

Outline of Measures for Fire Prevention and Safety under the Laws and Regulations of Fire Fighting

Fire in Japan

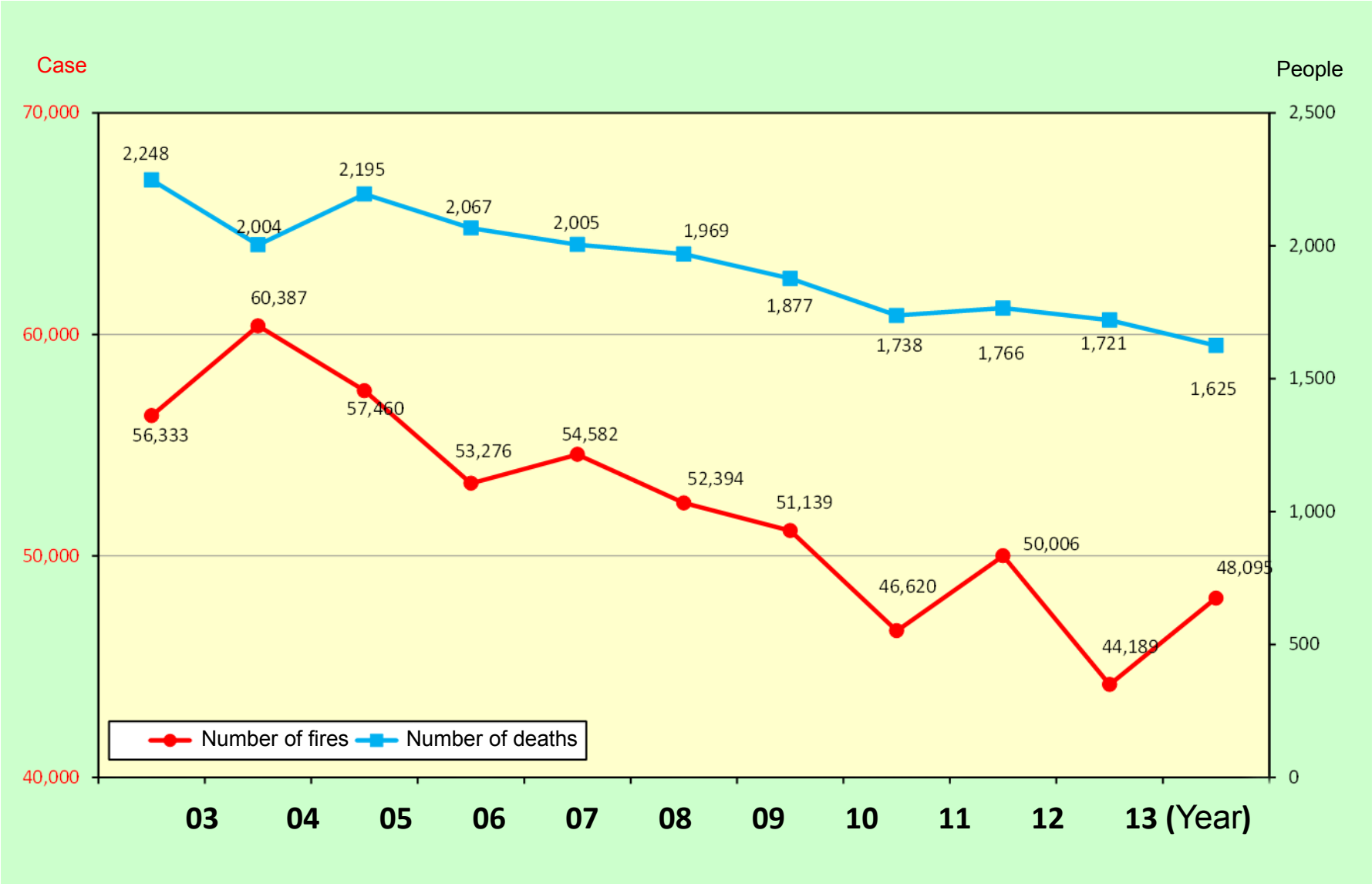
Total number of buildings for business purposes and apartment houses:	about 4 million
Of these, buildings that are required to install a sprinkler system :	about 67,000

