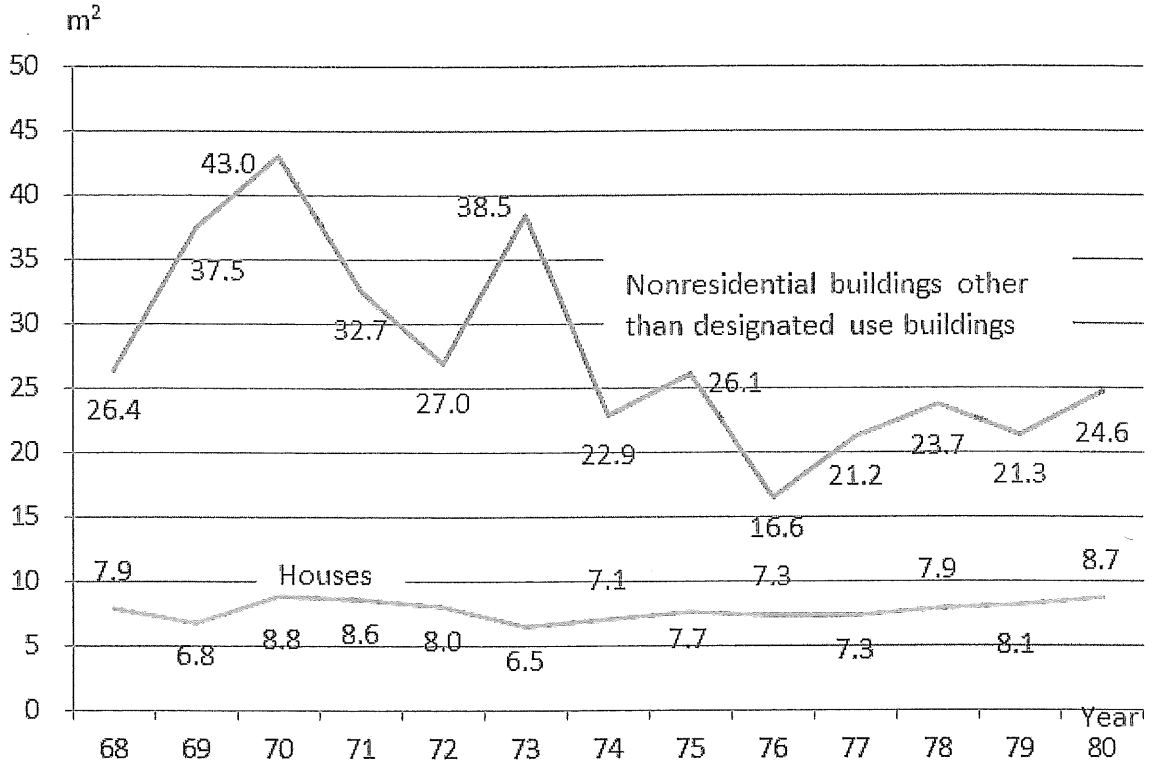


Figure 7-3 Average fire burned area in fire-resistive houses and nonresidential buildings other than designated use buildings (1968–80)

Overall, the graphs above indicate a high probability that the period of retroactive application of regulations pertaining to fire alarms was effective. They suggest differences between designated use buildings and other buildings, but this figure does not allow for ascertaining the difference in the effectiveness of retroactive application of regulations pertaining to equipment other than fire alarms.

5. DISCUSSION

5.1 Data Reliability

The Fire and Disaster Management Agency produces the Annual Fire Report using data according to the Instructions for Handling Fire Reports [r8] from fire investigations conducted by local fire departments, compiling it into an annual report. Not only might there be differences between individual fire officers and fire stations performing fire investigations, but the following items may also be factors that influence this study.

(1) Building classifications

The term "fire-resistive building" should be a classification applied to those buildings that meet the established standards or whose main structural components are fire-resistive, but as of 1970 there were many mixed-case structures where fire-resistive buildings were added as expansions to wooden buildings or fire-preventative structures.

This is for the following reasons:

1) There were no nationwide standards for buildings before the implementation of the Building Code in 1950.
2) After the Law was implemented, main structural components of buildings for specific uses or of a given floor space should be fire-resistive [r9], but the term "fire-resistive building" was not fully defined until 1959.
3) In 1951 there was de facto recognition of buildings partitioned in certain ways (e.g., using Class A fire doors or fire-resistive walls at the interface between wooden portions and fire-resistive structures) as wooden or fire-preventative structures to which fire-resistive structures had been added [r10].

Local fire departments could report the fire burned area of burnt mixed-structure buildings in any category of wooden structure, fire-preventative structure, or fire-resistive structure. As the fire burned area of a mixed-structure building is often large, such effects of classification cannot be ignored. For example, the total fire burned area for "fire-resistive" hotels was 8942 m^2 in 1968, but according to the data in "An Analysis and Evaluation of the Danger Posed by Fires: 112 Case Studies of Fires" [Note9] ("112 Case Studies of Fires," below), as shown in *Figure 8* the fire burned area of the Fukuzumi Inn and Shirakabako Hotel, which were classified as "fire-preventative, partially fire-resistive," was 732 m^2 (8.2%) and 1384 m^2 (15.5%), respectively, and that of the Ikenobo Mangetsujo Hotel, which was classified as "fire-resistive, partially wooden," was 6950 m^2 (77.7%). If these are classified as "fire-resistive buildings" in the Fire Report for that year, then they have an extremely large effect on average fire burned area, but at this point it is difficult to ascertain whether that was the case.

