Architects’ Role in Disasters

ARCASIA Committee on Social Responsibilities (ACSR) Half day symposium
Kathmandu  10 October 2013

The Japan Institute of Architects
20 years after disaster
OKUSHIRI ISLAND

Oct. 1993 affected by tsunami

Tsunami protection sea wall

Emergency evacuation facility at sea side

Sep. 2013 Okushiri island
JIA Disaster Relief Activities

JIA’s activities procedures are decided in major disasters, in the case of more than 6-seismic intensity earthquakes occurrence in Japan.

• Building Damage and Safety Assessments
  1. Quick inspection.
  2. Damage assessments.
  3. Consultation for victims and detailed assessments for recovery.

Post-evaluation placards

JIA
JIA Disaster Relief Activities

Volunteer Rapid Damage Assessments:

1995  South Hyogo earthquake(7)
2000  Tottori west earthquake(6+)
2001  Geiyo earthquake(6+)
2003  North miyagi earthquake(6+)
2003  Tokachi earthquake(6-)
2004  Niigata earthquake(7)
2005  Fukuoka earthquake(6-)
2007  Noto earthquake(6+)
2008  Iwate Miyagi earthquake(6+)
2009  Surugawan earthquake(6-)
2011  East Japan earthquake(7)
Seismic Intensity Scale
(Japan Meteorological Agency)

6 Lower (JIA Emergency)

Human perception and reaction:
It is difficult to remain standing.

Indoor situation:
Many unsecured furniture moves and may topple over. Doors may become wedged shut.

Outdoor situation:
Wall tiles and windows may sustain damage and fall.

7 (The Great East Japan Earthquake M9.0)

Human perception and reaction:
It is impossible to remain standing or move without crawling. People may be thrown through the air.

Indoor situation:
Most unsecured furniture moves and topples over, or may even be thrown through the air.

Outdoor situation:
Wall tiles and windows are even more likely to break and fall. Reinforced concrete-block walls may collapse.
Great East Japan earthquake 2011

Disaster countermeasures office

Tsunami affected area
Great East Japan earthquake 2011

Estimate damage with public service personnel

Record on the map
Support activities for victims

**Victims** suddenly have many problems on their lives. Health/dwelling/job/living environment

**Self-help** efforts are required to solve problems.

**Abilities for recovery** from disaster depend on their each situations. (age, gender, health status, occupation, family make-up, assets, etc)

- Local Government
- Professionals and their Organizations
- Citizen volunteers
Support Activities by Government

- Relief activity
- Shelter
- Dwelling for victims
- Reconstruction Plan Mutual agreement
- Damage assessment
- Temporary housing
- Temporary shop
- School for children
- Food & Supplies
- Rubble disposal
- Health care
- Place of work
- Reconstruction of industry

JIA
Comprehensive Role of Architects

• Recovery
  Recovery design assistance
  Repair/Rebuilding recommendations

• Prevention
  Building Risk Assessment
  Hazard Mitigation
  Recommendations for best practices
Prevention

Evacuation route in the event of earthquake

Desaster drill
Prevention

Architectural education

Existing Building Seismic Retrofits
Architects’ role as professional

What is professional?

- For whom? For what?
- Do professionals obtain sufficient social credibility?
- Why are some buildings and cities vulnerable?

Strategic use of professionals

1. Propose / Design:
   - the comprehensive reconstruction plan.
   - temporary housing, dwellings for victims.
2. Consultation for victims, including repair/ rebuilding recommendations.
3. Rapid damage assessment.
In the event of natural disasters, architects will be able to contribute to the society using their talents and skills.
What can Architects do for natural disasters’ risk reduction, for possible earthquakes, JIA?
What can Architects do for natural disasters’ risk reduction, for possible earthquakes, JIA?

Anybody should be secured from possible earthquakes.

- An effect of each earthquake to buildings.
- Not only structures, but every fixture also hurt us fatally.
- Three phases of the structural guideline and structural behavior.
- Apart from structures, nonstructural materials to be earthquake resistant.
- Examples of earthquake destructions.
- Attempts to enforce older buildings.
A torrential heavy rain, resulting in over-flood in Kyoto, autumns 2013
A torrential heavy rain, resulting in over-flood in Kyoto, autumns 2013
A tornados attack several times, to many places in Japan, this autumns.
A tornado attacked several times in many places in Japan.
A building height and a seismic intensity, the higher, then more affected by an earthquake. The building height to be stronger at high floor. The higher, then slower movement.
Any fixture should be fixed at higher floors not to fall down

(a) 冷蔵庫
A refrigerator

(b) テレビ
A TV set
The deference of an earthquake persistency by its building year

- Demolished
- Half demolished
- Partly demolished
- Stand still


図-4.1 RC造建築物の建設年代と被害率
An experiment in destructions, Building Research Institute of Japan

The real sized reinforced concrete building to be deformed.
A window and a door during the experiment

At one stage of deformation, windows and doors were completely damaged.
A surface of a concrete wall were damaged at final stage of this experiment of demolishing
How fixtures were broken by this deformation experiment.

All windows and doors were out of use, then no one can evacuate out of the room.
One of the proposal for a safer panic door, a dual door system.
An example of an enforcement to be resistant to a future earthquake, for a condominium.

Stuffing openings with concrete to be more resistant.
An example of an enforcement to be resistant to a future earthquake, for a condominium.

Adding a concrete wall to be more resistant.
An example of an enforcement to be resistant to an future earthquake, for toll gates of Highway.
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The Japan Institute of architects

ARCASIA 2013