Annual number of fires:	about 48,000 cases	1,625 fatalities
Of these, building fires:	about 25,000 cases	1,254 fatalities
Of these, residential fires:	about 14,000 cases	1,100 fatalities

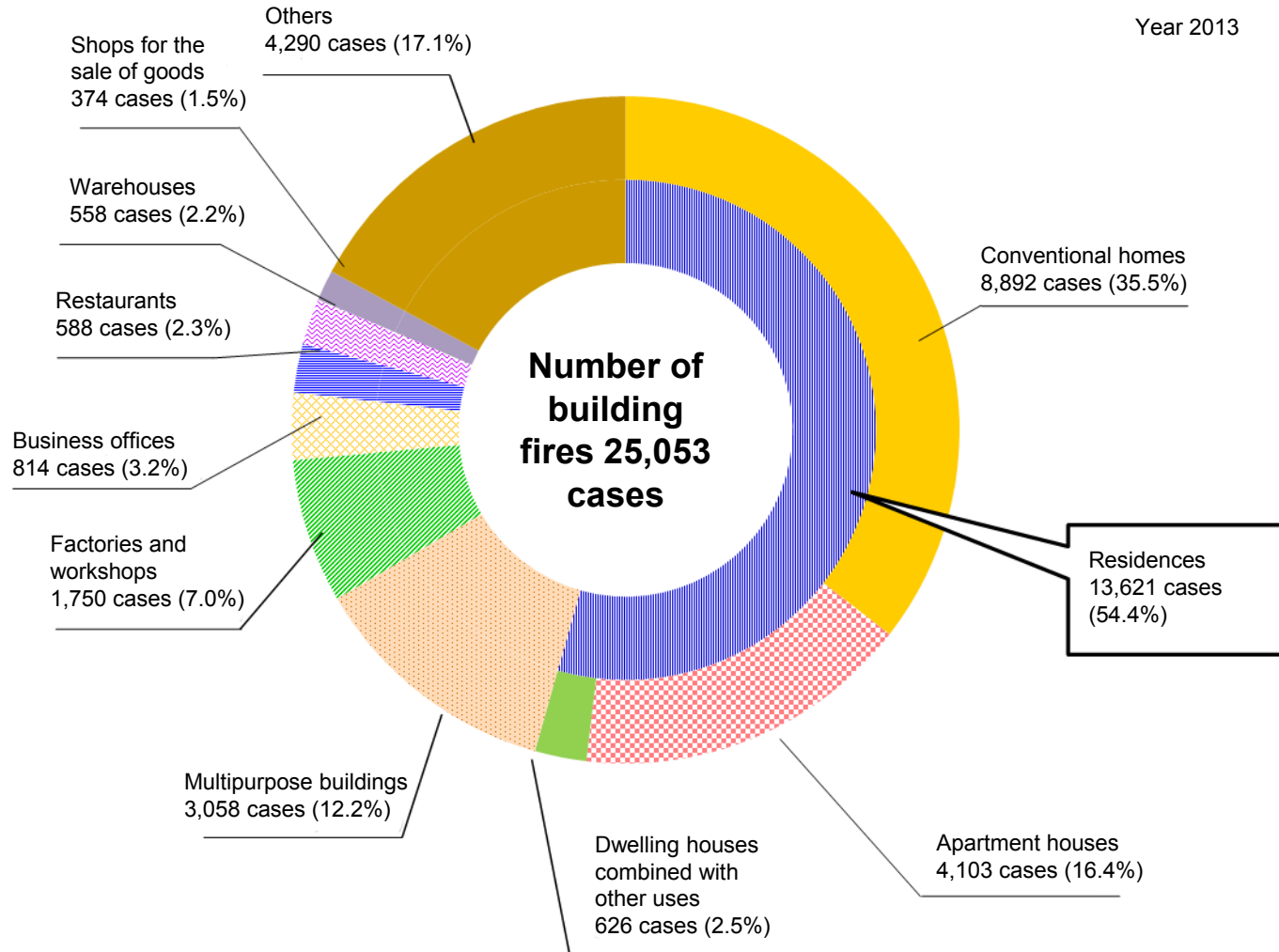
Leading cause of death from building fires
(1) CO poisoning/suffocation (38.2%) (2) Burns (37.6%)

