The Current State of Reconstruction in Sendai City
Outline of the Great East Japan Earthquake[1]

The largest earthquake in Japan’s recorded history
The fourth-largest earthquake in the world since 1900

Time of Occurrence
March 11, 2011 (Fri.) 14:46

Location of Epicenter
Off the Sanriku Coast (38.1° North, 142.5° East)

Magnitude
9.0

Greatest Seismic Intensity
7 (Northern Miyagi Prefecture)

[TGreatest Seismic Intensity in Sendai]
6 Upper (Miyagino Ward)

Tsunami Warning
March 11, 14:49
Major tsunami warning issued for the Pacific Coast of the Tohoku region

Tsunami height, time of impact
Sendai Port 7.2 m (estimated)
(The first tsunami wave arrived about 1 hour after the earthquake occurred)

Source: Earthquake and Tsunami Warning, The 2011 off the Pacific coast of Tohoku Earthquake (Japan Meteorological Agency)
### Outline of the Great East Japan Earthquake[2]

#### Damage in Tohoku by Area

The 2011 off the Pacific Coast of Tohoku Earthquake (the Great East Japan Earthquake) Report 147, (Fire and Disaster Management Agency, Disaster Countermeasures Office)

<table>
<thead>
<tr>
<th>Area</th>
<th>Greatest Seismic Intensity</th>
<th>Casualties (as of March 11, 2013)</th>
<th>Damaged Buildings (as of March 11, 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationwide</td>
<td>7</td>
<td>Dead: 18,493</td>
<td>Complete: 128,801</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing: 2,683</td>
<td>Half: 269,675</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injured: 6,217</td>
<td>Partial: 756,794</td>
</tr>
<tr>
<td>Iwate Prefecture</td>
<td>6-low (Ofunato City, etc.)</td>
<td>Dead: 5,034</td>
<td>Complete: 18,370</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing: 1,151</td>
<td>Half: 6,558</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injured: 211</td>
<td>Partial: 14,139</td>
</tr>
<tr>
<td>Miyagi Prefecture</td>
<td>7 (Kurihara City)</td>
<td>Dead: 10,427</td>
<td>Complete: 85,259</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing: 1,302</td>
<td>Half: 152,875</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injured: 4,144</td>
<td>Partial: 224,050</td>
</tr>
<tr>
<td>Fukushima Prefecture</td>
<td>6-high (Kunimi Town, etc.)</td>
<td>Dead: 2,922</td>
<td>Complete: 21,141</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing: 226</td>
<td>Half: 72,714</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injured: 182</td>
<td>Partial: 166,015</td>
</tr>
<tr>
<td>Aomori Prefecture</td>
<td>5-high (Hachinohe City, etc.)</td>
<td>Dead: 3</td>
<td>Complete: 308</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing: 1</td>
<td>Half: 701</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injured: 111</td>
<td>Partial: 1,005</td>
</tr>
<tr>
<td>Akita Prefecture</td>
<td>5-high (Akita City, etc.)</td>
<td>Injured: 11</td>
<td>Partial: 5</td>
</tr>
<tr>
<td>Yamagata Prefecture</td>
<td>5-high (Yonezawa City, etc.)</td>
<td>Dead: 3</td>
<td>Half: 14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injured: 45</td>
<td>Partial: 1,183</td>
</tr>
</tbody>
</table>

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Photo Source: Ministry of Internal Affairs and Communications, Fire and Disaster Management Agency

Kesennuma City, Miyagi Prefecture

Shirakawa City, Iwate Prefecture

Miyako City, Iwate Prefecture

Photo Source: Ministry of Internal Affairs and Communications, Fire and Disaster Management Agency
Damage in Sendai

◆ Causalities (as of September 30, 2013)

<table>
<thead>
<tr>
<th></th>
<th>In Sendai</th>
<th>Sendai Residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death Toll</td>
<td>908</td>
<td>813</td>
</tr>
<tr>
<td>Missing</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Injured</td>
<td>2,275</td>
<td></td>
</tr>
</tbody>
</table>

※ Sendai residents who died in the disaster: 987
（Sendai residents who died outside of Sendai: 174）

◆ Building damage (as of September 8, 2013)

