Damage from
the Tohoku-Pacific Ocean Earthquake
and future prospects

March 30, 2011

Nippon Telegraph and Telephone East Corporation
Status of the impact on communication facilities

■ Relay transmission lines
  • Disconnected in 90 routes*
    * Except for nuclear power plant area

■ Exchange office buildings
  • Demolished: 18 buildings
  • Flooded: 23 buildings

■ Telephone poles destroyed by flood, collapsed
  • 65,000 poles in the coastal region

■ Aerial cable destroyed by flood, physically damaged
  • 6,300 km in the coastal region

※Based on the site survey, above numbers were corrected on November 28th, 2011. For details, please visit the following website of page7. (http://www.ntt-east.co.jp/info/detail/pdf/shinsai_fukkyu.pdf)
Securing relay transmission lines

- Establish backup relay routes or switch routes to achieve connectivity at disrupted points or to bypass damaged relay transmission lines.
- Main relay transmission lines to be secured through the aforementioned measures.

Example of restoring transmission through the establishment of a backup relay route
≪from Ofunato Building to Kamaishi-Kaminakashima Building (Iwate Pref.)≫

【Restoration Image】
Disconnection of the relay transmission line connecting Ofunato Building and Kamaishi-Kaminakashima Building due to the earthquake

【Photographs showing the installation process】
Cables were disconnected along with the Sanriku Railways’ railroad track. 11 new poles were erected for the new cabling.
Connection of the core cabling between the existing cable and the backup relay route cable.
### Restoration prospects for exchange offices with discontinued services

Damage and restoration status of the exchange offices with discontinued services (55 buildings) are as follows.

<table>
<thead>
<tr>
<th>Degree of damage</th>
<th>Number of buildings*1</th>
<th>Method of restoration</th>
<th>Expected restoration date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  Only minor damages to buildings, but power supply facilities are damaged by flooding, etc.</td>
<td>16</td>
<td>Replacement of power supply facilities, adjustment of exchange facilities, replacement of failed parts, etc.</td>
<td>Mid-next week</td>
</tr>
<tr>
<td>B  Significantly damaged relay transmission lines due to a collapsed bridge</td>
<td>4</td>
<td>In addition to case A, reconstruction of transmission lines (construction of backup relay routes and re-erection of poles)</td>
<td>Mid-April</td>
</tr>
<tr>
<td>C  Demolished exchange offices and facilities, significantly damaged relay transmission lines, etc.</td>
<td>26</td>
<td>Construction of exchange offices, installation of switches, reconstruction of transmission lines after road restoration</td>
<td>Aiming for late April but may delay*</td>
</tr>
<tr>
<td>D  Fukushima Nuclear Power Plant area</td>
<td>9</td>
<td>Once the evacuation order is lifted, confirm the status and take any necessary measures</td>
<td>TBD</td>
</tr>
</tbody>
</table>

*1  As of March 28, 2011.

*2  Details will be announced separately once the timing of restoration is confirmed.
Restoration policy for exchange offices covering main government building of municipalities

- If the degree of damage is assessed as “C” and the government office buildings of municipalities are located within the area of an applicable exchange office, as a general rule, stopgap repair measures will be implemented within a week and public administration and other important circuits will be restored.

<table>
<thead>
<tr>
<th>Municipal government office</th>
<th>Locations of government office buildings, etc.</th>
<th>Building</th>
<th>Expected restoration date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iwate Pref.</td>
<td>Noda-cho</td>
<td>Noda</td>
<td>Mid-next week</td>
</tr>
<tr>
<td></td>
<td>The offices at the government building are open.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rikuzen-Takata-shi</td>
<td>Main government building is submerged. Temporary office building is built next to the Takata School Lunch Service Center.</td>
<td>Rikuzen-Takata</td>
<td>Mid-next week</td>
</tr>
<tr>
<td>Minami-Sanriku-cho</td>
<td>Main government building is submerged. Temporary office building is built at the Bayside Arena.</td>
<td>Shizugawa</td>
<td>Mid-next week</td>
</tr>
<tr>
<td>Onagawa-cho</td>
<td>Main government building is submerged. Temporary office building is built at the Onagawa Dai-ni Elementary School.</td>
<td>Onagawa</td>
<td>Mid-next week</td>
</tr>
<tr>
<td>Shichigahama-cho</td>
<td>The offices at the government building are open.</td>
<td>Shichigahama</td>
<td>Mid-April</td>
</tr>
</tbody>
</table>
## Service restoration schedule of disrupted buildings

