

## Seismic Retrofitting Promotion Plan and its Implementation of TMG



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1

## CONTENTS

- I Earthquake Damage
- II Damage Estimation and Current Situation of Tokyo
- III Plan of TMG
- IV Effort of TMG

2

## I Earthquake Damage

Damages of Great Hanshin-Awaji earthquake (17 January 1995)

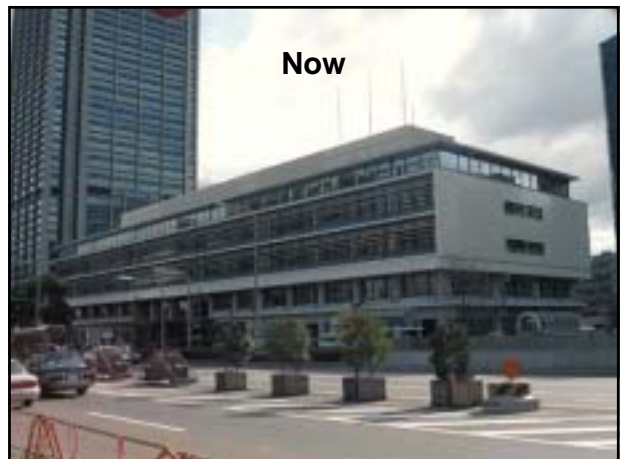


90% of death are **crushing death** due to collapse of buildings

24% of severely or collapsed RC buildings were that built with old standards

Magnitude	Buildings collapsed	Buildings partially damaged	Death and missing
7.3	104,906	144,274	6,437

3





## II Damage Estimation of Tokyo

- The occurrence of a big earthquake in Minami-Kanto area is about **70%** probability **in the coming 30 years** (Central Earthquake Research Committee, 2004)
- **One fourth** of the buildings may **collapse** when the earthquake occur

### Earthquake Resistance Standards

1950 Building Standards law

1981 Revision of Building Standards law ( new Earthquake Resistance Standards )

1995 Great Hanshin-Awaji earthquake

Seismic Retrofitting Promotion Act

6

## Niigatoken-Chuetsu Earthquake (23 Oct. 2004)



Magnitude	Buildings collapsed	Buildings partially damaged	Death and missing
6.8	3,175	13,792	65

7



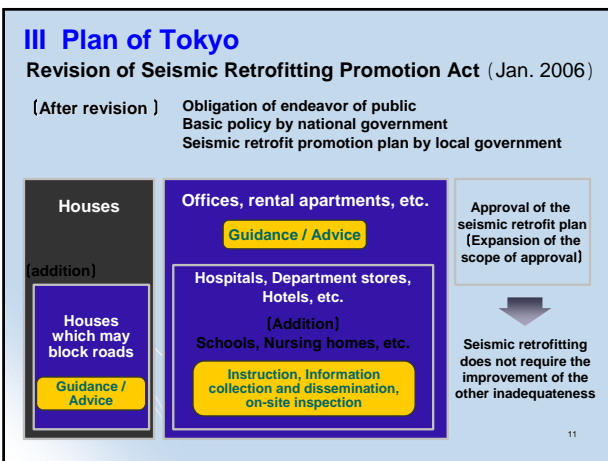


Spread of Fire

**[Damage Estimation]**

	Magnitude	Buildings collapsed	Buildings partially damaged	Death and missing
1 Sept. 1923 Kanto Earthquake	7.9	128,266	126,233	142,807
17 Jan. 1995 Great Hanshin-Awaji Earthq.	7.3	104,906	144,274	6,437
23 Oct. 2004 Niigataken-Chuetsu Earthq.	6.8	3,175	13,792	65
Damage estimation (Disaster Prevention Committee, TMG) North Tokyo Bay Earthq.	7.3	127,000	347,000	5,600
Damage estimation (Disaster Prevention Committee, TMG) Tama Earthquake	7.3	52,000	303,000	3,400