Note[9] "An Analysis and Evaluation of the Danger Posed by Fires: 112 Case Studies of Fires" (Tokyo Fire Department Administration Study Group, Zenkoku-Kajo-Horei Publishing, 1981) is a compilation of 112 case studies from inquiries made by the Tokyo Fire Prevention Council, Human Life Measures Subcommittee to evaluate the disaster prevention performance and develop plans to ensure the safety of human life. Cases were selected according to the following criteria: Events examined were domestic building fires occurring in 1932 and since 1952, mainly those classified according to the Order for Enforcement of the Fire Service Law Supplemental Table 1 as Item (4) (retail stores), Item (5)a (hotels), item (6)a (hospitals), or item (16)a (multipurpose buildings subject to fire prevention). Events are fires falling into one of the following categories:

1. Fires with fire burned area exceeding 1000 m^2
2. Fires with fire burned area between 500 m^2 and 1000 m^2, in which fatalities occurred
3. Fires with fire burned area under 500 m^2, in which at least three fatalities occurred
4. Fires with unusual routes of spreading
5. Fires with highly specific causes
6. Other fires that might help plan for fire prevention.

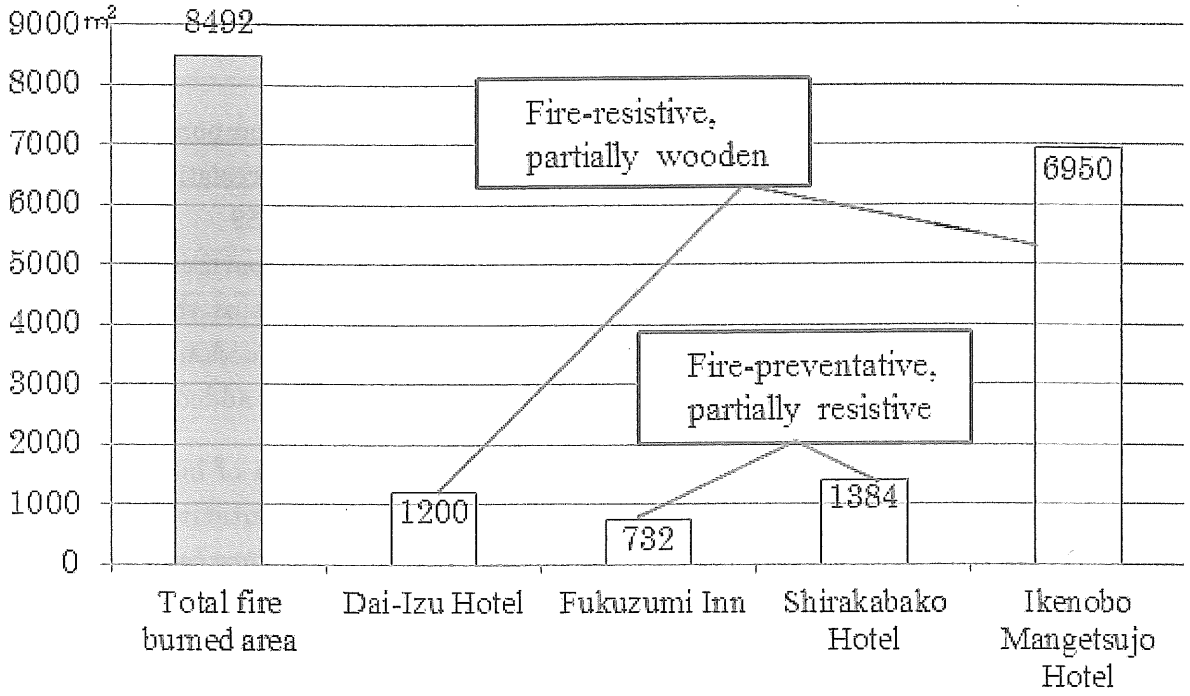


Figure 8 Comparison of total fire burned area in large hotel fires in 1968

Figure 9 shows data for fires at fire-resistive buildings and mixed-structure buildings that include fire-resistive components, extracted from the 1965–1980 data in "112 Case Studies of Fires." The figure shows that mixed-structure fires had a high share of the total from 1968–1969, but following that period the ratio dropped off.