<table>
<thead>
<tr>
<th></th>
<th>In Sendai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely collapsed</td>
<td>30,034</td>
</tr>
<tr>
<td>Severely damaged</td>
<td>27,016</td>
</tr>
<tr>
<td>Partially damaged</td>
<td>82,593</td>
</tr>
<tr>
<td>Minor damage</td>
<td>116,046</td>
</tr>
</tbody>
</table>

◆ Overall damage in Sendai (as of January 29, 2012)
Approximately 1.3684 trillion JPY
Damage caused by the tsunami

Houses swept away by the tsunami (Near Sanbontsuka, Wakabayashi Ward)
Damage caused by the tsunami

Arahama Elementary School

Approximately 250 people evacuated to the school rooftop when the tsunami struck.

Area where only the foundations of houses remain

(Pre-Disaster Arahama Area, Wakabayashi Ward)

(Post-Disaster Arahama Area, Wakabayashi Ward)
Damage to residential land in hilly areas

(Otoya, Taihaku Ward)

(Matsumorijingahara, Izumi Ward)

(Oritate, Aoba Ward)

(Midorigaoka, Taihaku Ward)
Areas flooded by the tsunami and disaster-affected residential areas

Flooded area: 4,523ha
Damaged residential lots: 5,728

Sendai Tobu Road which worked as an embankment

The main disaster-affected residential areas
Support from inside and outside the country
Construction of temporary housing

**Number of residing households**

<table>
<thead>
<tr>
<th></th>
<th>Mar. 30, 2012</th>
<th>Sep. 1, 2013</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefabricated temporary housing</td>
<td>1,346</td>
<td>1,102</td>
<td>11.4%</td>
</tr>
<tr>
<td>Leased private housing</td>
<td>9,838</td>
<td>7,806</td>
<td>81.1%</td>
</tr>
<tr>
<td>Leased Municipal housing and others</td>
<td>825</td>
<td>721</td>
<td>7.5%</td>
</tr>
<tr>
<td>Total</td>
<td>12,009</td>
<td><strong>9,629</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

**Area of residence at the time of the disaster**

- **Total (N= 9,629 households):**
  - Sendai City 6,451 (67.0%)
  - Miyagi Pref. (excluding Sendai City) 2,447 (25.4%)
  - Fukushima Pref. 675 (7.0%)
  - Iwate Pref. 44 (0.5%)
  - Other / Unknown 12 (0.1%)

One third are from outside of Sendai City (less than 10% are from Fukushima Prefecture)

**Location of prefabricated temporary housings**

- One third are from outside of Sendai City
- Less than 10% are from Fukushima Prefecture

(Asuto Nagamachi temporary housing)
Efforts to Rebuild Peoples’ Lives

◆ Multifaceted support with the collaboration of related organizations are offered to assist people living in temporary housing in order to enable them to get back to their normal lives such as rebuilding their homes.

The Post-Disaster Reconstruction Bureau primarily shares the current circumstances with support organizations including Ward Offices, Social Welfare Council and NPOs.

Support staff visit each households and understand their issues in everyday lives such as rebuilding homes and health problems.

Work to find solutions to problems keeping people from living independently through home visits and working with support organizations.

Multifaceted support is provided in collaboration with our supporting parties and related organizations based on our guidelines.

Number of home visits
7,980
※ including 647 households that could not be reached by multiple telephone calls or visits)

As of the end of Aug 2013
Debris removal

Estimated amount of debris produced in Sendai City

Approx. 1.35 million tons
(About 4 years worth of the city’s processing capacity)

December 2011  Removal of debris completed
September 2013  Incineration completed
March 2014  Planned completion of processing
(Including restoration of debris collection sites to original state)

Percentage of disposal to the total amount

As of August 31, 2013  95% treated

50% or more of the debris is targeted for recycling

As of August 31, 2013  74% recycled

Source

Roughly classified into:
- combustible
- non-combustible
- recyclable

Collection site

Established 3 debris collection sites (100 ha total) and temporary treatment facilities in the eastern coastal area
Subdivided into over 10 categories including concrete, home appliances, wood, etc.

