

F O R E W O R D

Earthquakes are potentially devastating natural events which threaten lives, destroy property, and disrupt life-sustaining services and societal functions. In 1986, the National Science Foundation established the National Center for Earthquake Engineering Research to carry out systems integrated research to mitigate earthquake hazards in vulnerable communities and to enhance implementation efforts through technology transfer, outreach, and education. Since that time, our Center has engaged in a wide variety of multidisciplinary studies to develop solutions to the complex array of problems associated with the development of earthquake-resistant communities.

Our series of monographs is a step toward meeting this formidable challenge. Over the past 12 years, we have investigated how buildings and their nonstructural components, lifelines, and highway structures behave and are affected by earthquakes, how damage to these structures impacts society, and how these damages can be mitigated through innovative means. Our researchers have joined together to share their expertise in seismology, geotechnical engineering, structural engineering, risk and reliability, protective systems, and social and economic systems to begin to define and delineate the best methods to mitigate the losses caused by these natural events.

Each monograph describes these research efforts in detail. Each is meant to be read by a wide variety of stakeholders, including academicians, engineers, government officials, insurance and financial experts, and others who are involved in developing earthquake loss mitigation measures. They supplement the Center's technical report series by broadening the topics studied.

As we begin our next phase of research as the Multidisciplinary Center for Earthquake Engineering Research, we intend to focus our efforts on applying advanced technologies to quantifying building and lifeline performance through the estimation of expected losses; developing cost-effective, performance-based rehabilitation technologies; and improving response and recovery through strategic planning and crisis management. These subjects are expected to result in a new monograph series in the future.

I would like to take this opportunity to thank the National Science Foundation, the State of New York, the State University of New York at

Buffalo, and our institutional and industrial affiliates for their continued support and involvement with the Center. I thank all the authors who contributed their time and talents to conducting the research portrayed in the monograph series and for their commitment to furthering our common goals. I would also like to thank the peer reviewers of each monograph for their comments and constructive advice.

It is my hope that this monograph series will serve as an important tool toward making research results more accessible to those who are in a position to implement them, thus furthering our goal to reduce loss of life and protect property from the damage caused by earthquakes.

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