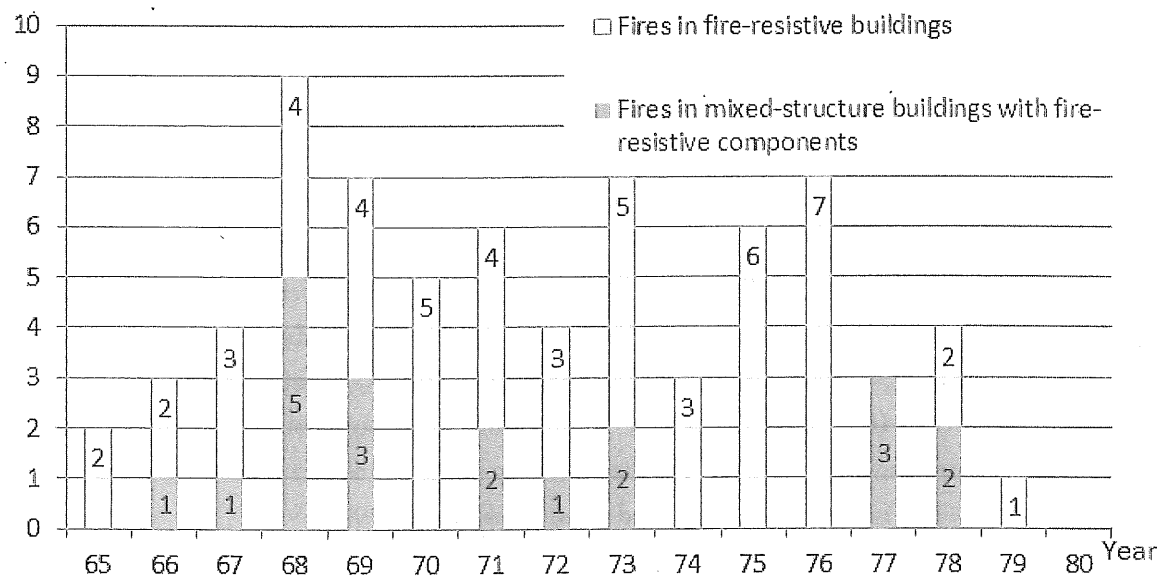


Figure 9 Fires in fire-resistive buildings and Fires in mixed-structure buildings with fire-resistive components

(Source: "112 Case Studies of Fires")

(2) Multipurpose building categories

Because there was no category in the "Damage by Building Fires by Source Building Usage and Construction" section of the 1968–1993 Annual Fire Report for buildings used for multiple usage categories (multipurpose buildings), the primary usage of fire source buildings is the basis for reporting, as if the fire occurred in a building of solely that type. According to Fire Code, multipurpose buildings are referred to as "multipurpose fire-preventative buildings," a term that was introduced in 1974 as a result of the Sennichi Department building fire [r11]. A precise definition and operational policy was clarified in 1975 [r12]. This means that there is a probability that data earlier than 1975 are slightly unreliable regarding the usage category of buildings for which fires were reported.

Meanwhile, *Table 4* presents the 1968–1980 data from "112 Case Studies of Fires" regarding fires in fire-resistive buildings or mixed-structure buildings with fire-resistive components, and many of these fires were extensive. When compiling fire reports, therefore, the manner in which these buildings are classified will have an extremely large effect on the average fire burned area by usage category, but it would be difficult to confirm this information now.

Table 4 Fires exceeding 100 m² in fire-resistive multipurpose buildings (1968–1980)

Year	Burned building	Fire burned area (m^2)
1968	Bronze Hall	1105
1969	Hayashi Building	740
	Kamata Cultural Center/Ito Yokado	1782
1970	Mito Central Building	10476
1971	Himeji International Hall	1844
1972	Sennichi Department Store	8763
1973	No. 6 Pole Star Building	285
1975	Ikebukuro Asahi Hall	811
	Shibuya Nanatenkai Building	592
1976	Sekine Building	505
	Imai Building	339
	Misawa Building (Rakuraku Bar)	256

(Source: "112 Case Studies of Fires")

5.2 *Differences in Trends of Average Fire Burned Area between Hotels and Hospitals*

While retroactive application of regulation for fire alarms significantly reduced the damage of fires in hotels, this is not the case for hospitals. One possible reason for this is differences in the percentage of locations where fire alarms were required to be installed.

Fire alarms in both hotels and hospitals were required mainly for locations with floor space of 300 m^2 or more. As of 1970 approximately 40% of hotels had fire alarms, while only 15% of hospitals did[Note10)], the gap being due to differences in the size of common medical facilities and accommodation facilities. In any case, a 40% adoption rate (the fraction of buildings conforming with the regulations for fire alarms in hotels) is not large enough to explain the sudden decrease in average fire burned area, so there must be some factor other than retroactive application of regulations.

5.3 *Ratios of Buildings with Fire Protection and Alarm Systems Installed*

Japanese regulations for installing fire protection and alarm systems depend on many factors, such as building usage, total floor space, number of floors, floor space per floor, floor usage, the size of windows, whether floors are underground, and how high they are [r13].

To investigate whether retroactive application of requirements for fire protection and alarm systems (fire alarms in particular) was a primary reason for the sudden reduction in average fire burned area, it would be advantageous to know the installation ratios of fire alarms and sprinklers by usage, as per Section 5.2. Obtaining this information is difficult, however. Fire Services White Papers provide information related to the number of installations [13] and buildings [14] with such equipment, but the building count is only for buildings with floor space of 150 m^2 or more, which creates significant deviations for counts of buildings of some usage types.

For example, *Table 5* shows the number of buildings by usage with floor space of 150 m^2 or more, the number of buildings in which fire alarms or sprinklers are installed, and floor space standards for installation.

Note[10)] Numbers for hotels were calculated as the ratio between the number of locations with total floor space of 150 m^2 or more (78,793 locations nationwide, 10,758 in the 10 largest cities) and the number of fire alarm installations in the 10 largest cities (5,928), the above data being taken from the 1976 Fire Services White Paper, and the total national number (109,338). Numbers for hospitals were calculated as the ratio between the number of locations with total floor space of 150 m^2 or more (45,495 locations nationwide, 10,173 in the 10 largest cities) and the number of fire alarm installations in the ten largest cities (3,975), the above data being taken from the 1976 Fire Services White Paper, and the total national number (113,973, from the 1976 Annual Report on Health and Welfare).

