

March 2018

Kobe City's Practice and Experience in Building Regulation for Resilience



Kobe City

Key Points

1. Damage caused by the Great Hanshin-Awaji Earthquake in 1995
2. Procedures for Building Confirmation and Inspection
3. Guidance to Buildings in Violation
4. Kobe's Retrofitting Program
5. Summary



1. Damage caused by the Great Hanshin-Awaji Earthquake in 1995



Summary of the Great Hanshin-Awaji Earthquake

Date: January 17, 1995, at 05:46 JST

Magnitude: M 7.2

Japanese seismic intensity: Max (Level 7)

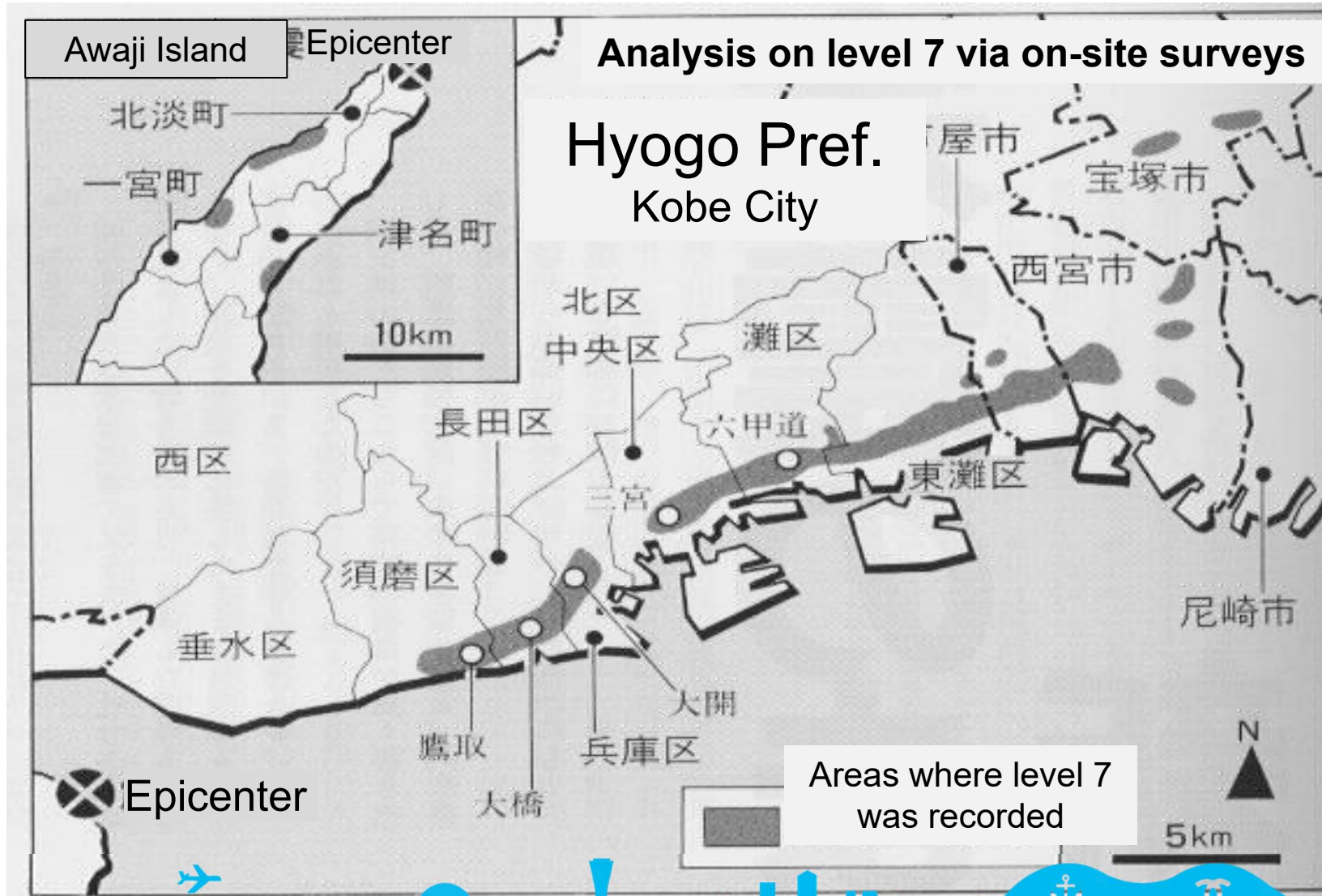
Epicenter location: the northern part of Awaji Island

