Structures Seminar
Department of Civil and Environmental Engineering
Northeastern University

September 12, 2013, 12:00-1:00 p.m.

Room: Shillman105

Seismic Design Applications using Energy-dissipation Fuse Concept

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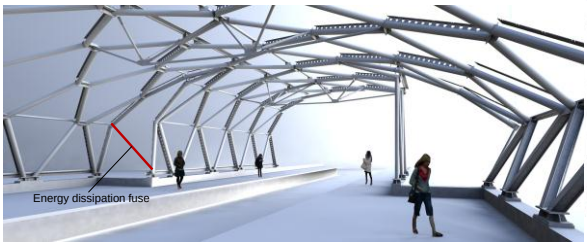
To attain resilience of major cities after large earthquakes, damage-controlled design using energy-dissipation devices or seismic isolation techniques for buildings and city facilities are gaining popularity in high seismic zones such as in Japan. Energy-dissipating fuses concentrate the input seismic energy into limited parts of structural members with high-ductility “fuses”, keeping the main structure undamaged by dissipating the energy in these replaceable components. Buckling Restrained Braces (BRBs) can be used as one of these representative fuses. In this presentation, several applications of this concept in various structural systems will be discussed, including new construction and retrofit of existing buildings.

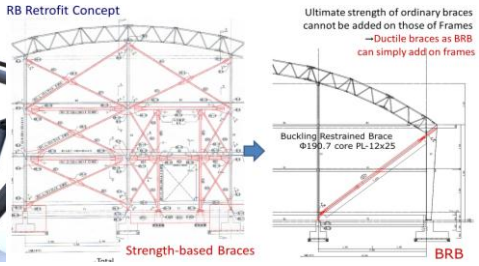
Seismic retrofit of aged building

Electricity self-sufficient building

Controlled rocking-frame building



Railway station structure



Retrofit of damaged gymnasia in Tohoku Earthquake

Toru Takeuchi is a Professor in the Department of Architecture and Building Engineering at Tokyo Institute of Technology in Japan. He graduated from Tokyo Tech in 1984, worked for Nippon Steel Corporation for 19 years as a structural engineer and researcher including several years of experience at Ove Arup & Partners in London. Since joining Tokyo Tech in 2003, he has been studying the seismic design of steel structures, including developing energy-dissipating devices such as BRBs, as well as spatial design of structures including latticed shells and cable structures. Prof. Takeuchi has received a Japan Structural Design Award in 2005, the IASS Tsuboi Award in 2005, the Good Design Award in Japan in 2005, 2012, and 2013, and the AIJ research thesis award in 2011.