

National Center of Earthquake Engineering Research (NCEER)

Red Jacket Quadrangle

State University of New York at Buffalo, N.Y., USA

The National Center for Earthquake Engineering Research (NCEER) was established in 1986 by a continuing grant from the US National Science Foundation. While NCEER headquarters are located at the State University of New York at Buffalo, each year NCEER supports more than 70 earthquake-related research studies at more than 25 institutions throughout the US and the world. At the international level, NCEER has established several formal cooperative research programs with colleagues in Japan, the People's Republic of China, Mexico and others. NCEER's research emphases focus on the performance of structures and systems such as reinforced and unreinforced concrete and masonry buildings, bridges, nonstructural building components and lifelines. These efforts include strong applications elements and are complemented by basic research studies in fundamental and innovative areas such as seismic hazards, geotechnical engineering, risk and reliability, intelligent and protective systems and socioeconomic issues. These studies provide essential direction to the applications - oriented programs.

The primary objectives of NCEER programs are to increase awareness of earthquake risk and to minimize damage caused by earthquakes through a system of research, transfer of technology, implementation of findings, and public education. To accomplish this, NCEER supplements its research endeavors with numerous additional activities which allow for the acquisition and distribution of earthquake related data and information. These include:

Publications:

The Center publishes newsletters on a quarterly and monthly basis, which feature research highlights, conference reviews, technical report abstracts, conference announcements and the like. NCEER research findings may be published as Technical Reports (more than 20 per year are generated) or may

be included in printed proceedings from NCEER sponsored workshops or conferences. Special publications such as the translated "US-Japan Case Studies of Liquefaction and Lifeline Performance During Past Earthquakes", are also produced.

Information Service:

The NCEER Information Service provides an essential resource to obtain reference materials and research support on a world-wide basis. A comprehensive collection of books, journals, technical reports and other material is maintained and shared on request. A monthly newsletter highlights new publications, calls for papers, etc. The QUAKELINE TM database, developed and maintained at the information Service offers on-line access to bibliographic material on earthquake engineering and related fields. The database now consists of over 17,000 records and can be accessed through the world.

Workshops and Conferences:

Over 150 conferences have been held since 1986 to exchange knowledge on earthquake research issues and mitigation strategies with colleagues in academia, practice, and government. Among the prominent conferences which have been held involving the international community are the US-Japan Workshops on Liquefaction, Large Ground Deformation and Effects on Lifelines and the First US-Japan Workshop on Earthquake Protective Systems for Bridges. NCEER researchers also disseminate research results at important national and international meetings, such as 10WCEE.

Strong Motion Network:

NCEER has developed 22 stationary digital strong motion instruments which have been deployed throughout the US, Canada and Australia and 15 mobile units which are available for aftershock studies.

Data obtained from NCEER stations have provided important insights on ground motion issues. The strong motion database, which is accessible to users by computer network, enables researchers to efficiently access large volumes of strong motion information.

Experimental Testing Facilities:

Because NCEER consists of a consortium of institutions involved in earthquake engineering research, it allows members of the research and practicing community access to its collective testing facilities. Facilities include structural testing laboratories equipped with a range of shake table installations, a full scale beam-column cyclic loading system, two centrifuge laboratories as well as a complement of geotechnical testing apparatuses. In addition to laboratory testing, NCEER conducts full scale field experimentation of devices and components. Our full-scale implementation of active control devices in cooperation with Takenaka Corporation of Japan exemplifies this activity at the international level.

Development of Computer Software:

NCEER research studies have led to the development of computer programs and databases in the following areas: Inelastic damage analysis of reinforced concrete structures, nonlinear seismic site response analysis, lifeline vulnerability analysis, strong motion database, expert systems for seismic building design and others. The software developments are intended to serve as analytical tools and to assist users with implementation of relevant earthquake research findings.

Post-Earthquake Reconnaissance:

NCEER has worked cooperatively with the Earthquake Engineering Research Institute, the National Academy of Sciences and others to investigate the impact and ramifications of damaging earthquakes throughout the world. Findings are shared with the research community via briefings and publications. Among the earthquake sites which have been examined are Ecuador, Armenia, Quebec, the Philippines, Costa Rica, Loma Prieta and Landers, California.

Many of these activities have been undertaken in conjunction with international cooperative research studies. NCEER's cooperation with colleagues in earthquake research throughout the world has been an extremely useful and satisfactory component of our activities and has contributed greatly to our technical accomplishments. This important interaction will continue to play a prominent role in the earthquake mitigation efforts of the Center.