Depth: 14km

An epicentral earthquake in large cities due to strike-slip mechanism



Distribution of level 7 of seismic intensity (Japanese scale)



Casualties of the Earthquake

- Casualties: 4,571 killed in Kobe City (6,433 in total)
- Elderly: Approx. 58% of the casualties were 60+ years of age
- Building collapse was the driver: approx. 73% suffocated or crushed



Collapse of Buildings

Fully destroyed buildings: 67,421
Partially destroyed buildings: 55,145



Damage to Transportation Infrastructure



Damage to City Hall

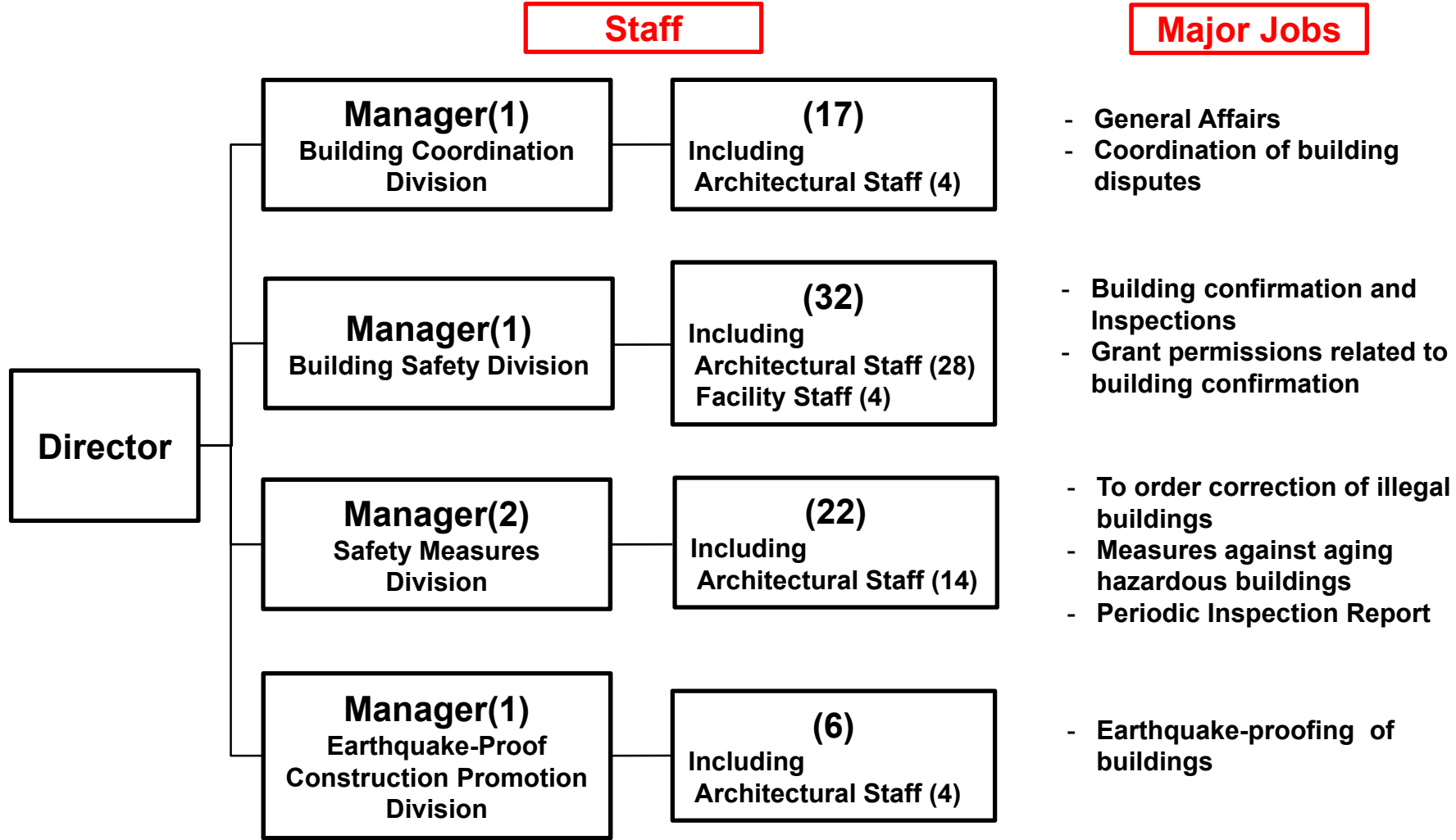
Building No.2 of Kobe City Hall, of which the sixth story was crushed



