Communications network damage by the Great East Japan Earthquake and securing communications

March 16, 2012

Natsuo Minamikawa
Senior Vice President
General Manager of Miyagi Branch
Executive Manager of Tohoku Future Network Design and Reconstruction Office
Nippon Telegraph and Telephone East Corporation
Today’s agenda

- Communications equipment damage and restoration of communications services
- Support for affected local governments and victims
- Building disaster-resistant network
- Supporting ICT use on the road to recovery
Damage situation and service unavailability (results)

- Maximum 385 exchanges buildings functionally disabled. (service unavailability: approximately 1.5 million subscriptions)

- About 70% of services restored by March 22, services fully restored by the end of April (excluding the nuclear accident area and island regions (2 islands))
Damaged point of communications equipments

Damage from earthquake ⇒ Almost no damage occurred

1. **Totally destroyed or flooded buildings and cable severed by tsunami**
   ⇒ About 20% of damaged buildings

2. **Widespread, long term power cuts, “cuts to power fuel”**
   ⇒ About 80% of damaged buildings

3. Nuclear accident no-entry zone (3 buildings)

---

Exchange buildings (Trunk)

Exchange buildings (Subscriber Line Switch)

Aerial cables

- Telephone poles
- Manhole
- Underground duct
- Feeder cable
- Power supply equipment
- Trunk cable

Copyright© 2012 NIPPON TELEGRAPH AND TELEPHONE EAST CORPORATION All Rights Reserved.
Situation of communications equipment damage

Disaster example

- Taro (approx. 280km)
- RikuzenTakada (approx. 150km)
- Minamisanriku (approx. 90km)
- Onagawa (approx. 70km)
- Shichigahama (approx. 20km)
- Nobiru (approx. 40km)
- Ishinomaki (approx. 50km)

Epicenter

Disaster Area
North to south 500km

Tokyo ~ Sendai approx. 370km (distance)
Damage situation caused by Tsunami

«Buildings in Onagawa, Miyagi Prefecture»
Damage situation caused by Tsunami
«Buildings in Nobiru, Miyagi Prefecture»

March 17, 2011
Damage situation caused by Tsunami
«Buildings in Shichigahama»

- Ruins of Shichigahama buildings washed away by the tsunami

Found at about 500m away

March 16, 2011
March 20, 2011
March 16, 2011
March 20, 2011
Restoration activities for communications services after the earthquake

○ Early restoration of communications services
  • Prior securing of power to deal with long-term power cuts
  • Emergency restoration of totally destroyed, washed away, flooded equipment, and resumption of services

○ Support for affected local governments and evacuees
  ⇒ 1900 evacuation centers and about 370,000 evacuees in the three disaster stricken prefectures
  • Provide free public telephones and internet
  • Provide safety confirmation measures such as Disaster Emergency Message Dial 171
Emergency restoration of equipment. Service resumption by the end of April

Composition of communications equipment before the disaster

In regards to service provision, services were provided from each NTT building

Emergency restoration through portable box-type communications equipment

In place of damaged communications buildings, portable boxes containing communications equipment were delivered and set up, and communications services resumed.
Examples of communications service restoration
«Buildings in Shizugawa, Miyagi Prefecture»

For installation location, land in elevated area borrowed, and communications box equipment set up
Examples of communications service restoration «Kadowaki Building, Ishinomaki, Miyagi Prefecture»

Kadowaki Building flooded by tsunami
(Ground floor submerged, electrical equipment use impossible)

Communications services resumed by mobile power vehicles/tankers (March 19)
(Commercial power supply resumed on April 24)
Free public telephones, special public telephone installation

- Free public telephones
- Special public telephone installation at evacuation centers

(East Japan area)
Location of special public telephone installations
: About 1200 locations
(About 4000 phones installed)
Free provision of internet connection / public wireless LAN

- Free provision of internet connection environment via FLET’S Hikari
- Free access to public wireless LAN such as FLET’S Spot

(East Japan area)
Number of free internet set up locations
: 450 locations (maximum)
【Factors Assisted Emergency Reconstruction of Affected Facilities】

1. Obtaining Information on the State of Disaster
   — Cooperation with prefectural disaster prevention, regional bureau of telecommunication, power companies, etc.

2. Logistics and the distribution of supplies
   — Ensuring supplies for recovery, gasoline, food, human support

3. Disaster-resistant facilities
   — Many facilities that survived were located underground or were protected by flood-prevention measures.

4. Finally: people ⇒ underlying strength of employees in charge of operations at the disaster site
   — Their sense of mission in working to secure continued communications links
【Feelings about Evacuee Support Activities: Communications Service】

1. Securing means of communication in disaster
   - Producing facilities that are robust in disaster, communications links that continue to operate

2. People seek information on well-being (safety confirmation).
   - More sophisticated Disaster Emergency Message Dial 171
   - Coordination of information between different means of communication such as email and social media

3. Turning community centers into information stations
   - Preparing a communications environment and independent power supply for evacuation shelters
Disaster Emergency Message Dial / Disaster Emergency Broadband Message Board

171
Disaster Emergency Message Dial
Supporting some 3.45 million messages

The Disaster Emergency Message Dial / Disaster Emergency Broadband Message Board service becomes available when large-scale disasters strike. This is a message board service that all residents in affected areas may use to confirm their personal safety by recorded message. Please remember this service, just in case ...
Measures against power cuts: safeguarding communications hardware from outage

Improving the deployment of generators at priority-communications sites
(1) Increasing the number of on-premise generators
(2) Deploying Power supply vehicles, strengthening fuel security
Exchange buildings damaged and submerged by the tsunami

(1) Relocation to higher ground

(2) Flood measures

Affected Exchange buildings

Moving town facilities to higher ground

Upper floors

Reinforcing flood walls
Measures against tsunami: routing lines inland, underground, and under rivers.
Turning Community Centers into Information Stations (Networking Communities)

**Community center**

Designated evacuation shelters, government offices, schools, community halls, plazas, shopping promenades, etc.

Conversion to "information station"

- Landline telephones, mobile telephones, Internet, television, radio, disaster-prevention radio are all available with a ready-to-use shopping gallery
- Optical cables, satellite, fixed-link radio, WiFi / WiMax, furnishing all infrastructure

**Daily**

- Event information
- Shopping information
- Tourism information
- WiFi spot
- Governmental information

Used for regional revitalization on a daily basis

**In disaster**

- Disaster information
- Traffic information
- Safety confirmation
- Evacuation instructions
- Public telephony free of charge, Internet use free of charge

Linking centers, forming community networks ⇒ disaster-resistant networks
“Live! Live! Miyagi”

A digital-signage display located on the 3rd Floor of JR Sendai Station will carry information on reconstruction and tourism in disaster-hit areas from March 2, 2012.