Table 5 Number of buildings by usage with floor space exceeding 150 m² and fire alarms or sprinklers (2011.3.31)

Usage		Buildings with total floor space of 150 m² or more	Buildings with fire alarms		Buildings with sprinklers	
			Floor space standards for installation (m²)	Number of buildings	Floor space standards for installation (m²)	Number of buildings
Designated use buildings	Theater, Auditorium, etc.	70,415	300	34,253	6,000	1,318
	Bar, Adult entertainment, etc.	15,998	300	13,865	6,000	670
	Restaurant, etc.	86,256	300	36,993	6,000	122
	Retail stores, etc.	149,347	300	85,945	3,000	6,846
	Hotel, Inn, etc.	63,864	300	48,554	6,000	1,990
	Hospital, Clinic, etc.	63,726	300	41,202	3,000	6,579
	Nursing home, etc.	32,299	all	30,707	275	21,014
	Day nursery, etc.	57,276	300	41,666	6,000	1,052
	Infant school	18,779	300	16,138	6,000	152
	Sauna, Steam bathhouse, etc.	1,669	200	1,532	6,000	19
	Underground mall, etc.	75	300	74	1,000	70
	Multipurpose buildings with designated use	355,800	300	171,803	3,000	12,729
Buildings other than designated use buildings	Apartment	1,224,743	500	No data published	No regulation	No data published
	School	129,703	500			
	Library, Museum, etc.	7,354	500			
	Public bath	5,658	500			
	Station	3,941	500			
	Temple, Shrine, etc.	54,706	500			
	Factory	508,750	1,000			
	Studio	401	500			
	Parking house, etc.	50,527	500			
	Warehouse	324,528	500			
	Office, etc.	437,776	1,000			
	Multipurpose buildings without designated use	239,557	500			
	National heritage buildings	8,703	all			
	Others	1,427				
Total		3,913,278		522,732		52,561

(Source: Fire Services White Paper 2012)

It is possible to obtain information about building counts by usage for those that require legal approval as in Section 5.2, but it is more difficult to obtain information about building counts where installation is not mandatory. Thus, calculating the percentage of buildings with fire protection and alarm systems installed for all usage types is difficult.

5.4 *Effects of Large Fires*

As shown in the data from "112 Case Studies of Fires," some fires were of sufficiently large scale for one case to affect that year's total fire burned area for the entire nation. *Figures 10* and *11* therefore respectively show total fire burned area data from the Annual Fire Report for fires in fire-resistive hotels and retail stores, but with fires from "112 Case Studies of Fires" with a fire burned area exceeding 500 m^2 omitted[Note11].