2. Procedures for Building Confirmation and Inspection



The Organization of Building Guidance Department in Kobe City Government



Summary of Kobe City

Area 557.02 km²
Population 1,533,290 (2017)

Achievements of major Jobs (April,2016 – March,2017)

Building confirmation (※)	165
Granted permissions related to building confirmation	111
Coordination of building disputes	101
To order correction of illegal buildings	159
Measures against aging hazardous buildings	19
Periodic Inspection Report	891
Earthquake-proofing of buildings	97

※the number of Building Official in Kobe City Government

the number of building confirmation by **Designated Confirmation and Inspection Body** is **4,406**



Application for Building Confirmation and Inspection

■ Application for building confirmation and inspection

- Rate of application for building confirmation and inspection
 - * Nearly 100%, though actual statistics are unavailable
- Rate of final inspections
 - * 99.3% in the case of Kobe City (2008)
- Reasons for fulfilling building confirmation and inspection system in Japan
 - * *Kenchikushi* system (monopoly of duties)
 - * Collaboration with financial institutions (loans)
 - * Heightened awareness due to the impact of damages caused by the earthquake



Interim Inspections

- Institutionalized as the Building Standard Law revised in June 1998
- The collapse of a large number of buildings due to the Great Hanshin-Awaji Earthquake in 1995 shed light on the importance of securing the safety of buildings.
- An interim inspection will be conducted by building officials, etc. at the time a predetermined specific construction stage is completed. The construction work may not proceed to the subsequent stages without the issuance of the **certificate of successful interim inspection**



Interim Inspections

- Buildings which must undergo interim inspections (in the case of Kobe City)

	Use of building	Size (No. of stories / area)
1	Detached housing and multipurpose housing	Buildings with a total floor area of 10 square meters or more
2	Any buildings other than those to be used for the purposes cited above	Buildings with a total floor area of 200 square meters or more
		Two- or more-storied buildings whose total area exceeds 50 square meters (or 100 square meters for certain purposes)



Interim Inspections

- **Timing of Inspections**

Interim inspections will be conducted after the completion of the following work.

Structure of buildings	Process concerning foundation work	Process concerning erection work
Timber-building (of one or two stories)		Erection work
Timber-building (of three or more stories)	Bar arrangement of foundation	Erection work
Steel construction	Bar arrangement of foundation	Installation work of floor slabs for the second story
Reinforced concrete structure	Bar arrangement of foundation	Bar arrangement work for the floor of the second story



Example of Interim Inspection

* Case of Steel Construction (Erection Work)

- An inspection will be conducted at the stage where steel frames have been established and floor slabs laid down.
- No work may be conducted towards the walls, such as the work to cover the steel frames, until the construction work up to this stage has passed the inspection.