Leading causes for building fires
(1) Cooking utensils (14.6%) (2) Cigarettes (10.0%)
(3) Arson (9.0%) (4) Heating devices (5.7%)
(5) Suspicion of arson (5.3%)

Trend in the Number of Fires and Fatalities

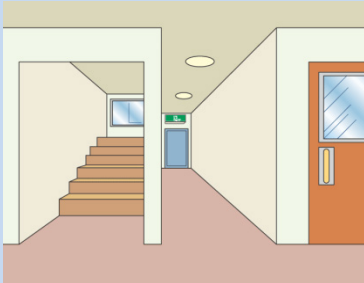


Number of Building Fires by Purpose of the Building Where the Fire Originated



Division of National Government Roles regarding Measures for Fire Prevention and Building Safety

Building structure
(Fire prevention section, making interior decoration non-combustible, stairs, and others)



**Ministry of Land,
Infrastructure,
Transport and
Tourism**

**(Building
Standards Act)**

Fire fighting equipment (including fire hydrants and sprinklers)
Fire control (including fire management, maintenance of equipment, and training)



**Fire and Disaster
Management
Agency of the
Ministry of Internal
Affairs and
Communications**

(Fire Services Act)

Measures for Fire Prevention and Safety under the Laws and Regulations of Fire Fighting (Overview)

Prevention of fires

- ◆Appointment of a fire prevention management chief
- ◆Implementation of fire fighting and evacuation drills
- ◆Fire management
- ◆Compilation of fire prevention plans
- ◆Implementation of inspection of facilities to be protected from fire
- ◆Utilization of fire prevention goods

Sensing/detecting/notifying

- ◆Automatic fire detection system
(Automatically notify the outbreak of a fire to inside the building)
- ◆Fire alarms for a short circuit
(Notify a short circuit via alarms)

Fire fighting in the initial stage

- ◆Fire extinguisher
- ◆Indoor fire hydrants
- ◆Sprinkler system
- ◆Other automatic fire fighting equipment

Fire brigade operations

- ◆Water for fire prevention
- ◆Emergency outlet equipment
- ◆Wireless communication auxiliary devices

Evacuation guidance

- ◆Evacuation tools
- ◆Exit route lighting /evacuation signage

⇒ Technology criteria and procedures are established by government ordinances and municipal ordinances based on the Fire Services Act. Also, necessary measures for fire prevention and safety are required in accordance with the purpose of the building, scale, and number of people. In addition, the fire fighting laws and regulations are applied to existing buildings as well (excluding some fire fighting equipment).

