Developing and Implementing Building Codes: Experiences from Disasters

GP/DRR Side Event ***Building Code Enforcement and Dissemination - Safer Building for Sustainable Habitat***

Great Hanshin-Awaji (Kobe) Earthquake (1995)

Osaka Sen-nichi Building (1972)

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Ministry of Land, Infrastructure and Transport (MLIT) of Japan

Composition of the BSL of Japan

(Purpose)

Article 1. The purpose of the Building Standard Law (BSL) is to safeguard the life, health, and property of people by providing minimum standards concerning the site, construction, equipment, and use of buildings, and thereby to contribute to the furtherance of the public welfare.

*City Planning Areas;

99,477 km^2, 26% of total land

(as of March 2004)

Whole area of Japan

General Provisions
- Administrative Provisions
- Miscellaneous
- Penalty

Building Codes (enforced throughout Japan)
- Structural Requirement
- Fire Requirement
- Equipment and Sanitary Requirement

City Planning Areas*

Planning Codes (enforced within "City Planning Areas")
- Relation between Sited and Roads
- Land-Use Zoning Regulation
- Building Height-Bulk- Shape Control
- Restrictions in Fire Protection Zone

Developing Building Codes

(Concerning anti-earthquake measures)

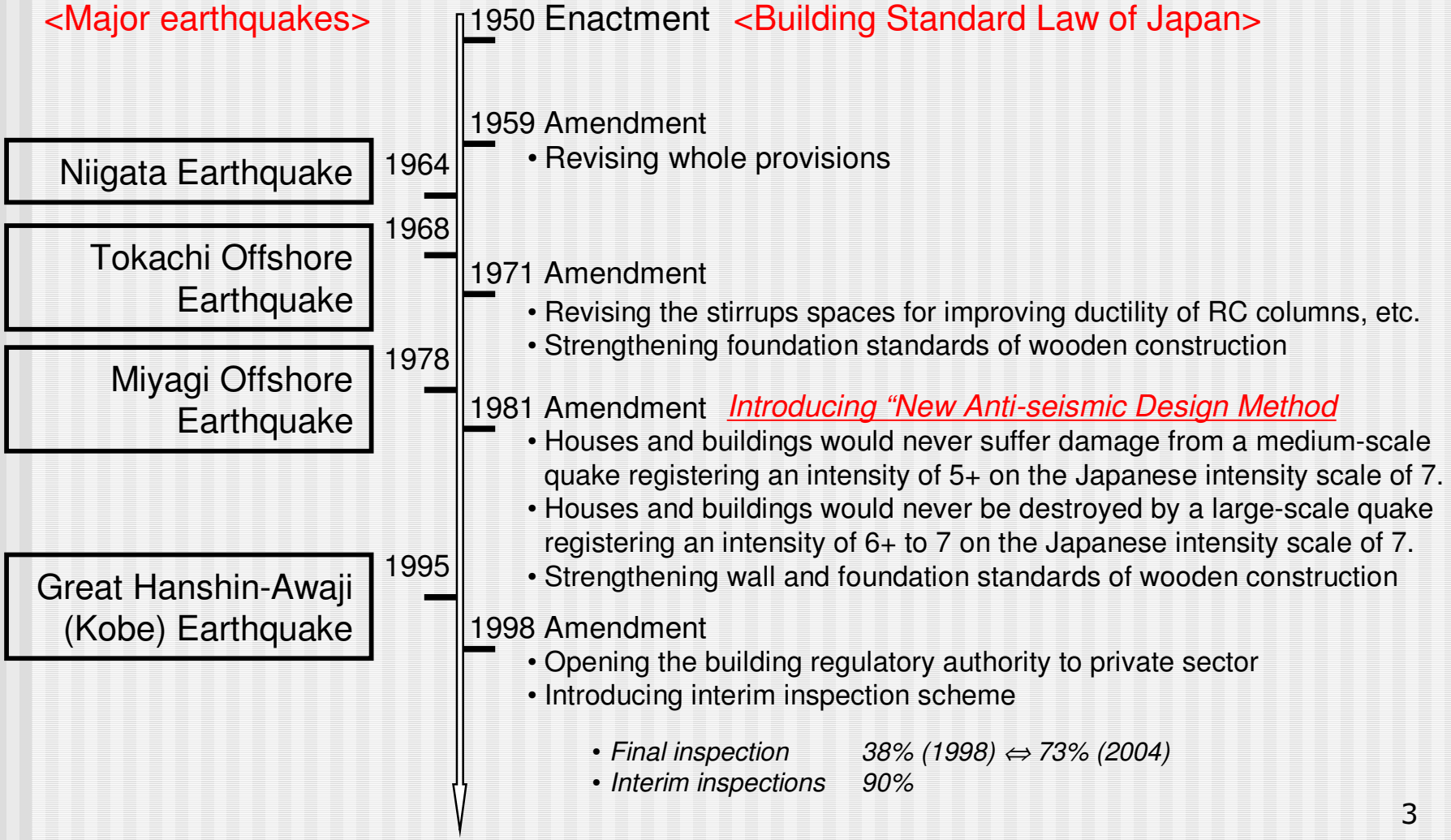
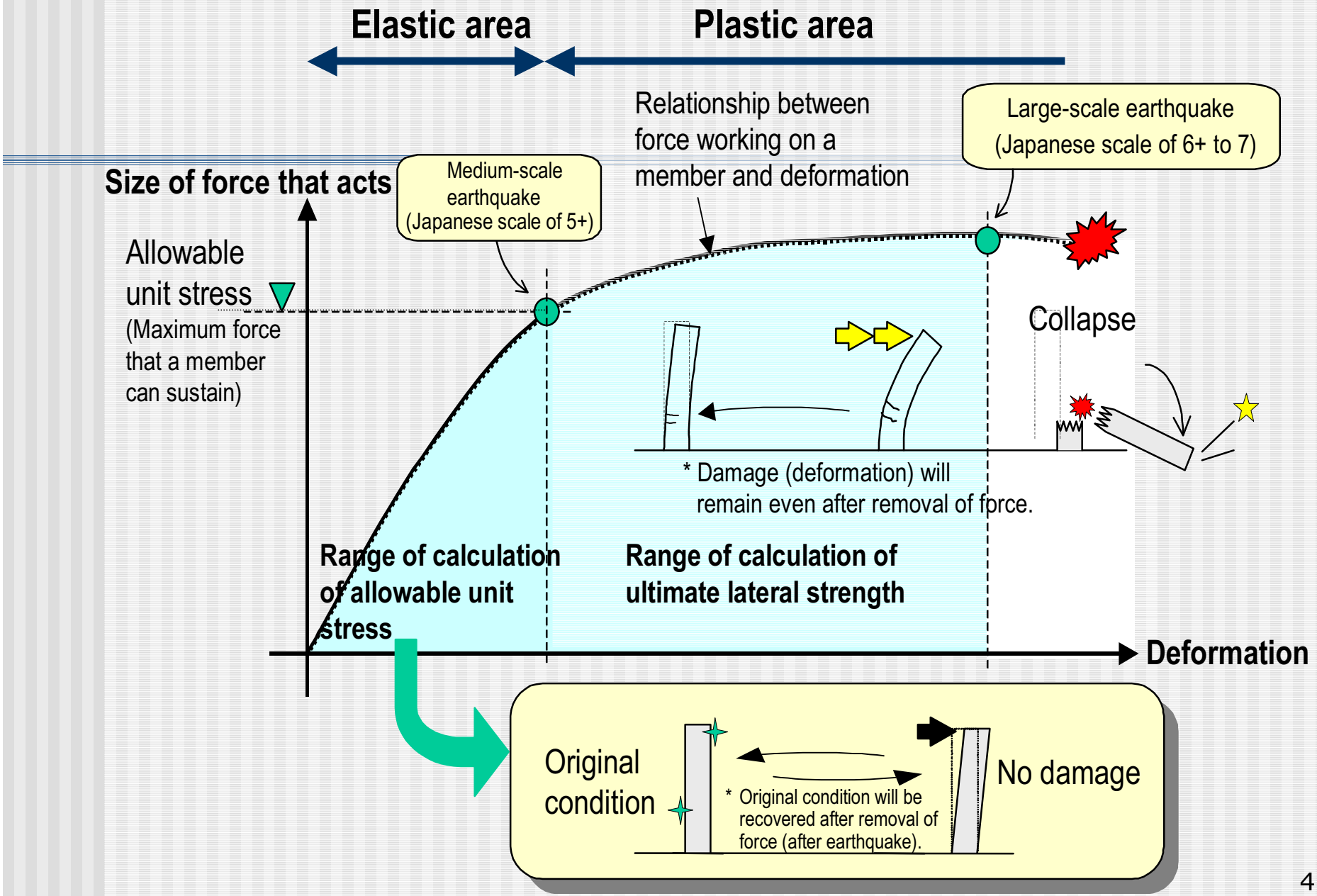