Floor slabs

Pillar



Example of Interim Inspection

At the time of the inspection, a request will be made to submit various data on the processes up to that stage.

- Certificates of materials of steel frames and reinforcing bars
 - Reports on the welded parts of inspections and tests of steel frames and reinforcing bars
 - Compressive strength tests
 - Photographs
- etc.



Periodic inspection Report

Reporting is requested **once every three years** in terms of Groups

	Use
A	(i) Theaters, cinemas, entertainment halls (ii) Viewing halls, public halls, assembly halls (iii) Museums, art galleries, libraries, bowling alleys, swimming pool buildings, places for practicing/exercising sports (iv) Schools, gymnasium (v) Department stores, supermarkets, retail premises for merchandising business, exhibition halls
B	(vi) Hospitals and clinics, child welfare facilities (including welfare facilities for the elderly, etc.) (vii) Hotels or Japanese inns (viii) Business offices, and other premises such as business offices
C	(ix) Apartment buildings (x) Public bathhouses (xi) Cabarets, cafes, night clubs, restaurants, etc



3. Guidance to Buildings in violation



Tendencies of Buildings in violation

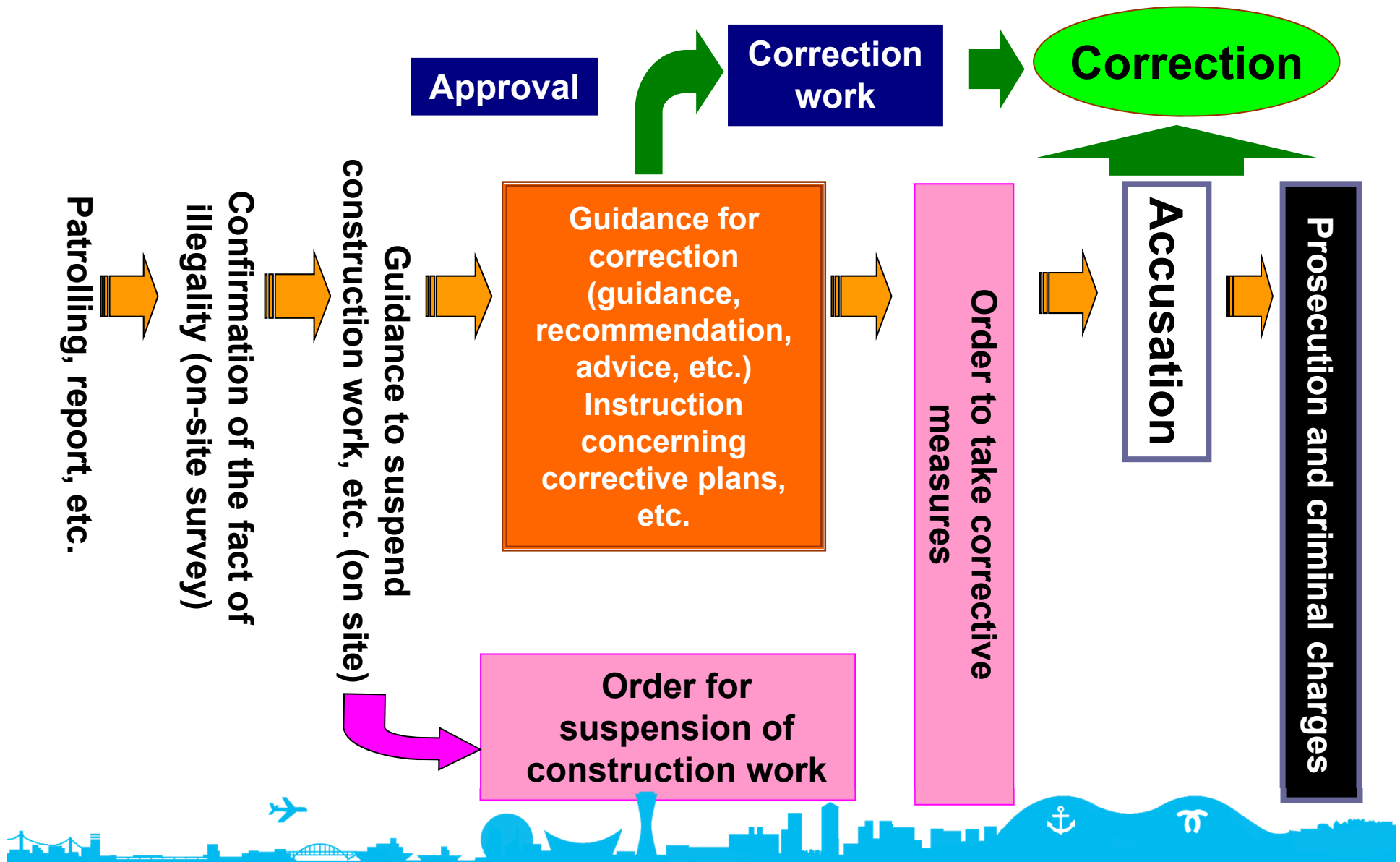
- ◆ As the final inspection ratio has improved, the number of newly constructed illegal buildings has declined.

