Meguro Ichihashi Lab.

[Disaster Risk Reduction Research from Hardware to Software]

Urban Earthquake Disaster Mitigation Engineering

http://risk-mg.iis.u-tokyo.ac.jp/

* Department of Civil Engineering

Risk Management/
Disaster Prevention Information Station

Risk Management/Integration Disaster Information System

Japan Is now facing a period of high seismic activity, and the expected earthquakes within next 30 years are Tokai earthquake (Magnitude 8, 87 % probability), Tonankai earthquake (M8.1, 60%), Nankai earthquake (M8.4, 50%) and Tokyo Metropolitan inland earthquake (M7.3, 70%). According to Central Disaster Prevention Council, total damage is estimated to be 200 trillion yen, including 2million collapsed/burnt buildings and houses. Can you protect your family, lover, friends and yourself from these earthquakes? The most important point for disaster mitigation is “How to increase the number of people who can specifically imagine the situation around them as time goes since the hazard attack”. An appropriate countermeasures requires disaster imagination. Our research group has established Risk Management/Integration Disaster Information System to show the disaster situation specifically based on physical and social research results.

Hardware (Analysis of physical phenomena and implementation of disaster safer structure)

Retrofitting for masonry structures

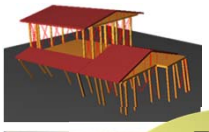
Retrofitting system for low earthquake resistant masonry structures by technically feasible and economically affordable PP(polypropylene)-band.

Building collapse analysis

Collapse simulation of building using AEM which enables high-accurate analysis from continuum to non-continuum.

Seismic capacity evaluation

Development of seismic capacity evaluation method using vibration generator and DEM. Figure shows the housing collapse simulation by DEM.



Furniture overturning analysis

Furniture overturning simulation using EDEM. Difference in the layout of the room and furniture were analyzed.

Software (Implementation of disaster resilient society)

Social promotion system for masonry retrofitting

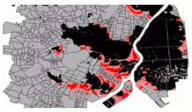
Development of the promotion system for retrofitting of masonry structures.

Evacuation behavior

Analysis of human evacuation in underground city and buildings, based on walking characteristics and building designs.

Fire spreading

Damage caused by fire spreading was analyzed. Figure shows the situation 12 hours after the Great Kanto Earthquake.



Design of disaster related laws

Research of adopting incentives for retrofitting vulnerable buildings. Effect of “Seismic Retrofitting Encouraging System”, in case of Shizuoka prefecture, was evaluated.

Risk Management/ Integration Disaster Information Station

Disaster Information Archive

Hazard map management

For the management of real-time earthquake disaster prevention, damage estimation and evaluation result, hazard maps are organized and accumulated systematically.

Tsunami hazard map

Establishment of hazard map based on pulse height observation using echo sounding. Aimed to contribute to tsunami warning system using multipurpose-buoy.

Disaster investigation report

Organize, accumulate and make use of the knowledge from the past disasters.

Disaster Information Collection

Virtual reality information system

Create a 3D city in VR environment and deliver information such as evacuation route.

Next generation disaster prevention manual

Damage estimation and response navigation will be shown by inputting earthquake information such as epicenter .

Disaster imagination tool development

Meguro method/ Meguro-maki: A tool for improving disaster imagination. Create a story of your own by setting a situation around you during the disaster.