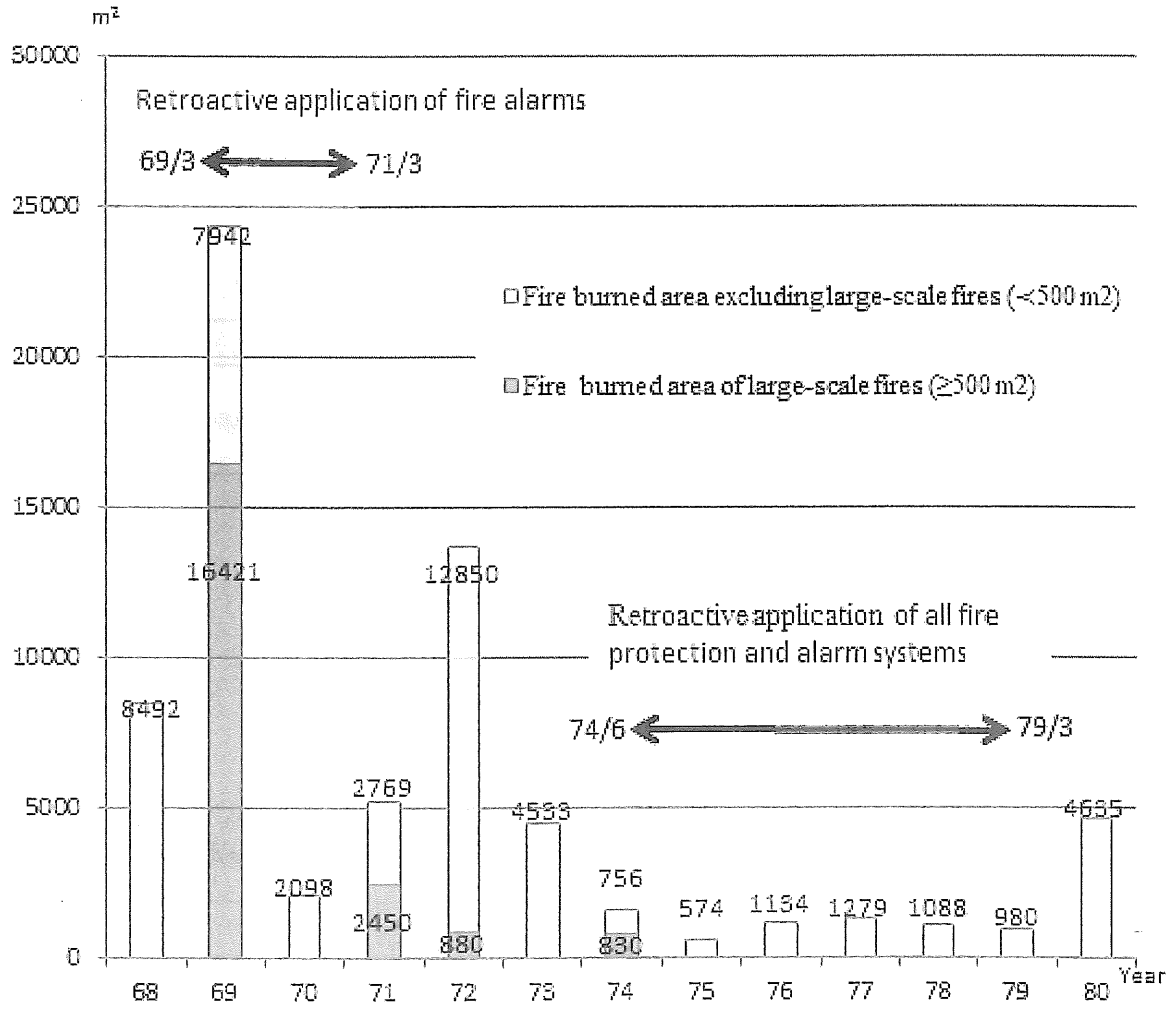


Figure 10 Fire burned area for hotels with fire-resistive construction, comparing fires with fire burned area less than 500 m^2 and those with more.
(Source: Annual Fire Report and "112 Case Studies of Fires")

Note11) According to the Annual Fire Report, the fire burned area in hotels that were fire-resistive buildings was 574 m^2 in 1975, but according to "112 Case Studies of Fires" the fire burned area of the Senjo Hotel in that year was 1501 m^2, alone exceeding the reported total. This discrepancy is likely due to some miscalculation; nonetheless, the Senjo Hotel fire was omitted from the calculation of large-scale fires.

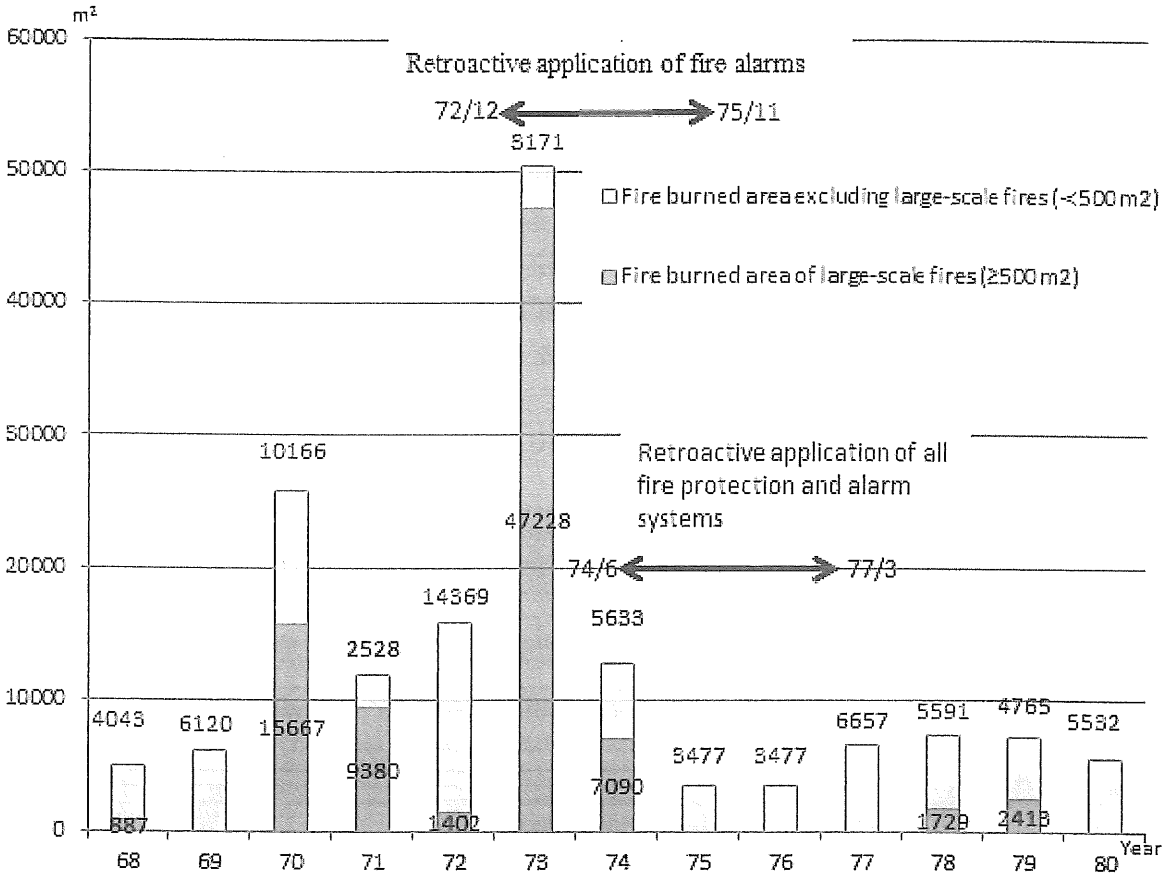


Figure 11 Fire burned area for retails stores with fire-resistive construction, comparing fires with fire burned area less than 500 m² and those with more.
(Source: Annual Fire Report and "112 Case Studies of Fires")

