The Scenario-Based Plan for a Large-Scale Earthquake in Tokyo Metropolitan Area

Purpose: Information
Submitted by: Japan
The scenario-based plan for a large-scale earthquake in Tokyo Metropolitan area
-Tokyo Inland Earthquake-

Cabinet Office
Government of Japan

Flow on Developing Plans for Earthquake Countermeasures

① Estimation on distribution of seismic intensity and tsunami height
  - Estimate the distribution of seismic intensity and tsunami height in case of earthquake occurrence

② Damage estimation
  - Estimation on damage to buildings and facilities, people, transportation network and transportation facilities, transporting relief supply, communication and information system
  - Estimation of damage caused by fire

③ Fundamental principles for earthquake countermeasures
  - Master plan from prevention to response, recovery, and reconstruction

④ Strategies for earthquake countermeasures
  - Developing quantitative goals for disaster risk reduction and concrete methods in a realistic manner

⑤ Emergency response procedures
  - Defining operations to be taken by each organization and scale of support

⑥ Concrete operation plans
Seismic Distribution of the Earthquake (M7.3)

- A certain level of imminence (plate boundary between Philippine Sea Plate and North America Plate)
- Damage to the center of the capital
- Strong shake (JMA seismic intensity 6-) will attack wide area

Main estimation in the Tokyo Inland Earthquakes models to be prepared for

Damage to buildings and people (Earthquake, M7.3)

[Winter, 6PM, Wind speed 15m/s]

◆ No. of houses and buildings:
  - collapsed or burned 850,000

◆ No. of Casualties:
  - Approx. 11,000

- Burned 77%
- Liquefaction 4%
- Landslide 1%

- Burned 55%
- Collapse of block wall 7%
- Traffic Accident 2%
- Building Collapse 28%
- Landslide 8%

- Debris: 96 million tons
- Injured (including seriously injured): 210,000
  - Seriously injured persons: 37,000

Seismic activity 18%
Economic Damage Estimation (Earthquake, M7.3)

Damage estimation: Approx. 112 trillion yen

Condition: Winter, 18:00, wind speed: 15m/s

- In the affected area
- At home (excl. affected area)
- Overseas

Direct Damage:
- (cost for recovery)
- Damage to the buildings: 55.2 trillion yen
- Indirect damage (Decline of production value)
- Total 39.0 trillion yen
  - (13.2 trillion yen)
  - (25.2 trillion yen)
  - (0.6 trillion yen)

Indirect Damage:
- (loss of time and opportunity due to transportation disruption)
- 6.2 trillion yen

<Damaged function>
- Economical function and core function of capital
- Function of transportation network

Economic Damage Estimation:
- Damage to properties
- Damage to the people

Total Damage:
- Direct Damage: 66.6 trillion yen
- Indirect Damage: 6.2 trillion yen
- Total 72.8 trillion yen

Fundamental Principles for Tokyo Inland Earthquake

Ensuring continuity for core function as capital
- Target and countermeasures for three days after occurrence of a disaster

Response to great damage – developing earthquake-resilient communities

Planning preventive measures and quick implementation
- Earthquake-proofing of buildings
- Countermeasures for Fire
- Ensuring security inside and outside of houses
- Ensuring infrastructures, including critical infrastructure
- Countermeasures for long period ground motion
- Protection of cultural property

Establishing wide-area disaster management system
- Establishing cooperation system in wide-area capital region
- Countermeasures for relief and rescue operation
- Fire operation
- Support for people requiring assistance during a disaster
- Health and hygiene, epidemic prevention
- Maintenance of security
- Supporting system for voluntary activities

Countermeasures for recovery and reconstruction
- Countermeasures for disaster waste disposal
- Recovery of infrastructures, including critical infrastructure
- Comprehensive deliberation on reconstruction of the capital

Response to a large number of evacuees and stranded people
- Countermeasures for evacuees
- Promotion of using public facilities and private facilities as shelters
- Quick implementation of assessing risk
- Providing Temporary houses which can be chosen from some options

Countermeasures for stranded people
- Prevention of confusion around stations, deliberation on smooth guide for stranded people
- Providing information of the principle (“Staying where they are”) Facilitating temporary sheltering employees and students

Improvement of local/business capacity

Promotion of nationwide movement
(self-help, public-help, mutual-help)
Strategies to reduce the direct damage

**[Target] Halve the death toll**
- Wind speed: 15m/s approx. 11,000 → 5,600 (-50%)
- Wind speed: 3m/s approx. 7,300 → 4,300 (-40%)

*The number indicates death toll

**Effect of disaster risk reduction**

1. Death by building collapse
   - Wind speed 15m/s: approx. -1,300
   - Wind speed 3m/s: approx. -1,000 (including survived people due to fixing furniture)

2. Death by Fire
   - Wind speed 15m/s: approx. -4,000
   - Wind speed 3m/s: approx. -1,500

3. Death by collapse of steep slope
   - Approx. -100

**Concrete goals**

- Earthquake proofing of houses and other buildings: 75% → 90%
- Fixation of furniture: approx. 30% → 60%
- Improvement of compact city: unburnable area → more than 40%
- Improvement of early fire extinguishment: voluntary disaster management organizations 72% → 96%
- Fixation of furniture: approx. 30% → 60%
- Countermeasures for steep slope area: Saved houses: X1.3

**Goals**

- Reduce economic loss 40%
  - Wind speed 15m/s approx. 112 trillion yen → 70 trillion yen (-40%)
  - Wind speed 3m/s approx. 94 trillion yen → 60 trillion yen (-40%)

**Effect of disaster risk reduction**

1. Recovery cost
   - Wind speed 15m/s approx. -28 trillion yen
   - Wind speed 3m/s approx. -19 trillion yen

2. Cost derives from production suspension
   - Approx. -4 trillion yen

3. Cost derives from disruption of transportation
   - Approx. -0.7 trillion yen

4. Economical effect to inside/outside Japan
   - Wind speed 15m/s approx. -1 trillion yen
   - Wind speed 3m/s approx. -10 trillion yen

**Concrete goals**

- Countermeasures for recovery cost reduction:
  - Earthquake proofing: 75% → 90%
  - Completed retrofitting of bridges under controlled by national government
  - Completed reinforced quay wall 55% → approx. 70%
  - Countermeasures for fire
    - Retrofitting of transportation facilities

- Business Continuity
  - Developed BCP plan: Large companies almost 100%
  - Medium-sized companies more than 50%
  - Maintaining production of companies by reducing damage to buildings
  - Promotion of activities for business continuity based on the BCP Guideline

- Early recovery for transportation networks:
  - Earthquake proofing: 75% → 90%
  - Completed retrofitting of bridges for emergency transportation road
  - Completed reinforcement of quay walls 55% → approx. 70%
  - Debris reduction for early deregulation of transportation restriction

Strategies to reduce the economic damage

Decided at Central Disaster Management Council in April 2006

Concrete goals

Countermeasures for recovery cost reduction
- Earthquake proofing: 75% → 90%
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The Main Base for Wide-area Disaster Management in the Tokyo Bay Waterfront Area ("Ariake-no-Oka") ※Tokyo Metropolitan City Hall would be the alternative, if "Ariake-no-Oka" cannot be utilized

Priority of location
① Prime Minister’s Office
② Central Government Building No.5
③ Ministry of Defense
④ Tachikawa Wide-area Disaster Management Base

Establishment of Local Headquarters for Extreme Disaster Management

Plan for Specific Activities Based on the “Emergency Action Plan for the Tokyo Inland Earthquake” (Overview)
Thank You

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