Fy2015: 13 cases (Fy1999: 235 cases)

- ◆ Violation in case of extension work and change of use is significant.
 - Failing to observe the regulation to set back from the center of the road
 - Constructing a building with the building-coverage ratio or the floor-area ratio exceeding the statutory limit
 - Use of a building in violation (using the first floor of a residential building as a workshop, etc.)
 - Addition to a building without the relevant license, and any of the above-mentioned violations of laws/ordinances due to the extension, etc.



Flow of Correcting Buildings in Violation



Efforts of Violation Management

◆ Early discovery of illegal buildings

- Voluntary patrol (throughout year) to survey new construction sites
- Simultaneous patrol (1wk x 2/year)
- Individual investigation based on 110 violation reporting

◆ Early correction

- Guidance for correction (guidance, advice, recommendation, etc.)

◆ Proper handling

Following response to malicious or highly risky violation:

- Order under Building Standard Law Article 9
- Request for suspending energy supply (for new buildings)
- Report to Minister of Land, Infrastructure and prefectural governors (Law Article 9.3)
- Accusation
- Administrative subrogation



4. Retrofitting Program



3) Seismic Retrofit of “buildings used by many people”

Major activities to promote seismic retrofit

Large-scale buildings of which the seismic diagnosis are mandatory

(Large-scale buildings require immediate safety confirmation)

Targets:

- Buildings used by **many and unspecified people** such as hospitals, shops, and hotels,
- buildings of which **the users require assistance in evacuation** such as schools and nursing homes,
- Large buildings store/process more than certain amount of **hazardous materials** (5000m² or more, except for specified use)

- Amendment to the law in 2013 made implementation and report of **seismic diagnosis** mandatory.

Report deadline: End of December of 2015 → Results published on March 29, 2017

- **Subsidy mechanism** to support seismic retrofit of targeted buildings

Kobe City’s subsidy program for seismic retrofit of large-scale buildings requiring immediate safety confirmation (2014-)

- Could be used alongside with subsidy program by the national government
- Increased amount of subsidy for buildings that signed agreement with the city to allow the use as welfare evacuation facilities (e.g. hotels and guest houses) in FY2015



3. Summary: Seismic Retrofit Plan in Kobe City [2016-2020]

1) Achievements

- **The seismic retrofit rate reached 91% in 2013** from 84% in 2003 when the previous plan was developed.
- The seismic retrofit rate of public housing owned by the city reached 85% in 2014, compared to 75% in 2007 when the previous plan was developed.
- The seismic retrofit rate of private buildings marked 82% in 2014, compared to 75% in 2007 when the previous plan was developed.
- The seismic retrofit rate of public buildings achieved 98% in 2015, compared to 68% in 2007 when the previous plan was developed.