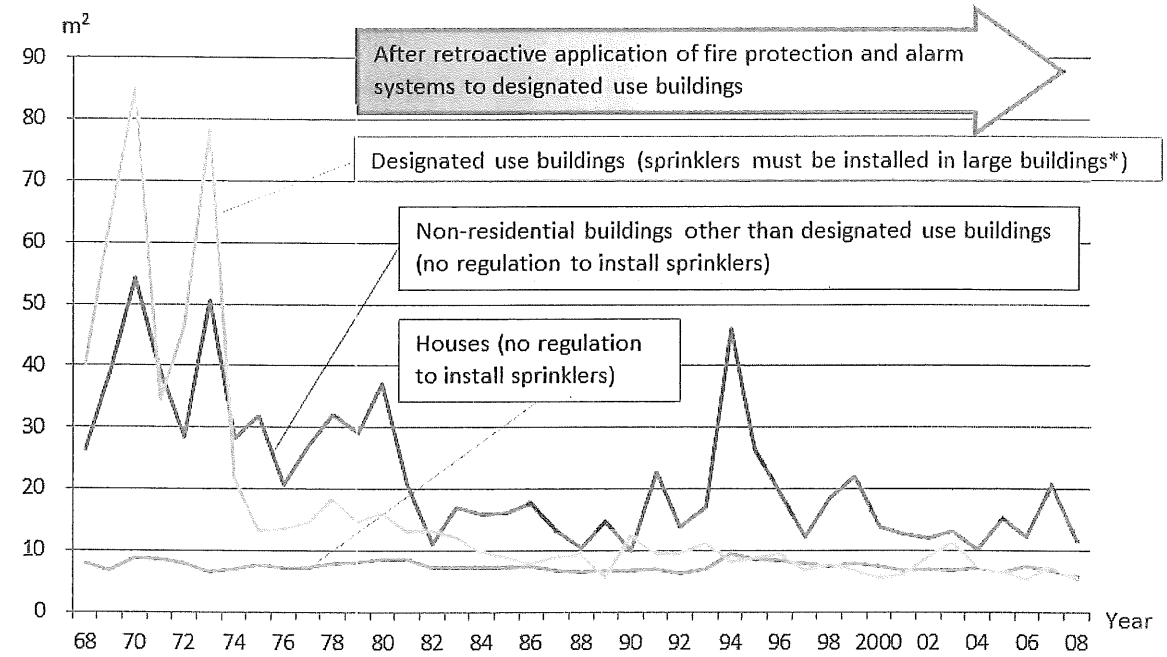
These graphs suggest that retroactive application of fire alarms had a significant effect on reducing large-scale fires, which in turn contributed to the rapid decline in average fire burned area.

Note, however, that except for the case of the 1973 Taiyo Department Store fire, each of the 5 hotels and 11 stores that experienced large-scale fires had fire alarms installed, so simply installing fire alarms is not a sufficient measure to prevent large-scale fires. Still, retroactive application of regulations requiring the installation of fire alarms in all hotels and retail stores with floor space exceeding 300 m^2 reduced the risk of large fires, and that in combination with other fire-prevention measures likely had the intended effect. Such considerations may be sufficient to explain the problem brought up in Section 5.2, how effects were attained even with a fire alarm installation rate of only 40% in hotels.

Retroactive application of regulations for installation of all fire protection and alarm systems in designated use buildings took place in 1979 (1977 for retail stores and multipurpose buildings), so from that point on all designated use buildings with floor space exceeding 6000 m^2 would have sprinklers, an extremely effective measure for reducing fire burned areas.

None of the 70 fire buildings described in "112 Case Studies of Fires" and occurring in 1968 or later had sprinklers installed, but there were 24 building fires from 1979 onward at locations that should have had sprinklers.

Figure 12 shows the average fire burned area by building usage for fire-resistive buildings from 1968 to 2008. This graph shows that the average fire burned area for nonresidential buildings other than designated use buildings was approximately the same as designated use buildings until around 1990, but following that the figure often increased. The main reason for them was several increases in the fire burned areas of schools, factories, warehouses, and the like, building types for which there was no requirement for installing sprinklers, regardless of size. This means that if the initial handling of fires is not performed appropriately, a large-scale fire could easily result.



* Large buildings: Total floor space ≥6000 m² (hospitals and retail stores, ≥3000 m²)

Figure 12 Average fire burned area in fire-resistive buildings by building use (1968–2008)

The above indicates that the rapid decline in average fire burned area in fire-resistive buildings seen from around 1970 to 1975 comes largely from sudden reduction of large-scale fires by the retroactive application of regulations for fire alarms, and from 1979 onward, further effects were seen due to retroactive application of regulations for sprinkler installations.

5.5 *Effects that Reduce the Scale of Individual Fires*

In addition to preventing large-scale fires, it is possible that amendments to fire-related rules and regulations had the additional effect of gradually reducing the overall scale of individual fires, thus contributing to a lowering of the average fire burned area. Further investigation of this possibility requires a consideration of the changes in average fire burned area for buildings other than designated use buildings.

