Experiences and Lessons Learned from the Great East Japan Earthquake

Submitted by: Japan
Experiences and lessons learned from the Great East Japan Earthquake

Overview of the Great East Japan Earthquake
Massive Earthquake and Tsunami

- Occurred on 11 March 2011, 02:46pm
- Moment Magnitude 9.0
- Massive tsunami - observed tsunami height: more than 20m (22yards), run up of tsunami wave height: 40.5m (44yards)

Tsunami Disaster

Photo taken at Miyako City, Iwate Prefecture
Courtesy of Tarocho Fisheries Cooperative Association
Catastrophic Damage
Photo taken at Kesennuma City, Miyagi Prefecture on 14 March Courtesy of Tokyo Fire Department

Widespread Inundation
Aerial Photo around Miyagi Prefecture
12 March 2011
Enormous power of the tsunami
Photo taken in Iwate Prefecture
27 April

The tsunami pushed the car to the roof of a three-story building
Photo taken at Miyagi Prefecture

©Building Research Institute, JAPAN
©Shunichi Koshimura, Tohoku University
Damage caused by Great East Japan Earthquake

Estimated damage to the economy:

<table>
<thead>
<tr>
<th>Item</th>
<th>Damage (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>10.4 trillion yen (135 billion dollars)</td>
</tr>
<tr>
<td>Lifeline facilities</td>
<td>1.3 trillion yen (17 billion dollars)</td>
</tr>
<tr>
<td>Social facilities (roads, ports, etc.)</td>
<td>2.2 trillion yen (28 billion dollars)</td>
</tr>
<tr>
<td>Agriculture, forestry, and fisheries</td>
<td>1.9 trillion yen (25 billion dollars)</td>
</tr>
<tr>
<td>Others</td>
<td>1.3 trillion yen (17 billion dollars)</td>
</tr>
<tr>
<td>Total</td>
<td>16.9 trillion yen (220 billion dollars)</td>
</tr>
</tbody>
</table>

Human Damage:
- Casualties: 15,769
  as of 06 Sep
- Missing: 4,227
  as of 06 Sep
- Evacuees:
  Max 470,000 → 3,439
  as of 14 Sep

Immediate Government Response

Government inspection in Miyagi Prefecture, 12 March 2011
Many countries supported Japan.

“People are incredibly calm, despite the ground constantly shaking.”

— THE INDEPENDENT
Monday, 14 March 2011

Disaster Risk Reduction
and
Disaster Preparedness
Earthquake-resistant Retrofitting of Buildings

- School Facility
- Building

- Progress of earthquake-resistant retrofitting

<table>
<thead>
<tr>
<th>Category of building</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houses</td>
<td>79% (2008)</td>
</tr>
<tr>
<td>Public schools</td>
<td>73.3% (2010)</td>
</tr>
<tr>
<td>(elementary and junior high schools)</td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td>56.2% (2009)</td>
</tr>
</tbody>
</table>

Earthquake-resistant Retrofitting for Shinkansen (bullet train)

- Reinforced Shinkansen bridge columns

- Reinforced by steel plate
Area Mail

* Area Mail is a useful system, which delivers emergency information to mobile phones.

Reference: Japan Meteorological Agency
J-ALERT

* J-ALERT, a nationwide automated early warning system

- National Government
- municipalities

Transmission device → artificial satellite → Reception device

Operation Table in Fire Department → Receiving antenna → receiver

Inside building broadcasting → CATV, Community FM

1-2 seconds → In 5-23 seconds

* Quickly transmits tsunami and other warnings from coast to coast

Good Practice by Disaster Education

* “Miracle of Kamaishi”
  Students in Kamaishi City, Iwate Prefecture, all evacuated safely, because of the disaster education.
Evacuating students and neighbors in Kamaishi
11 March 2011, just before tsunami reaches.
©Toshitaka Katada, Gunma University

Learning from the Past

* Taking countermeasures followed by lessons learned from the past disasters
* The percentage of the death is decreasing

<table>
<thead>
<tr>
<th></th>
<th>Meiji-Sanriku Earthquake Tsunami 1896</th>
<th>Showa Sanriku Earthquake Tsunami 1933</th>
<th>Great East Japan Earthquake 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of the casualties in Taro district</td>
<td>1,867</td>
<td>972</td>
<td>230</td>
</tr>
<tr>
<td>of all the population</td>
<td>83% of all of the population</td>
<td>20% of all of the population</td>
<td>6% of all of the population</td>
</tr>
</tbody>
</table>