Image of “Anti-seismic Design Method” of Japan



Damage caused by Great Hanshin-Awaji (Kobe) Earthquake (1995)

Casualty	Death: 6,308
	80 % were killed by building collapse (crush and suffocation)
	Injured: 43,177
Damage to buildings 	Housing:436,416 units - 100,302 completely destroyed - 108,741 half destroyed
	Public buildings destroyed: 750 units
	Other buildings destroyed: 3,952 units
Fire	Fire outbreaks: 294 units

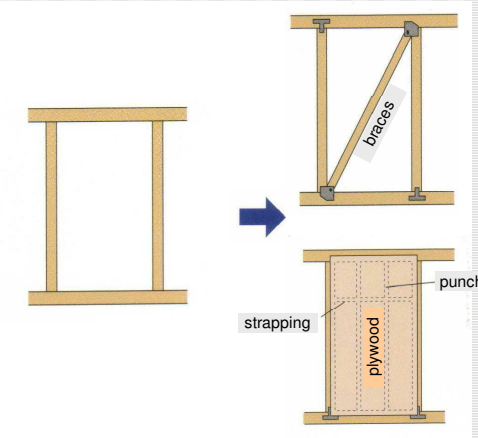
** The majority of damaged buildings were constructed before 1981, when the current anti-seismic design method was introduced.*

Existing Buildings not Conforming to Structural Requirement (all Japan)

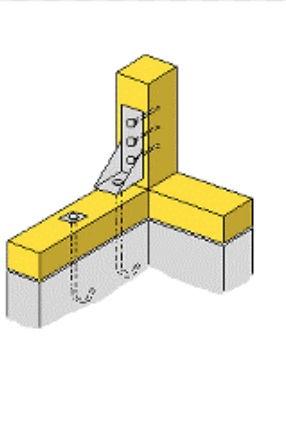
	Total Stock	Stock not Conforming to Structural Requirement
Housing	44 million units	14 million units (30%)
Buildings other than housing	3.4 million buildings	1.2 million buildings (40%)

Examples of Construction Methods for the Improvement of Earthquake-Resistant Construction

Examples of methods for seismic reinforcement of wooden houses



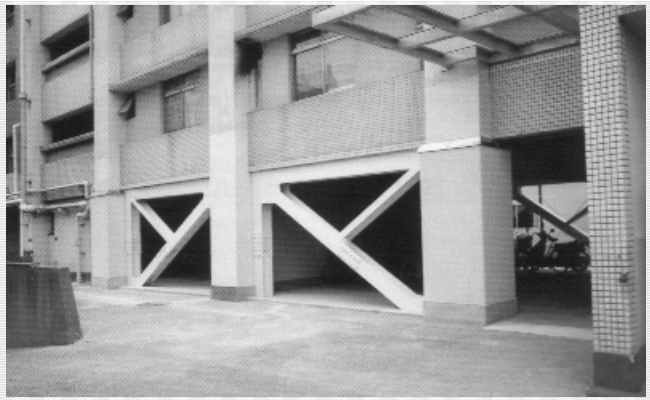
Installation of earthquake-resisting walls and braces



Reinforcement of joints

Damper hardware for seismic control

Examples of seismic reinforcement of apartment houses



Reinforcement (Example 1)