2) Setting goals for seismic retrofit of houses

Seismic retrofit goal: 95% of homes to be seismic-resistant by 2020.

To achieve the target, it requires to reduce 30,000 houses considered as non-seismic-resistant in 7 years, out of 67,000 non-seismic-resistant houses (estimation in FY2013).

Need 1.5 faster speed to achieve the target, compared to the speed during the previous plan period.



2. Promoting seismic retrofit of houses and buildings

1) Awareness raising

Inform widely

- City magazine “KOBE”
- Newspaper ad, TV, Radio
- Door-to-door drops

Inform in details

- Open house of earthquake-resistant house
- Consultant session

Inform directly

- “Intercom action” in cooperation with the local community
- Staff visit

For the next generation

- Seismic diagnosis training (for high school students in architectural course)
- Classes on seismic resilience (housing education)



Use of seismic-resilience mascots

Kobe City, “Seismic-resilience Campaign”
(every September and October)

Cooperation between group of experts and civil societies



Seismic-resilience mascots (Okiru Hakase)



Visiting seismic-retrofit houses (house visit)



“Intercom action” in the
community
“door-to-door visit”



Housing education
(Classes on seismic-
resistance)



5. Summary



Conclusion

- ◆ In Japan, responsibility for illegal buildings is borne by
 - Designers (*Kenchikushi*)
 - Builders
- ◆ The national and municipal government:
 - are required to ensure that accidents similar to those that have happened in the past do not occur in future by reviewing building standards and systems
 - also prevent violations through inspections and patrols
 - take responsibility, however, if due care and attention are not taken in the course of their business (whether it be intentionally or through negligence)



ANNEX: Additional Slides of Interest



Summary of Kobe City

Area 557.02 km²

Population 1,533,290 (2017.03.31)



Legislation

◆ Local governments in Japan

There are two levels of local governments in Japan

- 47 prefectures
- 787 cities , 748 towns , 184 villages;
and 23 wards in Tokyo.



A president of each local governments is directly elected by its residents, who is called a Governor or a Mayor.

All members of each parliament of local governments are directory elected by its local residents.