Examples of Fire Fighting Equipment



Automatic fire detection system



Fire alarms for a short circuit



Fire extinguisher



Indoor fire hydrants



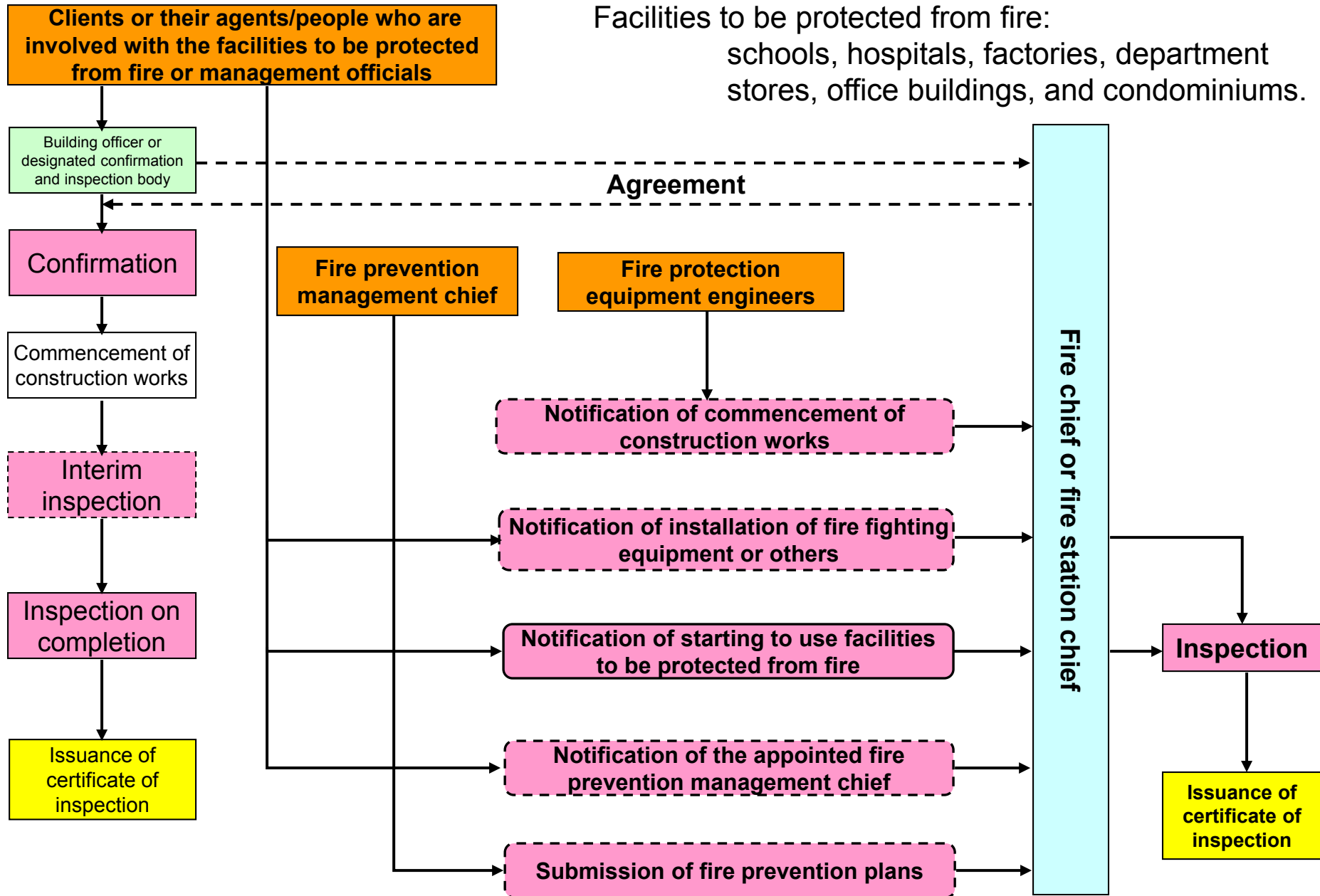
Exit route light



Escape ladder

