Great Earthquakes Disaster-Prevention Measures for Houses and Buildings

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Damage to Buildings and Other Places Caused by Great Earthquake
(The Hanshin-Awaji Great Earthquake Disaster in 1995)

• Circumstances in the Hanshin-Awaji Great Earthquake

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of persons killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons killed by having seemingly been crushed by collapsed buildings, furniture or others</td>
<td>4,831 (88%)</td>
</tr>
<tr>
<td>Burned bodies and dead bodies that appeared to have been burned</td>
<td>550 (10%)</td>
</tr>
<tr>
<td>Persons killed by other causes</td>
<td>121 (2%)</td>
</tr>
<tr>
<td>Total</td>
<td>5,502 (100%)</td>
</tr>
</tbody>
</table>

- Anticipated damage
  - Casualties from quakes: About 6,700 persons
  - Number of buildings completely destroyed by quakes: About 170 thousand buildings

- Great Earthquakes Presumed to Occur in Future
  - Tokai Earthquake: About 6,700 persons
  - Tonankai and Nankai Earthquakes: About 6,600 persons
Targeted Regions for Measures against Main Great Earthquakes

- East Hokkaido
- Expected focal region of trench-type earthquakes around the Japan Trench and the Chishima Trench
- East Miyagi and East Fukushima
- West Akita Northwest Yamagata
- South West Nigata and North Nagano
- West Nagano and East Gifu
- Nagoya, Kyoto, Osaka and Kobe Area
- East Shimane
- Nigata-Chuetsu Earthquake
- Targeted regions for the outline of disaster prevention measures for an inland earthquake in the South Kanto Region
- Regions for the promotion of disaster prevention measures for Tonankai and Nankai Earthquakes
- Hanshin-Awaji Earthquake
- Targeted regions for strengthening disaster-prevention measures against earthquakes (Tokai Earthquake)
### Number of Buildings Estimated to Have Insufficient Earthquake Resistance

#### Housing

<table>
<thead>
<tr>
<th></th>
<th>Total houses (Throughout the country)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total housing units</td>
<td>47 million houses</td>
</tr>
<tr>
<td>Number of houses having insufficient earthquake resistance</td>
<td>11.5 million houses</td>
</tr>
<tr>
<td>(Percentage of the total number)</td>
<td>About 25%</td>
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</tbody>
</table>

※Estimated by MLIT as of March 2002

#### Non-housing

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Total number</td>
<td>3.4 million buildings</td>
</tr>
<tr>
<td>Number of buildings with insufficient earthquake resistance</td>
<td>1.2 million buildings</td>
</tr>
<tr>
<td>(Percentage of the total number)</td>
<td>About 35%</td>
</tr>
</tbody>
</table>

※Estimated by MLIT as of March 2002
Percentage of houses having insufficient earthquake resistance

Trend Only!

Accelerate?
Developments of anti-earthquake measures

<Principal earthquakes>

1950Niigata Earthquake

1971Miyagi Off-shore Earthquake

1981Tokachi Off-shore Earthquake

1995Hanshin-Awaji Great Earthquake

1959

Enactment

• Complete revision of the provisions

1964

Wooden Construction

• Strengthening foundation standards

1968

Wooden Construction

• Revision of wall quantities

1971

New Earthquake-proof Standards

• Revising and strengthening RC standards

1978

• Houses and buildings would never suffer damage from a quake registering an intensity of 5 on the Japanese intensity scale of 7.

• Houses and buildings would never be destroyed by a quake registering an intensity of 6 to 7 on the Japanese intensity scale of 7.

1981

Enforcement of the Law concerning the Promotion of the Improvement of Earthquake-Resistant Construction

• Establishment of financial aid for cost of seismic design and improvement (Apartment Houses, Offices and Others)

1995

Nigata-Chuetsu Earthquake

2000

• Establishment of financial aid for cost of seismic design (Stand-alone Houses)

2002

• Establishment of Certification Mark System for Dwelling performance (Earthquake resistance grade)

2004

• Establishment of financial aid for cost of seismic improvement (Stand-alone Houses)

2005

• Establishment of Lending by the Housing Loan Corporation at an interest rate point two (0.2) percent lower than the benchmark interest rate

• Establishment of Abolishment of the Requirements for Actual Age in Reduced Taxation on Housing Loans and Others
Making Houses and Buildings Earthquake-Resistant

- Enforcement of the Law concerning the Promotion of the Improvement of Earthquake-Resistant Construction
- Assistance by aid, financing and so forth
- Promotion of technical development
- Consultation windows, enlightenment, and so forth
- Adoption of "Seismic Diagnosis Easy for Anybody to Understand"
Examples of Construction Methods for the Improvement of Earthquake-Resistant Construction

Examples of methods for seismic reinforcement of wooden houses

Installation of earthquake-resistant walls and braces
Reinforcement of joints
Damper hardware for seismic control

Examples of seismic reinforcement of apartment houses

Example 1 of reinforcement of pilings
Example 2 of reinforcement of pilings
The Law Concerning the Promotion of the Improvement of Earthquake-Resistant Construction

- Based on the Lessons Learnt from the Hanshin-Awaji Great Earthquake
  - Obligations for the owners of buildings which many people will use to direct their efforts toward seismic diagnosis and seismic improvement
  - Retroaction of matters disqualified other than earthquake-resistant related provisions concerning certified earthquake resistance improvement work
  - Guidance, advice, instructions, and others by the competent authorities of government

- Certification under the Law Concerning the Promotion of the Improvement of Earthquake-Resistant Construction (1995 to 2002)