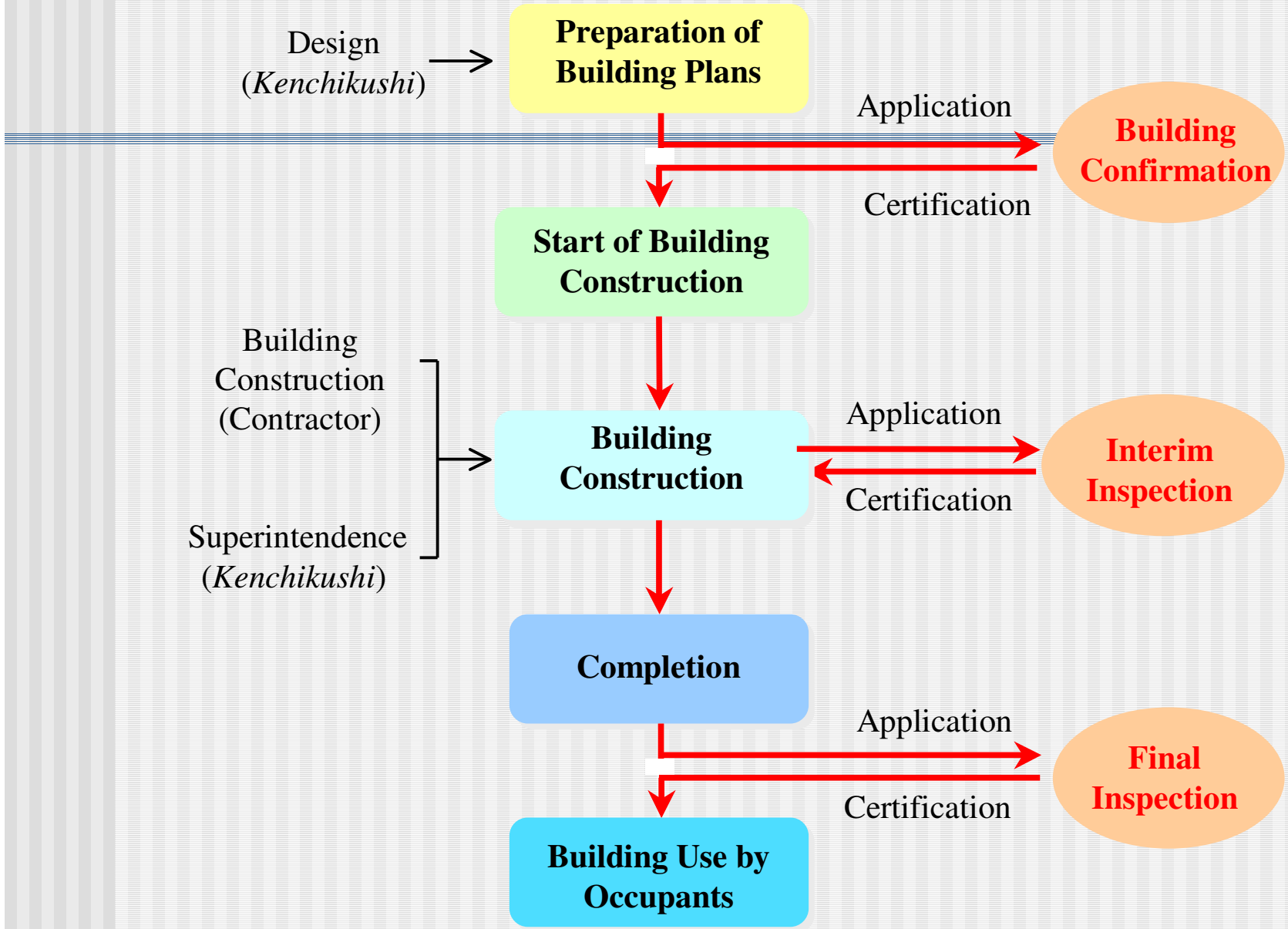
Reinforcement (Example 2)

Implementing Building Codes

- Building Confirmation and Inspection System
- ***Kenchikushi*** System

  (Qualified Architect/Building Engineer)

Regulatory Process for Building Construction



Implementing Building Codes

Building Regulatory Authorities

Building regulatory authority has been opened to private sector since 1999.

	Designated Administrative Agency (public sector)	Designated Confirmation and Inspection Body (private sector)
Number (April 2007)	431 (approx. 1800 building officials)	127
Number of Building Confirmations (FY2005)	264,412	475,500

Implementing Building Codes

Kenchikushi (Qualified Architect/Building Engineer)

- **1st class *Kenchikushi*** can design buildings and superintend construction work for all buildings.
- **2nd class *Kenchikushi*** can design and superintend construction work mainly for small buildings.
- ***Mokuzo (wooden structure) Kenchikushi*** can design and superintend construction work of only small wooden buildings.

1st class *Kenchikushi*	2nd class *Kenchikushi*	*Mokuzo Kenchikushi*	**Total**
322,248	692,968	14,950	1,030,166

(as of March 2006)

Key Issues for Governments

Are Building Codes Domestic Issue?

- No! It is very useful to exchange ideas and policies related to building codes among similar disaster-prone countries by formulating a network.
- Such a network is especially needed regarding earthquakes and tsunamis, as it is difficult to experience and verify the effects of measures by a single country.