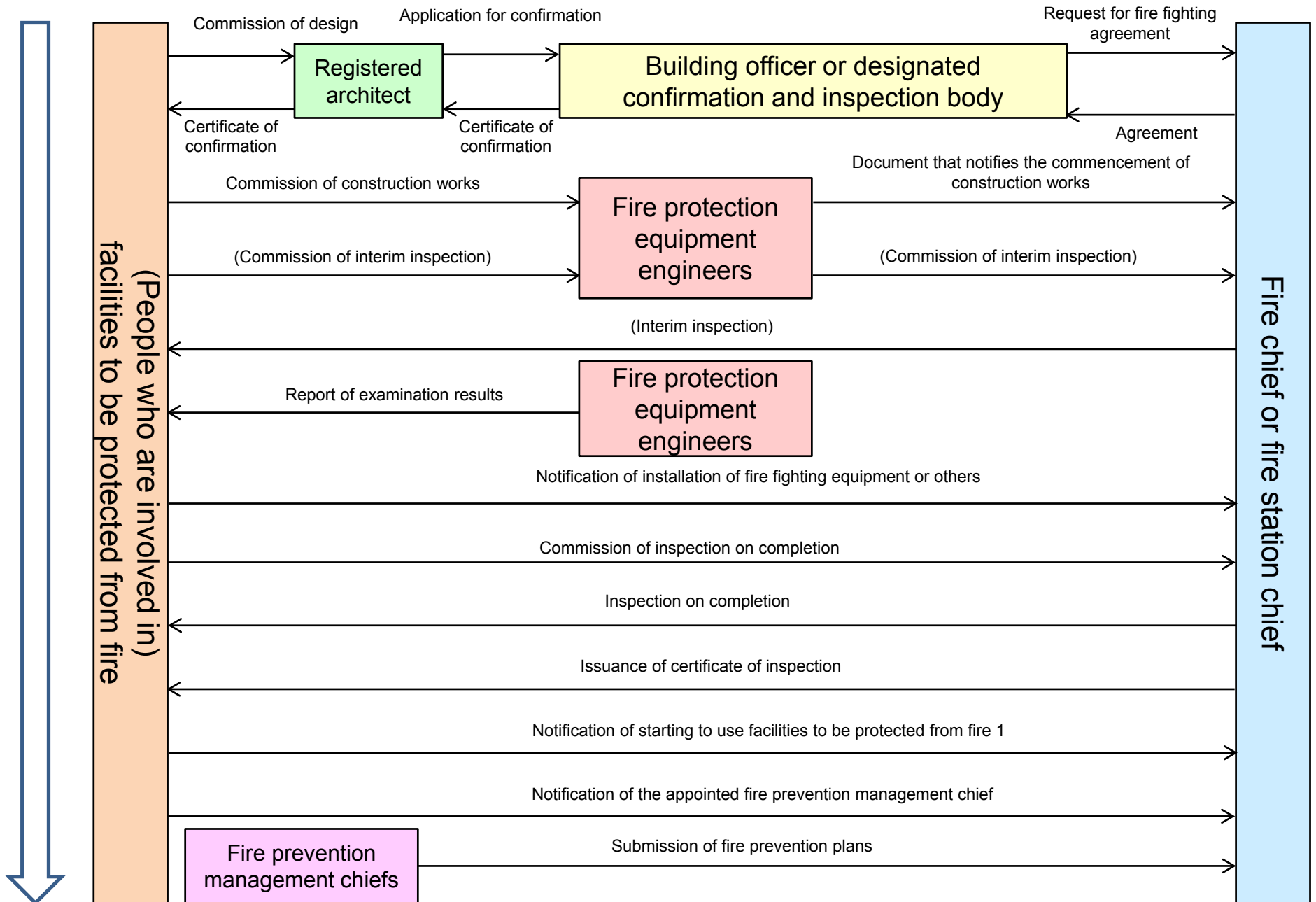


Sprinkler heads

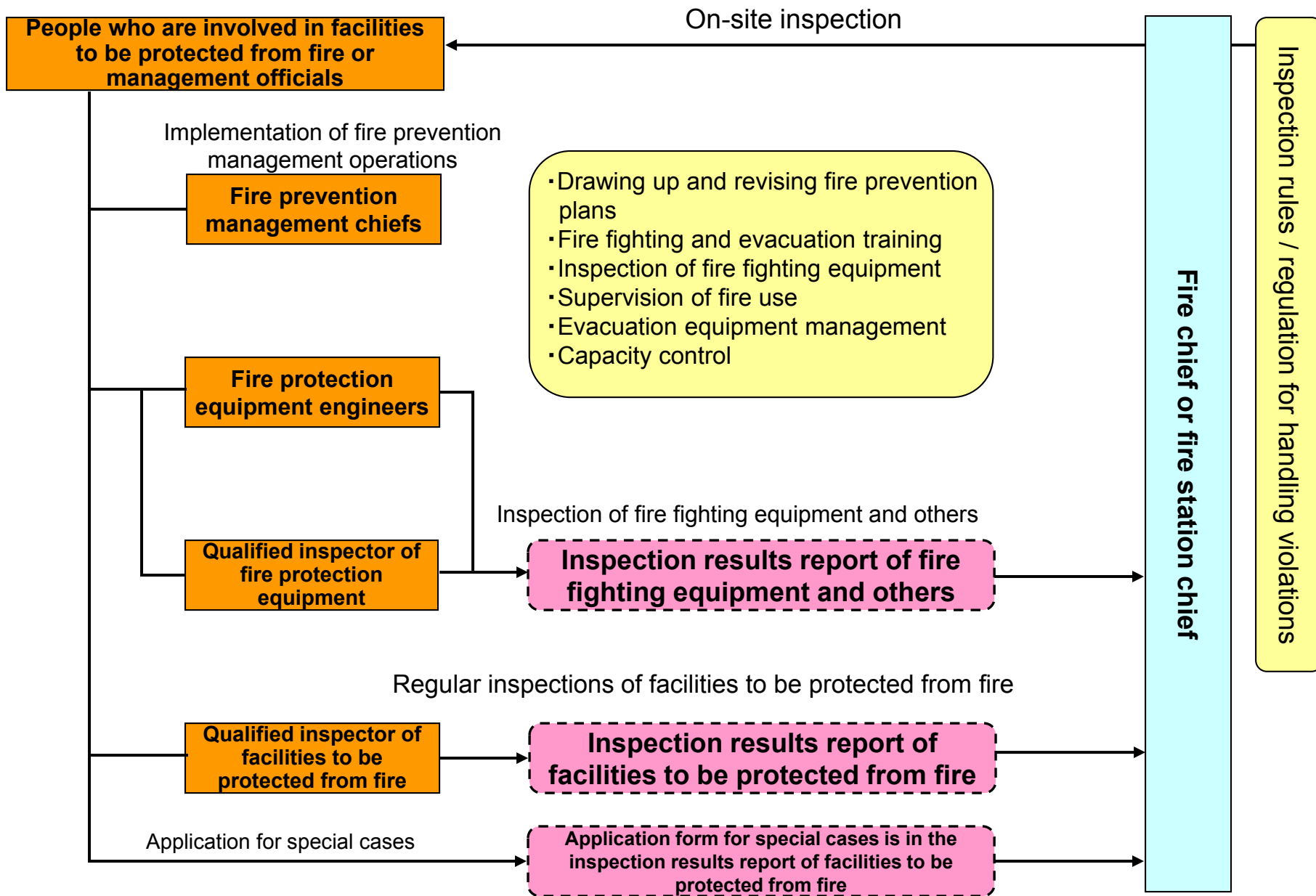


Reference

Confirmation System before Starting to Use Facilities to Be Protected from Fire



* Facilities to be protected from fire include