<table>
<thead>
<tr>
<th>Use</th>
<th>Number of Certifications</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2,709</td>
<td>2,339</td>
<td>370</td>
</tr>
</tbody>
</table>
Support System for Seismic Diagnosis and improvement

• Financial Aid for Seismic Diagnosis and Seismic Improvement of Houses and Buildings
  Stand-alone Houses: About 16 percent of the cost of the improvement will be financially supported
  Apartment Houses, Offices and Others: About 13.2 percent of the cost of the improvement will be financially supported
  (It will become easier to cope flexibly with the state of local governments (Budget in 2005))
• Lending Program for the Improvement Cost of Earthquake-Resistant Construction
  Lending by the Housing Loan Corporation at an interest rate point two (0.2) percent lower than the basic interest rate
• Reduced Taxation on Housing Loans for the Improvement of Earthquake-Resistant Construction
  For a period of ten (10) years, one (1) percent of housing loans outstanding can be deducted from the amount of income tax.
• Abolishment of the Requirements for Actual Age in Reduced Taxation on Housing Loans and Others (from 2005)
  The requirements for actual age in reduced taxation on housing loans and others will be abolished for old houses that meet with earthquake resistance standards, even if they are old. The increase in volume of the purchase and sale of old houses would also help seismic diagnosis and seismic improvement be accelerated.

Fireproof buildings:
  Built within twenty-five (25) years
Non-Fireproof buildings:
  Built within twenty (20) years

Requirements for actual age will be abolished.
Conformance to new earthquake-proof standards will be required.
## Operation Status in Local Governments of the System for Seismic Diagnosis and Seismic Improvement

(As of March 31, 2004)

<table>
<thead>
<tr>
<th>Types of Housing</th>
<th>Categories</th>
<th>Number of Municipalities in Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand-alone Houses</td>
<td>Seismic Diagnosis</td>
<td>580 municipalities</td>
</tr>
<tr>
<td></td>
<td>Seismic Improvement</td>
<td>254 municipalities</td>
</tr>
<tr>
<td>Apartment Houses</td>
<td>Seismic Diagnosis</td>
<td>320 municipalities</td>
</tr>
<tr>
<td></td>
<td>Seismic Improvement</td>
<td>136 municipalities</td>
</tr>
</tbody>
</table>

※Number of Municipalities in Japan : 2854 (As of January, 2005)
Actual Numbers of Support for Seismic Diagnosis and Seismic Improvement

• Seismic Diagnosis (Total numbers up to the end of March 2004)
  – Housing: 170,000 houses (160,000 of the houses were financed from the national treasury)
  – Specified Buildings: 40,000 buildings (62 of the buildings were financed from the national treasury)

• Seismic Improvement (Total numbers up to the end of March 2004)
  – Housing: 3,500 houses (40 of the houses were financed from the national treasury)
  – Specified buildings: 10,000 buildings (49 of the buildings were financed from the national treasury)
Measures for Housing for Disaster Victims in Niigata Chuetsu Earthquake

Check for Affected Degree of Damage

- Emergency Safety Check for Buildings Suffering from Disaster
  Attention was focused by emergency checkups for the prevention of the second disaster. The emergency checkups were conducted for 36,143 houses from October 24 to November 10, 2004.

<table>
<thead>
<tr>
<th>Category</th>
<th>Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>In danger</td>
<td>5243 cases (14%)</td>
<td></td>
</tr>
<tr>
<td>Caution needed</td>
<td>11122 cases (31%)</td>
<td></td>
</tr>
<tr>
<td>Already checked</td>
<td>19778 cases (55%)</td>
<td></td>
</tr>
</tbody>
</table>

Consultation Framework

- Creation of Consultation Framework for Housing
  - Establishment of consultation offices in thirteen (13) municipalities that were disaster-affected areas. Registered architects go round evacuation centers to support housing consultation. Toll-free telephone services are also available.
  - Establishment of Information Providing Centers of Vacant Houses to supply centralized information about vacant public rental housing and private housing.
Securing of Dwelling Facilities

- Emergency Temporary Dwelling
  - Construction of 3,460 houses
  - One-day Caring Center for elderly were completed in Nagaoka City.

- Moving in Vacant Public Housing, etc.
  - One hundred and eighty six (186) public housing units in Niigata prefecture were secured, and partial moving-in was made into that housing.
  - Information about vacant public rental housing all over the country is supplied.

- Introduction of Other Facilities (Ministries and agencies)
  - Information about vacant Housing for Job Development and housing for government workers is provided, and Japanese inns and hotels in Niigata prefecture are made use of as evacuation places for the elderly people.

Repairing and Rebuilding

- Housing Loans for Emergency Restoration by the Housing Loan Corporation
  - Lending for construction fund and repairing fund, etc.
    - (Ordinary interest rate: 2.85% → Interest rate in case of loans for emergency restoration: 1.7% as of December 14, 2004)

- Emergency Repair by Disaster Relief Law (Ministry of Health, Labour and Welfare)
  - An amount up to 600,000 yen is paid per family unit for emergency repair of a partially-destroyed house.

- Support by Natural Disaster Victims Relief Law (Cabinet Office)
  - An amount up to 3,000,000 yen is paid for demolishing a completely and a partially-destroyed house, ground leveling, and interest for loans.

*An additional amount is added to an interest rate subsidy for loans, an emergency repairing subsidy by Disaster Relief Law, and a subsidy by Natural Disaster Victims Relief Law, which is based on a proper system of Niigata prefecture.

- Establishment of Head Office of Housing Repair Assistance Team
  - Making up for shortages of building technicians in case local builders and others perform repairing work; and the introduction of builders to disaster victims