The percentage of the death is decreasing
Emergency Response and Recovery

Japan Self-Defense Force

11 March: 8,400
since 18 March to 5 May: more than 100,000/day
→ More than 40% of all JSDF dispatched

Emergency Fire Response Teams

104,093 (total, since 11 March to 6 June)
→ One in six firemen across the economy joined rescue operations
Rescue teams rushed to the affected area

Photo provided by Tokyo Fire Department

Kesennuma City, Miyagi Pref.

On-site headquarter

Tokyo Fire Department

Photo took on 12 March, in Kesennuma City, Miyagi Prefecture
Provided by Tokyo Fire Department
Quick Recovery of the Infrastructure: Expressway

- Emergency recovery operation of Tohoku Expressway (the longest expressway in Japan) had done on 22 March, just 11 days later of the occurrence of the disaster.
- It contributed not only to the transportation of the emergency relief supplies, but also recovery of the economy in Japan.
Aftershock
Off the coast of Miyagi
M7.1 (April 23, 23:32)

Recovery of transportation

<table>
<thead>
<tr>
<th>Date</th>
<th>Percentage of recovery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/11</td>
<td>10</td>
</tr>
<tr>
<td>3/16</td>
<td>20</td>
</tr>
<tr>
<td>3/21</td>
<td>30</td>
</tr>
<tr>
<td>3/26</td>
<td>40</td>
</tr>
<tr>
<td>3/31</td>
<td>50</td>
</tr>
<tr>
<td>4/5</td>
<td>60</td>
</tr>
<tr>
<td>4/10</td>
<td>70</td>
</tr>
<tr>
<td>4/15</td>
<td>80</td>
</tr>
<tr>
<td>4/20</td>
<td>90</td>
</tr>
<tr>
<td>4/25</td>
<td>100</td>
</tr>
<tr>
<td>4/30</td>
<td></td>
</tr>
<tr>
<td>5/5</td>
<td></td>
</tr>
<tr>
<td>5/10</td>
<td></td>
</tr>
<tr>
<td>5/15</td>
<td></td>
</tr>
<tr>
<td>5/20</td>
<td></td>
</tr>
<tr>
<td>5/25</td>
<td></td>
</tr>
</tbody>
</table>

- Highway (979 km) for disaster management
- Expressway for general use
- National Road
- Port for disaster management
- Port for general use
- Shinkansen (bullet train)
- Local Train
- Airport for disaster management
- Airport for general use

Produced by Cabinet, from the material of MLIT

©Suzuki Kogyo Co., Ltd

Suzuki Kogyo Co., Ltd.
http://www.suzukitec.co.jp
How the formulated BCP Worked after the Disaster
(Business Continuity Plan)

* Formulation Status of BCP (by Size of Firm)
  - The rate of "Formulated" or "Under Formulation"
    - Large-scale 58% (Nov. 2009)
    - Medium-sized 27% (Nov. 2009)

Reference: "Summary Report on the Company's Effort for Business Continuity and Disaster Risk Reduction" 2010 OAO

Grass Roots Activities

* 717,700 volunteers (as of 28 August) worked in affected area.

Volunteer Bus Tours ©Nano-hana Busline Co., Ltd

Volunteers at affected area
Recovery of business confidence

Way Forward
Toward Reconstruction

11 April

11 September

East Japan Earthquake Picture Project Web service by Yahoo! JAPAN

Improving the Countermeasures against Disasters

Committee for Technical Investigation on Countermeasures for Earthquakes and Tsunamis learned from the Great East Japan Earthquake, 28 May 2011
Strengthening of International Cooperation on Disaster Management

- Japan proposed hosting the 3rd United Nations World Conference on Disaster Reduction in 2015.
- Also, Japan will share the lessons of Great East Japan Earthquake with the world, and promote for disaster management cooperation with the world.

Children Reading “Inamura no hi”, Tsunami Education Picture book

Photo taken by MERCY Malaysia
Affected Area is Ready for Welcoming Tourists!

Thank you for your attention