schools, hospital, factories, department stores, office buildings, and condominiums.

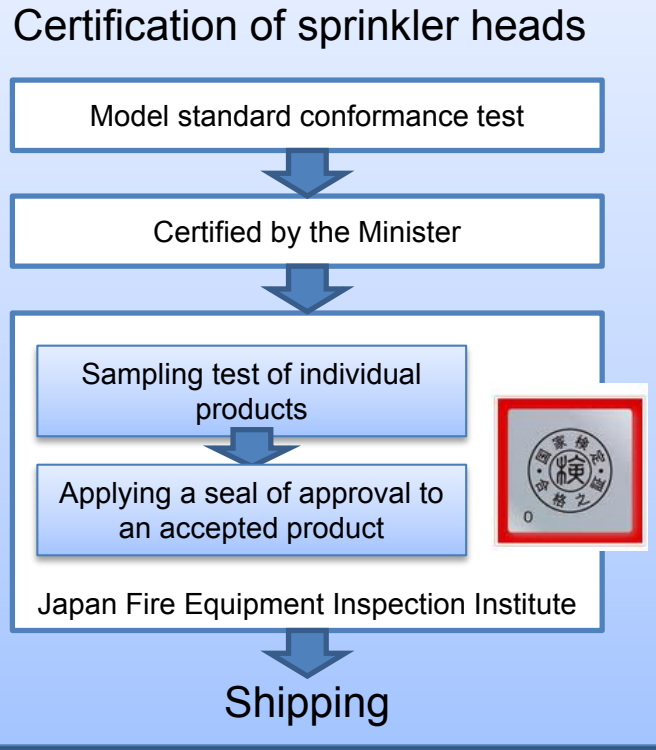


<Examples of Fire Fighting Equipment Installation Standards (1)> Sprinkler System Installation Standards