(1) The effects of fire alarms

Since the 1960 amendments to the Fire Code, there have been nationwide, uniform requirements for fire alarms in buildings of a certain size or usage. Many buildings built before 1960, however, did not have fire alarms. The fraction of buildings conforming with the regulations of such systems gradually increased as new buildings were built and older buildings underwent extensive repairs or renovations. This is one possible reason why the average fire burned area for nonresidential buildings other than designated use buildings fell to less than one half the levels seen between 1970 and 1976 (*Figure 7-3*)

Most fire-resistive residential buildings are apartment buildings, for which alarm systems were required in buildings exceeding 500 m^2.[r14] At the time, fire departments could issue exemptions from rules requiring fire alarms in cases of apartments with floor space of 70 m^2 or less that featured fire-resistive construction, and had high-performance fire control features between units and in halls and stairways [r15]. As a result, most apartment buildings did not have fire alarms, and this may be why there was a trend toward reduced fire burned area in nonresidential buildings other than designated fire prevention buildings, but that trend was not seen in fire-resistive residential buildings (*Figure 7-3*).

(2) The effects of incombustible and flame retardant interior materials

The two areas of the Japanese Building Code that have a direct relationship with reducing fire burned areas are restrictions on interior materials and fire compartment. A number of revisions to regulations concerning interior materials were implemented between 1964 and 1974, as listed in *Table 6*.

Table 6 Increasing restrictions on interior materials in the Building Code (1964–1974)

Year enacted	Clause	Description
1964	Article 112, Item 5–Item 7	Set fire partition sizes on 11th floor or higher at 100 m^2 or less, with provision for expansion to 200 m^2 or 500 m^2 given sufficient fireproofing of interior materials.
	Article 120, Item 2, Item 3	Set fire partition sizes on 11th floor or higher at 100 m^2 or less, with provision for expansion to 200 m^2 or 500 m^2 given sufficient fireproofing of interior materials.
	Article 123, Item 3, Paragraph 2	Set out details related to the non-combustibility of interiors in special evacuation stairways and terminal rooms.
	Article 129, Item 4	Added restrictions on interiors of rooms and emergency routes in buildings exceeding 31 m in height.
1969	Article 128-4, Item 1, Paragraph 1	Expanded application of rules concerning interiors to hotels, hospitals, and apartments three stories or higher and with floor space of 300 m^2 or more.
	Article 129, Item 1, Item 2, Item 4	Strengthened law, excluding flame retardant materials from the hallways and stairs of special buildings and high-rise buildings.
1971	Article 111; Article 116-2; Article 128-3-2; Article 144-4	Established definition of "windowless room" and calculation methods to strengthen laws by adding requirements for fire-resistive construction of main structural components that compartmentalize rooms (Article 111); require smoke control systems (Article 116-2), and places limits on interiors (Article 128-3-2).
	Article 128-3-2 through Article 129	Strengthened restrictions on special building interiors, etc.
1974	Article 129	Strengthened limits on interiors by requiring that ceiling finishes in high-rise special buildings be created from semi-noncombustible materials or better.

Restrictions on interior materials in Order for Enforcement of Building Code (article 129) were first regulated in 1959, and revised several times (*Table 6*). Therefore the effect of early revisions might be reflected in fire statistics.

Figure 13 shows manufacturing volumes of gypsum board, one of the primary materials used for building interiors now. The graph shows that gypsum board production volumes increased approximately two and half a times between 1964 and 1974, seemingly in sync with increased restrictions on interior materials. Supposing that increasingly tighter restrictions on interior materials was a factor in the rapid increase in gypsum board production volumes, this might be an explanation for why the fire burned area of buildings to which fire protection and alarm systems standards were not retroactively applied nonetheless fell between 1970 and 1976 to less than one half of previous values. However, an inconsistent observation is that a considerable amount of the gypsum board manufactured at the time would have been used in houses, yet there is no visible trend toward reduced average fire burned area in fire-resistive residential buildings.