### 《Iwate Prefecture》 21 buildings

<table>
<thead>
<tr>
<th>Municipality/Building Name</th>
<th>Degree of damage/restoration schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Noda-mura</td>
<td></td>
</tr>
<tr>
<td>Tano-hata-mura</td>
<td>O</td>
</tr>
<tr>
<td>Miyako-shi</td>
<td>O</td>
</tr>
<tr>
<td>Otsuchi-cho</td>
<td>O</td>
</tr>
<tr>
<td>Yamada-machi</td>
<td>O</td>
</tr>
<tr>
<td>Sumita-cho</td>
<td>O</td>
</tr>
<tr>
<td>Rikuzen-Takata-shi</td>
<td>Δ</td>
</tr>
<tr>
<td>Kamaishi</td>
<td>O</td>
</tr>
<tr>
<td>Ofunato-shi</td>
<td>O</td>
</tr>
</tbody>
</table>

### 《Miyagi Prefecture》 23 buildings

<table>
<thead>
<tr>
<th>Municipality/Building Name</th>
<th>Degree of damage/restoration schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Kesenuma-ashi</td>
<td>O</td>
</tr>
<tr>
<td>Minami-Sanriku-cho</td>
<td>O</td>
</tr>
<tr>
<td>Onagawa-cho</td>
<td>O</td>
</tr>
<tr>
<td>Ishinomaki-shi</td>
<td>O</td>
</tr>
</tbody>
</table>

### 《Fukushima Prefecture》 11 buildings

<table>
<thead>
<tr>
<th>Municipality/Building Name</th>
<th>Degree of damage/restoration schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Iwaki-shi</td>
<td>O</td>
</tr>
<tr>
<td>Soma-shi</td>
<td>O</td>
</tr>
<tr>
<td>Narahama-machi</td>
<td>O</td>
</tr>
<tr>
<td>Tomioka-machi</td>
<td>O</td>
</tr>
<tr>
<td>Okuma-machi</td>
<td>O</td>
</tr>
<tr>
<td>Namie-machi</td>
<td>O</td>
</tr>
</tbody>
</table>

*Restorations may be delayed in some cases from the original schedule (end of April).
Example of restoration works (new installation of switching equipment)  
≪Shichigahama Building (Miyagi Pref.)≫

- Since the whole Shichigahama Building was lost to floods, a SBM-BOX and IP-BOX (outdoor-use circuit switch) will be installed at the building’s original site, to restore services by mid-April.

**SBM**: Subscriber Module (Equipment which accommodates PSTN and leased line circuits to be multiplexed and connected to a fiber optic line, connecting to a NTT exchange office building)
Example of restoration works (backup relay routing + accommodation switch to a different building)

Since the Onagawa Building was flooded and damaged, service is scheduled to be restored by mid-next week through the installation of a RSBM-F (outdoor use circuit switch) in the Onagawa Town Disaster Countermeasures Headquarters, and establishing a connection to the Watanoha Building, which is located at a higher layer within the telecommunication network.

*RSBM : Remote Subscriber Module (Equipment which accommodates PSTN and leased line circuits to be multiplexed and connected to a fiber optic line, connecting to a NTT exchange office building)
Since the Rikuzen-Takata Building is not functioning due to damage from the tsunami, circuits originally situated in this building will be switched to a PSTN circuit switch located in neighboring exchange building for the restoration of services by mid-next week.

Example of restorations (backup relay routing + accommodation switch to a different building)

[Rikuzen-Takata Building (Iwate Pref.)] ~Temporary restoration in a specific area~

[Photographs showing the damaged Rikuzen-Takata Building]

The tsunami greatly damaged the building and flooded the surrounding area.

Power equipment was also greatly damaged from the flooding.

【Restoration Image】

Provide communication services by borrowing fiber optic lines from NTT DOCOMO from a neighboring NTT exchange office building.

- Red: existing cables
- Green: existing cables (DOCOMO owned)
- Blue: new cables

Kesen Yokota Building (Neighboring Area)

PSTN circuit switch

Rikuzen-Takata City Office (Flooded)

City office/Temporary residents

PSTN circuit switch
【Reference】Restoration image of existing exchange office buildings

- Removal of wreckage surrounding the building
- Removal of wreckage and non-usable equipment inside the building
- Restoration of building power
- Installation of communication equipment
- Restoration of services
Reference: Exchange offices with discontinued services in Iwate Prefecture
<Reference> Exchange offices with service disruptions in Miyagi Prefecture

[Legend]
A
B
C
Exchange offices

[Map showing locations in Miyagi Prefecture]
Isobe
Namie
Iwaki Futaba
Naraha
Okuma
Katsurao
20km
30km
Hisanohama
Evacuation directive
20km radius
Sheltering directive
20-30km radius

Exchange offices with service disruptions in Fukushima Prefecture

Legend:
A
B
C
D
Exchange offices

Fukushima Daiichi Nuclear Plant
Fukushima Daini Nuclear Plant
Iwaki Kawauchi
Iwaki Tsushima
Iwaki Katsurao
Iwaki Futaba
Iwaki Tomioka
Iwaki Hirono
Iwaki Hisanohama
Evacuation directive
10km radius
Sheltering directive
20-30km radius