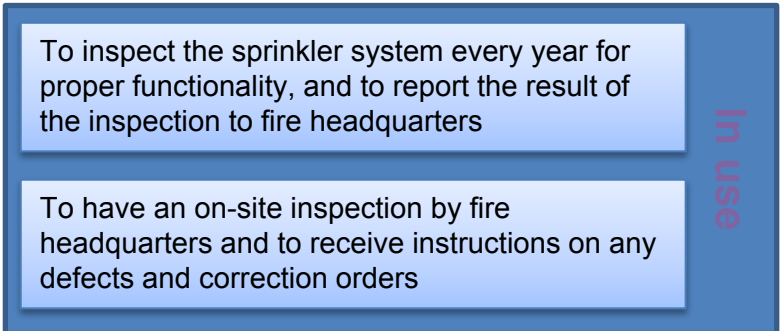
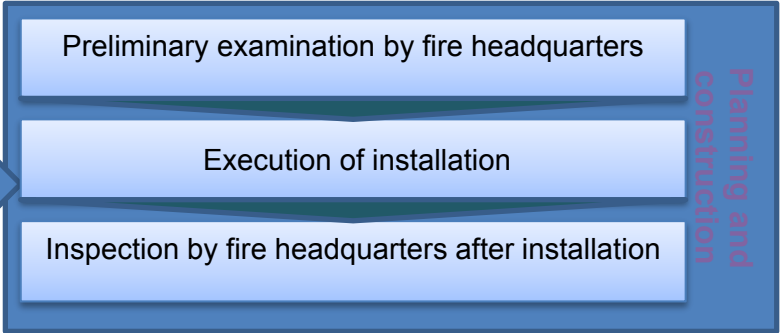


- Sprinkler head standards (extract)**
- To operate within the prescribed time at an air current temp. of 135°C, and an air current speed of 1.8 m/s
 - To uniformly gain a water sprinkling distribution of 0.2 L/min/cm²
 - Other standards include strength, corrosion, oscillation, and water hammer resistance

- Sprinkler system installation standards (extract)**
- Sprinkler heads in a fireproof building must be installed within a horizontal distance of 2.3 m or less in each part of the ceiling
 - Sprinkler systems must be capable of a water discharge pressure of 0.1MPa or more, and a water discharge amount of 80 L or more at the top of each head when multiple heads operate simultaneously
 - Other standards include installation height, emergency power sources, pumps, pipe laying, and water source standards



Obligation to use conforming products



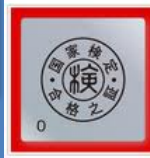
<Examples of Fire Fighting Equipment Installation Standards (2)> Automatic Fire Detection System Installation Standards



Detector standards (extract)

- To send a signal within the necessary operation time when placed in a vertical air current at a speed of 1 m/s at 125% of nominal operating temperature (example of a fixed temperature detector)
- Not to operate at a temperature 10°C lower than the nominal operating temperature
- Other standards include strength, corrosion, oscillation, and heat-resistance

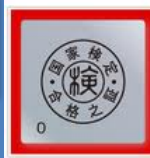
Certification (same as sprinkler heads)



Standards of a receiver (abstract)

- To have functions that automatically display the cautionary zone of a fire and sounds an alarm when receiving a fire signal
- To display the cautionary zone within five seconds from starting receiving a fire signal
- Other standards include strength, corrosion, oscillation, and heat-resistance

Certification (same as sprinkler heads)



Automatic fire detection system installation standards (extract)

- To install a detector in each guarded area (every 500 m²)
- To install the detector at least 0.6 m from walls or crossbeams to prevent malfunction
- When sounding a limited alarm on the floor that a fire breaks out or on the floor above, to sound an alarm to the whole building if the fire signal does not stop after a certain period of time
- Other standards include installation height, emergency power sources, pumps, pipe laying, standard of water source

Obligation to use conforming products

Preliminary examination by fire headquarters

Execution of installation

Inspection by fire headquarters after installation

Planning and construction

To inspect the sprinkler system every year for proper functionality, and to report the result of the inspection to fire headquarters