(Temporary incinerator)  (Stacked damaged vehicles)
(Piles of home appliances)  (Mound of metal)
Tsunami defenses (plan view)

- Residential area
- Sendai Tobu Road
- Shiogama-Watari Line prefectural road
- Park (hill)
- Coastal disaster-prevention forest
- Coastal breakwater
- Sand beach
- Teizan canal
- East side
- West side
- Road part (two-lanes) approx. 10m wide
- Evacuation route
- Roads to be lifted up
- Full-scale model of road elevation

Approx. 6m high
Width of embankment base approx. 30~40m

Defense against largest tsunami
- Defense against tsunami that occurs only once every few decades or centuries
- Cross-section view
1) As a basis for future predictions

Simulation at spring high tide
The March 11 tsunami simulated at spring high tide (T.P.+0.76m) would result in a tide level approx. 1.2m higher than tides on March 11.

Tide level: T.P.+0.76 m
Coastal embankment  T.P.+5.5m
Coastal embankment  T.P.+6.2 m

Embarkment heights and locations are from the time of the disaster

2) Based on reconstruction plans

1. Coastal and river levees as planned by Japan and prefecture.
2. Raised roadbeds laid over original location of prefectural roads, but changes were made in Okada and Minami Gamo to downsize disaster risk zone.

Tide level: T.P.+0.76m
Coastal/River embankments  T.P.+7.2m
Raised prefectural road 6m

- Max. floodwater height:
  - ~0.5m
  - ~1m
  - ~2m
  - ~4m
  - 4m~

- West side of the elevated road would be flooded less than 2m

- Elevated(6m) prefectural road

- Coastal embankment T.P.7.2m

- Flood line

- Terrain (elevation) data: Immediately after the earthquake struck on March 11, 2011 (taking into account land subsidence)
- Applied tsunami scale: Modeled and simulated on the March 11, 2011 tsunami (largest class earthquake in history) by Tohoku University
Rebuilding of housing (1)
Disaster-Prevention Collective Relocation

(Plan for Disaster-Prevention Collective Relocation)

Support system for areas eligible for relocation (Disaster Risk Areas)

- Support for moving expenses
- New residents buy or lease land
- Relocated residential area
- Areas promoted for relocation
- Support for housing reconstruction and purchase of land (interest subsidized)
- Purchase of disaster-affected land (optional) (including the relocation cost, etc.)

Disaster Risk Areas
Approx. 1,540 households

Development of 13 relocated residential areas is scheduled for completion during FY 2014
Rebuilding of housing (2)
Restoring and aiding damaged residential land

Of the residential lots in Sendai City damaged by the earthquake, **5,728** were assessed as “dangerous” or “caution required.”

Aid provided for residential land restoration within the public works program area (Approx. 44%)  

Disaster-affected residential land in areas other than those noted on the left (Approx. 56%)  

Restoration work is conducted by utilizing subsidy programs including national government reconstruction subsidies for construction fees. As the lots are private properties, land owners bear part of the cost.

For construction works such as rebuilding retaining walls, Sendai City subsidies 90% of the cost exceeding 1 million JPY when certain requirements are met.

(Conceptual view of a slope collapse and landslide prevention work)

Seikaen area, Aoba Ward
Planned number of units  3,000
## Schedule for Rebuilding of housing

<table>
<thead>
<tr>
<th></th>
<th>FY2013</th>
<th>FY2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relocation promotion project</strong></td>
<td>Provide 3 areas</td>
<td>Provide 1 area</td>
</tr>
<tr>
<td></td>
<td><strong>Relocation site preparation</strong></td>
<td>Provide 7 areas</td>
</tr>
<tr>
<td><strong>Restoring damaged residential land</strong></td>
<td>Already provided 2 areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Construction</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Developing Public Reconstruction Housing</strong></td>
<td>Provide 661 houses</td>
<td>Provide 2327 houses</td>
</tr>
</tbody>
</table>

*Now: Advertisement for residents*
April 1-June 30, 2013

Sendai-Miyagi Destination Campaign

Number of Inbound Tourists (April-June)

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>2,046,956</td>
<td>524,254</td>
<td>1,732,299</td>
<td>1,895,830</td>
</tr>
</tbody>
</table>

Comparison of Overnight Visitors (April-June)

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>218,840</td>
<td>234,140</td>
<td>245,358</td>
<td>249,639</td>
</tr>
</tbody>
</table>

* Data based on sample surveys conducted at major tourist facilities in Sendai City.
* As this is an estimation, future figures are subject to change.