10



**Seismic Retrofitting Promotion Plan of TMG**  
(Formulated in March, 2007)

**Purpose and Situation**

- Promoting seismic retrofitting of houses and buildings to halve the estimated damages
- Providing guidelines for municipalities for development of seismic retrofit promotion plans

**Target buildings**

- Houses and Buildings built before new earthquake resistance standards enforced (1 June 1981)

12

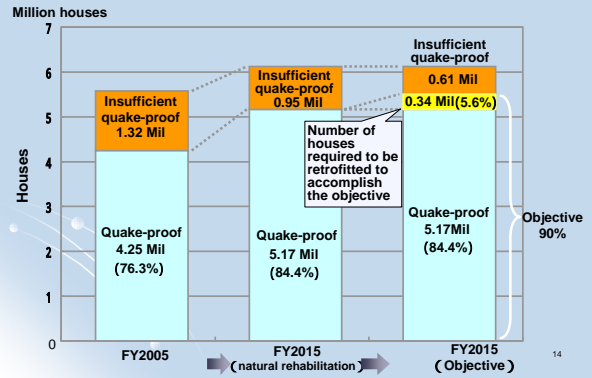
### Seismic Retrofitting Promotion Plan

Time span - 10 years from FY2006 to FY2015  
Objectives

Types of Buildings	Ratio of quakeproof buildings	
	End of FY2005	End of FY2015
Houses (detached house, apartment)	76.3%	90%
Buildings for special use	76.7%	90%
Buildings available to general public, such as department store, hotel, theater, etc.	77.6%	100%
Primary and middle schools	72.8%	100%
Public buildings critical to disaster reduction (Fire stations, police stations, etc.)	78.0%	100%
Buildings along emergency road	—	100%

13

### Number of Houses Required to Achieve the Objectives of Earthquake Retrofitting



14

#### IV Endeavor of TMG

##### Promotion of earthquake retrofitting of private buildings

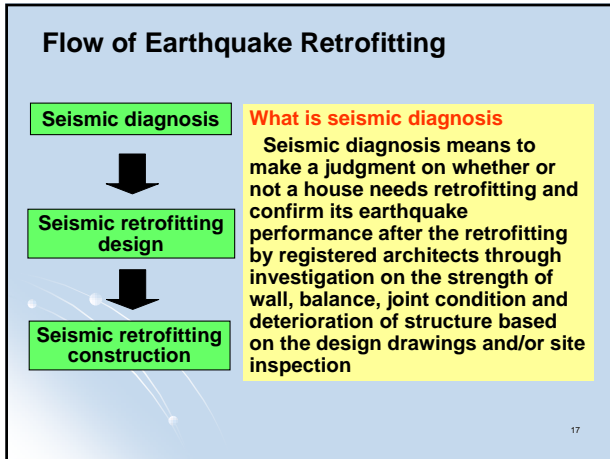
- 1 Financial aid to the building owners
- 2 Consolidate the environment for easy seismic retrofitting
- 3 Raising public awareness and motivation

15

#### 1 Financial Aid to the Building Owners

- 1 Financial aid for the houses in dense area of wooden house
- 2 Financial aid for apartment buildings
- 3 Financial aid for the houses along the emergency road

16



### Financial Aid for Wooden Houses in Redevelopment area

#### Seismic Diagnosis

One sixth of the cost with upper limit of 25,000 Yen  
[In the case of partial aid]

	Owner	Country	TMG	Ward
(Proportion)	1/3	1/3	1/6	1/6
(Amount)	50	50	25	25 thousand Yen

#### Seismic Retrofitting

- Width of the road less than 6 meters

It is estimated it will cost 1.5 Mil Yen for a house to retrofit

	Owner	Country	TMG	Ward
(Proportion)	1/2	4.5/20	5.5/40	
(Amount)	750	330	210	210 thousand Yen