To have an on-site inspection by fire headquarters and to receive instructions on any defects and correction orders

In use

Installation Rate of Sprinkler Systems and Automatic Fire Detection Systems

Building	Sprinkler system				Automatic fire detection system			
	Standard (Note 1)	Required number	Installed number	Installation rate	Standard (Note 2)	Required number	Installed number	Installation rate
Intensive care home for the elderly, and others	In principle, all	31,534	31,415	99.6%	All	39,956	39,822	99.7%
Retailer	3,000 m ² or above	7,317	7,265	99.3%	300 m ² or above	87,704	85,983	98.0%
Hotel	6,000 m ² or above	1,989	1,980	99.5%	All	45,823	45,396	99.1%
Underground shopping mall	1,000 m ² or above	58	58	100%	300 m ² or above	62	62	100%
Total of all facilities		67,085	66,792	99.6%		554,149	541,392	97.7%

On-site Inspections, Handling Violations

- Number of facilities to be protected from fire:
about 4 million (as of March 31st, 2014)
- Number of on-site inspections by fire-fighting personnel
• • • 890,000 cases per year (FY2014)
- Number of correction orders
• • • 117 cases per year (FY2014)

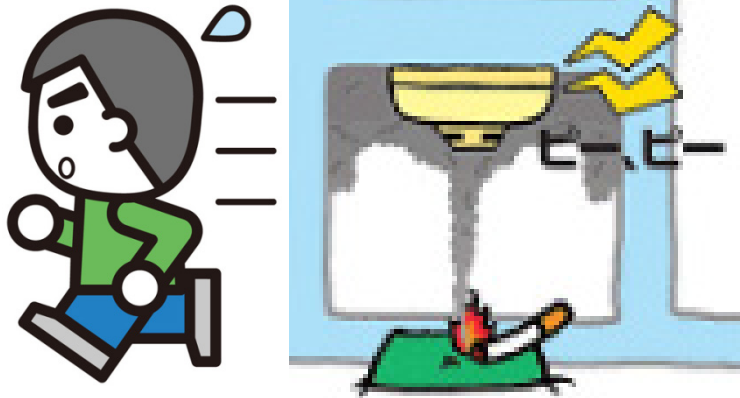
Mandatory Installation of Residential Fire Alarms

Trend in the number of fatalities due to residential fires

- The number of fatalities due to residential fires (excluding suicides) exceeded 1,000 in 2003, and reached 1,220 in 2005.
- Approximately 60% of those fatalities involved elderly persons aged 65 years or older, which will tend to increase reflecting the shift to an aging society. (Approximately 60% of fatalities were due to people who failed to escape from a fire.)

* Non residential buildings were already required to install fire alarms, but detached houses were not yet required to do so.

There are concerns over further increases with the shift to an aging society.

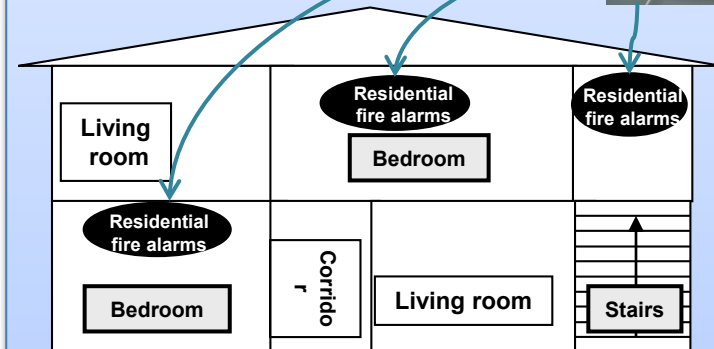


Revision of the Fire Services Act in 2004 required the installation of residential fire alarms in bedrooms and other areas of all houses.

Installation rate: Approximately 80% (As of June, 2014)



- Locations to be installed



With the spread of residential fire alarms, the number of fatalities due to residential fires has been decreasing. Homes with residential fire alarms also received added benefits in terms of a decrease in fatalities, fire-damaged area, and amount of damage, compared with those without a fire alarm.