers numbered over 950. We participated in compose of 8 books on disaster mitigation. We were awarded 4 items of the Prize of the Advancement of Science and Technology as well as the Prize of Natural Science by the Chinese Academy of Sciences, among which the "Shanghai Nanpu Bridge" win the First Prize of the Advancement of Science and Technology by the Chinese Academy.

1. High quality data acquisition and analysis in research

1.1 The measurement has been carried out more than 20 years in Yunnan and Shandong Provinces as well as Shanghai.

1.2 The wind resistance tests for almost all domestic long-span bridges and super high-rise buildings and the complex of high-rise buildings were carried out in Tongji University.

1.3 The earthquake-resistance design test for many domestic well-known projects were completed on the multi-degree-freedom shaking table.

1.4 The velocity of strong wind on the old Shanghai TV Tower was successfully measured, and the precious data of the wind velocity field as well as the structural vibration have been acquired.

2. Devoting and serving to society

2.1 Tongji University participated in or was responsible for formulation of all state and Shanghai Municipality seismic design code and/or regulations and wind resistance design regulation.

2.2 We participated in the assessment and identification of earthquake resistance and disaster prevention plan for tens cities and large scale enterprises in China.

2.3 We have successively trained several hundred managers engaged in earthquake disaster management for Ministry of Construction and several batches of managers who are responsible for environmental protection for State General Bureau of Environmental Protection.

2.4 We have actively undertaken disaster mitigation study of large-scale projects, such as landslides of Three Georges of Yangtze River, aseismic research on ship lift for Three Georges, wind resistance study on Shanghai Yangpu Bridge, etc..

Morover, a new disaster prevention and relief research institution, named by Shanghai Institute for Disaster Prevention and Relief(SIDPR), was established in 1989. The institute is a scientific research institution directed by Shanghai Science and Technology Commission as well as Shanghai Construction Commission for professional work. Since its establishement, SIDPR has undertaken several major research projects assigned by Shanghai Municipality, such as pre-feasibility study on the Establishment of Disaster Prevention and Management Center of Pudong New Area, Shanghai, the project 8-8B of the Priority Programme for China's Agenda 21. Entrusted by Shanghai Earthquake Resistance Office, SIDPR is in charge of function enforcement of administration for Shanghai engineering earthquake resistance qualification. The institute also conducted works for both domestic and international insurance companies on business of risk consulting.

Dalian University of Technology

Disaster protection and mitigation research of Dalian University of Technology mainly focus on two aspects. One is anti-seismic disaster protection research on major structures and lifeline engineering. The other is major drainage basin and reservoir scheduling research. Anti-seismic disaster protection research started in 1957. Flood control and beneficial scheduling research on reservoirs began in 1980, and great progresses in the fields of decision making theory and software design on automatic scheduling of reservoir flood took place recent years.

The main achievements on disaster protection and mitigation in Dalian University of Technology consist of the following:

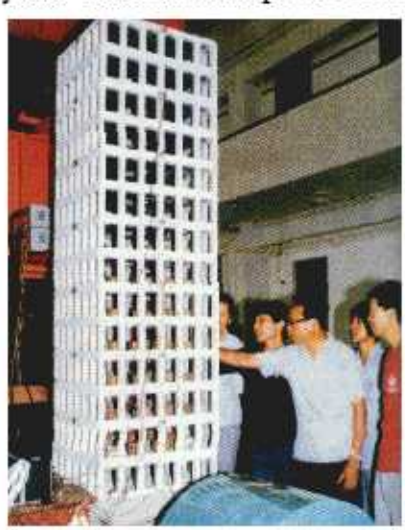
1. Strong earthquake destructive theory and experiment technology on major project

Research achievements on the aspects of structural anti-seismic theory and experiment technology of major projects are remarkable in Dalian University of Technology. Award of National Science and Technology Conference was obtained in 1978. Seismic safety analyses and model tests on Longyangxia Dam, Lijiaxia Dam, Laxiwa Dam and Fengman Dam were finished sequentially. Main achievements are summarized as the following:

(1) Simulation technology of dynamic model destructive test on concrete dam is proposed. Model materials with the property of simulation are developed. Similarity conversion relationship between prototype and model is put forward.

(2) Concrete dynamic destructive mechanism of dam and the relationship between destructive process and seismic intensity, duration, frequency are researched, and virtual crack model is developed.

(3) The opinion that seismic destruction of high dam should be solved by the means of vibration control was proposed firstly. Vibration control theory and vibration absorption technology are abounded.



(4) New achievements are obtained in the research of response, deformation and stability failure mechanism on earth-rock dam and concrete-faced rockfill dam under the load of earthquake. Energy analysis method of seismic liquefaction on sand soil and practical engineering method to assess anti-seismic capacity on earth-rock dam are put forward.