Key Issues for Governments

Important Priorities (WCDR Session 4.6 in January 2005)

1) Analysis of hazards (earthquakes, storms, fires, tsunamis, etc.) affecting housing and buildings in each region
2) Development and improvement of building technology which reflect risks, building production practices and other factors in each region
3) Establishment of building codes and standards and development of social systems to disseminate them and ensure their thorough implementation
4) Assessment of safety of existing buildings, and development and dissemination of technologies for strengthening and retrofitting
5) Prevention of secondary losses resulting from damage to buildings in disasters, and development of repairing technologies and systems

Key Issues for Governments

Important Priorities (WCDR Session 4.6 in January 2005)

6) Training of engineers, builders, administrators, etc.

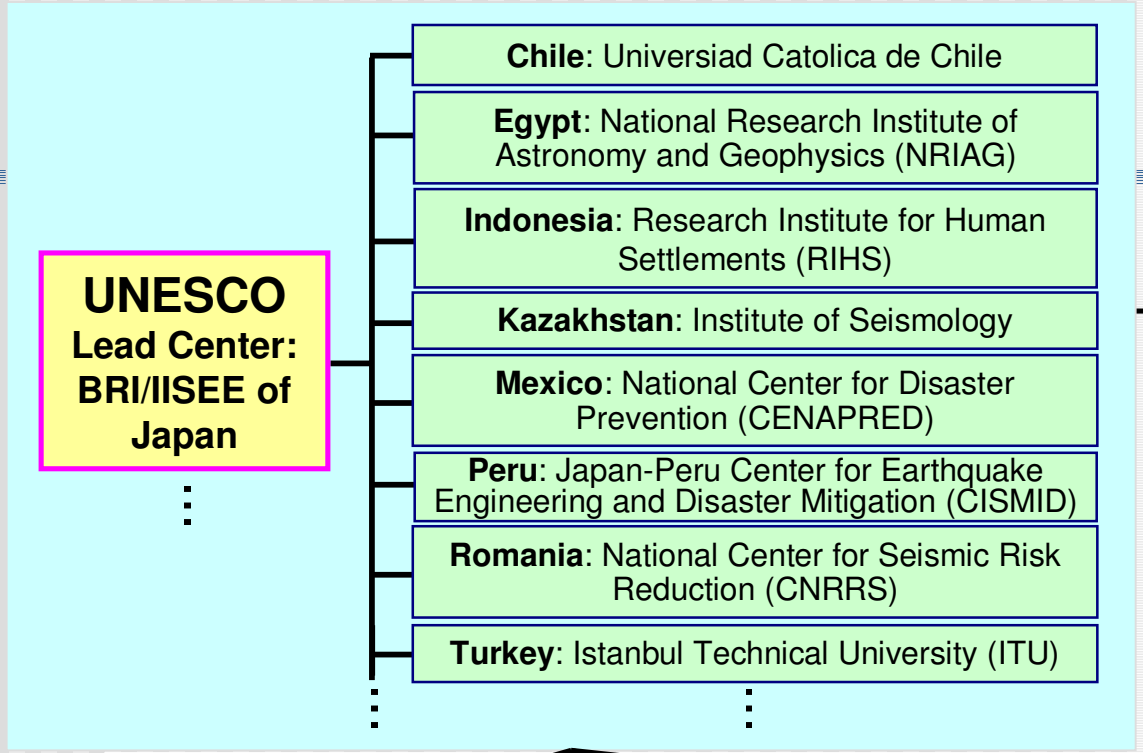
7) Education for communities, building owners, developers, etc.

8) Formulation of building disaster prevention measures and development of implementation systems at the national and regional levels

9) International cooperation at the research institute level, the national and regional government levels, and the community level

10) Formulation of land use plans for future developments and urban expansion

Research and Training Platform for Earthquake Disaster Mitigation based on Seismology and Earthquake Engineering *(future image)*



Proposals, Social activities

- Joint proposals to participating countries
- Joint advise on request from participating countries
- Joint proposals to international organizations
- Acceptance and implementation of joint research for solving national or local issues
- Cooperation in restoration following disasters

Research

- Plan and implement joint research
- Mutual dispatch of researchers
- Sharing research achievement
- Joint presentation of research achievements (seminars and symposiums, etc)
- Sharing information of damages from earthquakes

Training

- Fostering of lecturers for training
- Vertical specialization in training
- Mutual dispatch of lecturers for training
- Cooperative development and sharing of learning materials and curriculums
- Sharing and publishing training information
- Cooperation and nomination in offering trainees

Database

- Information on researchers
- Information on research institutes
- Information on research achievements
- Information on utilization of research achievements
- Associated information of each country (Building codes, related standards)

Effective Utilization of Human Resource Network *(future image)*