18

### Financial Aid for Apartment

#### Seismic Diagnosis

1/6 of the cost within 1/4 of the aid by ward

	Owner	Country	TMG	Ward
(Proportion)	1/3	1/3	1/6	1/6

#### Seismic Retrofitting

1/4 ~ 1/6 of the 23% of the total cost and within 1/4 of the aid of ward, JPY125,000/house

19

### Financial Aid for the Elderly Persons to Prevent Their Life in Case of the Collapse of Building

**Quakeproof shelter**

250,000 Yen  
(2 days to set up)

**Quakeproof bed**

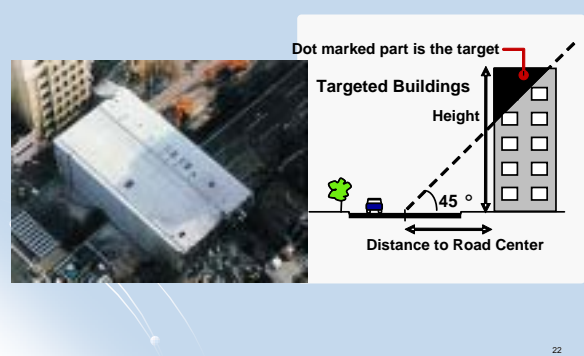
210,000 Yen

20

### Financial Aid for the Houses along the Emergency Road



### Financial Aid for the Houses along the Emergency Road



### Tax Exemption for Seismic Retrofitting

#### Houses

- Exemption of income tax (10% of the cost, upper limit 200,000 yen)
- Exemption of city planning tax and fixed property tax

#### Commercial buildings

- Special pay off for the income and corporate taxes for 10% of the construction cost

23

### 2 Consolidate the Environment for Easy Seismic Retrofitting

Introduction of low-cost and reliable seismic retrofitting method for wooden houses

- Introduction of equipment

Seismic resistant frame made by aluminum alloy



Built in 1965 Iw0.53 1.0  
1.7 mil Yen 2 days

Reinforcement by seismic resistant panel




- Strengthening wall by special panel and architectural hardware
  - Fixing-up from inside the room without damaging the ceiling and floor
- Built in 1960 Iw0.68 1.06  
540,000 Yen around 5 days


24



### Examples of Seismic Retrofitting



**Retrofitting technique  
( seismic isolator )**



**Retrofitting example  
( outside brace )**

25

### 3 Raising Public Awareness and Motivation

**Establishment of community seismic retrofitting promotion committee**



**Information dissemination activities through earthquake safety campaign**



**Consultation services on seismic resistance of wooden house**



**Seismic safety forum**



**Advertisement in the train**

26

#### Consultation system

- Registration and announcement of the “Seismic Diagnosis Office of Wooden House” for the registered architect's office who has the reliable engineers  
(234 offices at present)

#### Seismic retrofitting DVD

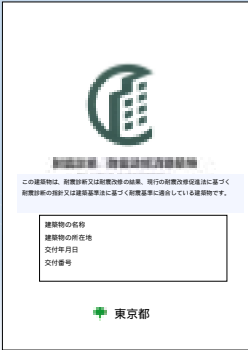
General information For wooden houses  
For apartment buildings



27

### Seismic Diagnosis and Retrofitting Mark Display System

**[sample of the plate]**



**Outline of the system**

- Displaying the mark for the buildings which has finished seismic retrofitting
- using the nationally uniform mark
- Displaying at the entrance so that the earthquake performance can be easily confirmed
- Publishing on the homepage of TMG

**Target buildings**

- The buildings which has finished the seismic retrofitting in accordance with the approved retrofitting plan based on the seismic retrofitting promotion act and confirmed by TMG

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東京都

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(From 11th May)

**Consultation service for various inquires on seismic safety**  
Inside TMG Disaster Prevention and urban Development center

**Address** Bitake Bldg. 1-15-9 Shibuya  
**Tel** [03-5778-2790](tel:03-5778-2790)(director call)



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30