2. New technology on joint time-frequency seismic analysis

New fruits of Adaptive Gaussian Basis Function and Orthogonal-Like Gabor expansion in the field of signal analysis in 1990s are utilized in Dalian University of Technology. Joint time-frequency non-stationary seismic input model is created and new technology is developed. New results are gained at the aspects of strong earthquake response and destructive characteristic of structures under the excitation of time-frequency non-stationary seismic input model.

3. Research on geotechnical seismic engineering

Dynamic non-linear constitutional relationship of soil, anti-seismic analysis method of dynamic stability analysis theory of earth-rock dam, slope and foundation are researched deeply and systematically. Influential achievements are gained,as follows:

(1) Limit equilibrium analysis method of non-homogeneous earthen structure and foundation stability is created and developed on the base of variation method and mathematical optimization technology.

(2) Non-linear simulated computing method on dynamic geotechnical engineering analysis is developed.

(3) Computing methos and program system of static, dynamic and stable analysis on plaster dam of electric power system is exploited.

4. High-rise structure optimized design basing on reliability and function

Structural anti-seismic optimization theory and model of high-rise building is created on the base of structural reliability theory and structural optimization theory, and the thought of function design.

5. Flood control and beneficial decision making scheduling research on reservoir

Distinguished researches include the followings. Fuzzy hydrology and water resources fuzzy set analysis theory, flood control and fuzzy optimization theory are created. Persistent utilization and economic coordinated developing model of water resources in Dalian city provides an scientific decision making tool for government and national long-range economic development. Flood control and scheduling fuzzy optimization model of reservoir group at the center of Three-Gorge of Yangtze River provides an important method for prospective real-time scheduling of Three-Gorge Dam.More than ten real-time flood scheduling making decision systems including Dahuofang Reservoir, Qinghe Reservoir, Chaihe Reservoir, Tanghe Reservoir and Baishan-Fengman Reservoir Group were sequentially finished during twenty years. Those played important contributions to flood control of downstream industrial cities.

Beijing Disaster Reduction Association

Since 1994, Beijing Disaster Reduction Association (BDRA) has organized academic seminars, helped the government work out disaster reduction plans and programs, conducted disaster consultation and expert proposals, and developed popular science and propagation on disaster reduction. The main activities are as follows:

- BDRA organized experts to work out "Program and Outline on the Disaster Reduction in Beijing" and "Natural Disaster Reduction" in "the 9th 5-Year Plan Program in 2010 of Beijing's Science & Technology Development"
- In 1996, BDRA and the city's Economic Commission, Flood-control Office and Yanhua Company jointly organized conference on Danger Removal and Reinforcement of Tube Bridge 1 across the Yongding River".
- It held 3 large annual academic meetings respectively entitled "Disaster Reduction in the Capital and the Strategy in a Century", "Next Century Continuing Development and Comprehensive Disaster Reduction in Beijing" and "Comprehensive Disaster Reduction and Continuing Development in Cities".
- Organized special seminars and workshops such as "Analysis and Countermeasures to Natural Disasters in Agriculture in Beijing Area", "Important Disaster Trend and Countermeasures in Beijing Area", analyzing concrete problems and hidden dangers existing in production and management and raising practical proposals.

Beijing in Development

• BDRA joined in "Legislation Workshop on Beijing's Continuing Development" and arried out "China's Agenda for 21-th Century".

• Comducted "Study to A Cancer of Lung Causing Substance-Radon Concentration in Beijing's Environmental Monitoring", "Study to Beijing's Fire Monitoring and Early Warning System" and "Study to Water in South China Supply to North China and Droughts in Mid-China".

• BDRA jointly organized the first "Summit for China's Safety and Disaster Reduction in the 21-th Century and Continuing Development Strategy" with China's Disaster Control Association and China Economic Time under the State Council's Development Center.

BDRA organized many papers for the academic workshop "Afforestation of the Capital in the 21-th Century", the annual academic meeting of the Fire Fighting Association and the magazine "City, Earthquake Control and Disaster Reduction".

BDRA has also published many papers, such as "Duty Heavier Than Tai Mountain-Scientific Management Guide for Disaster Reduction", "Disasters in China's Citie's and Their Control Countermeasures", "Principle on Disasters in Cities", "Strategy on Safety and Disaster Reduction of China in the 21-th Century" and compiled Encyclopedic Knowledge on Self Rescue and Protection for Teenagers".

BDRA lanched promoting and education activities, including seminars, exhibition and discussion. For example, in 1997, it produced 100 exhibition boards for "Popular Science Mobile Exhibition for Disasters in Cities" which were welcome by people in the city and its suburbs. BDRA has organized lectures for about 20 times. Over 4,000 persons listened to the report.

Promotion of Disaster Reduction