Final Inspections

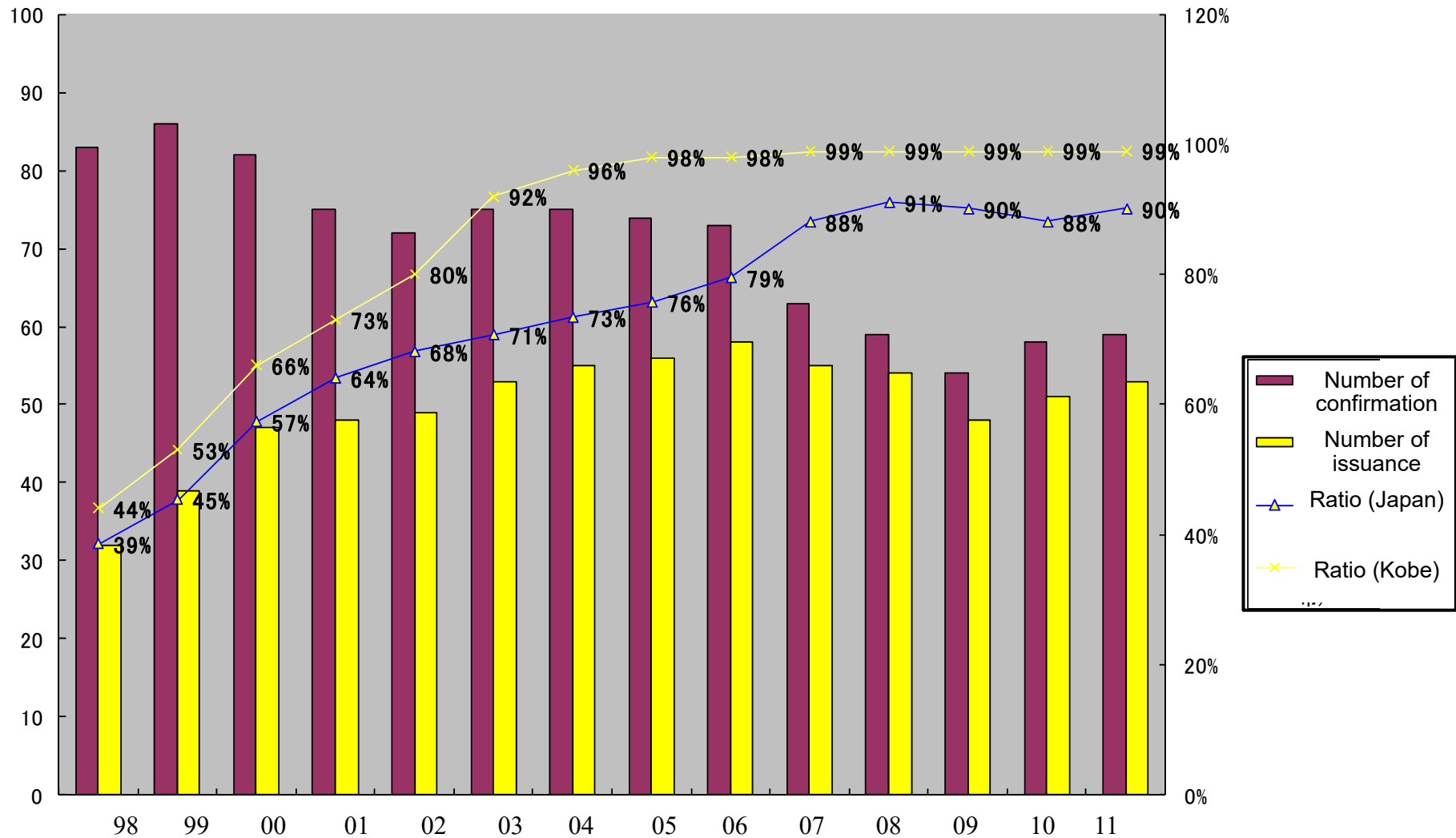
- [Plate, Approved by Final Inspection]



The proportion of buildings subject to final inspections rose from **44.0%** in FY1998 to **99.8%** in FY2014.



Changes in Final Inspections Ratio (nationwide and Kobe)



Periodic Inspection Report

【 Purposes 】

The safety of buildings will be ensured by stipulating that owners and administrators of buildings are required to report the results of periodic surveys and inspections on their buildings, elevators, etc.

【Provision as Grounds】 (Building Standard Law Article 12)

The owner and administrator of a building, etc. designated by a designated administrative agency shall have a qualified person with the relevant expertise to survey and inspect the premises, structure and construction facility of the building regularly and report the results thereof to the agency.



Provision as Grounds, etc.

◆ Order of measures against buildings in violation (Article 9 of the Building Standard Law)

Designated administrative agencies may give mandates to take necessary measures to correct illegality with respect to buildings or sites of buildings which violate the provisions, etc. of any article of the Building Standard Law.

[Intended parties]

Building owner, contractors, and operational managers of the construction work, owners and administrators of the site, etc.

[Measures to correct illegality]

Suspension of the construction work, removal, transfer, renovation, extension, repair, redecoration, prohibition of use of buildings, etc.

◆ Penal provisions

Any party which fails to comply with the order will be sentenced to imprisonment of 3 years or less or fines of 3 million yen or less.

◆ Administrative Punishments

Kenchikushi ... admonition, suspension of business for not more than 1 year, rescission of license

Building constructors ... suspension of business for not more than 1 year, rescission of permissions

Housing constructors ... suspension of business for not more than 1 year, rescission of license