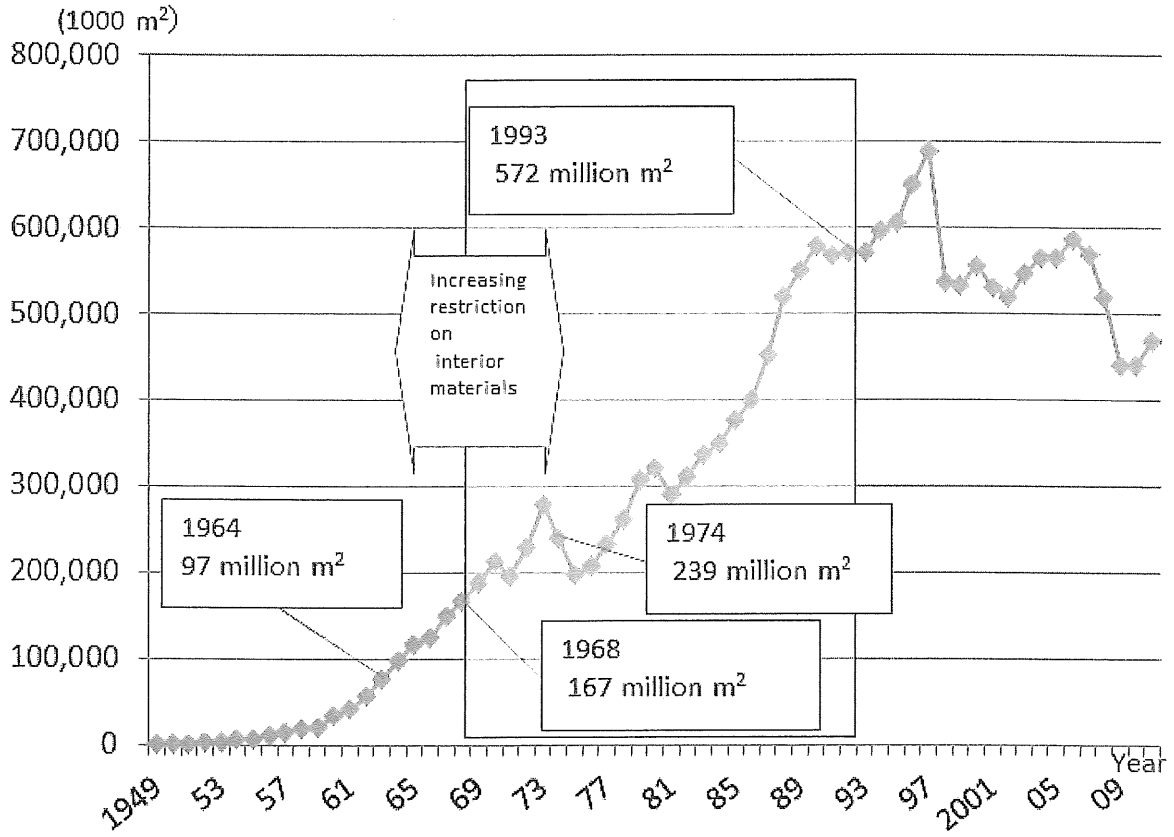


Figure 13 Gypsum board production volume
(Source: Gypsum Board Manufacturer's Association home page)

6. CONCLUSIONS

This paper presented the causes for the sudden decrease in fire damage to large buildings from about 1970 to 1980 by comparing fire statistics with the content of revisions to fire regulations and retroactive application to existing buildings.

The results of this study are summarized as follows:

1) Retroactive application of regulations resulted in the installation of fire alarms in all designated use buildings of a certain size, which in turn lowered the risk of large-scale fires. Therefore the number of incidences of large-scale fires rapidly fell, perhaps due in part to synergistic effects with other fire prevention measures.
2) Retroactive application of regulations pertaining to sprinklers played a major role in preventing large-scale fires from 1979 and beyond, but was not related to the rapid decline in average fire burned area seen between 1970 and 1975.
3) Even in buildings that were not the target of retroactive application of regulations pertaining to fire protection and alarm systems, the application of regulations related to the installation of fire alarms and restrictions on interiors to increasingly many buildings, along with increasing widespread use of gypsum board, played a role in reducing fire burned areas.

4) While there is a possibility that other fire regulations, such as requirements for fire compartments and indoor fire hydrants, have played a role in reducing average fire burned area, such effects were not identified.

APPENDIX 1

Main Revision of Order for Enforcement of the Building Code pertaining to fire prevention and safety (1964–1974)

Measures	Year of enactment	Amendment (as per amended document)	Description
Fire compartment	1964	Article 112, Item 5–Item 7	Set fire compartments in buildings over 10 stories at 100 m^2 or less, with allowances for 200 or 500 m^2 compartments with non-flammable interiors
	1969	Article 112, Item 9	Newly established pit compartment
	1969	Article 112, Item 13; Article 113, Item 1, Paragraph 4	Set requirements for automatic closing of fire compartment fire doors during emergencies, etc.
	1974	Article 112, Item 14	Newly established requirements for fire doors that remain shut between fire compartments, and furthermore required that fire doors used in pit compartments and compartments for other purposes be of a type that remains closed, or has a smoke detection system with smoke blockage features that activate upon detection of smoke
Restrictions on interior materials	1964	Article 129, Item 4	Placed limits on interior of evacuation routes and occupied rooms in buildings exceeding 31 m in height
	1969	Article 128-4, Item 1, Paragraph 1	Expanded application of regulations for interiors to hotels, hospitals, and apartments exceeding 2 stories and 300 m^2
	1971	Article 128-3-2 though Article 129	Strengthened restrictions on interior decoration for special buildings, etc.
	1974	Article 129	Strengthened restrictions on interiors by requiring finishing of ceilings in special high-rise buildings to be at least semi-noncombustible
Evacuation facilities	1964	Article 120, Item 2, Item 3	For 15th floors and above, set permissible walking distances to direct access stairs according to the amount of non-flammable material used in occupied rooms
	1969	Article 121, Item 3	Set requirements for dual-directional evacuation when 2 or more direct stairways are available
	1971	Article 126-2; Article 126-3	Established new standards pertaining to the installation and construction of smoke control systems
Facilities for fire-fighters	1971	Article 129-13-2 though Article 129-13-3	Established new standards pertaining to the installation and construction of emergency elevators

APPENDIX 2

Main revision of Fire Code and Order for Enforcement (1964–1974)

Measures	Year of enactment	Amendment (as per amended document)		Description
		Fire Code	Order for Enforcement	
Sprinkler systems	1964		Article 12	Set forth requirements for sprinkler systems to be installed on the floor 11 and higher of special-purpose buildings, and established installation standards (However, sprinklers are not required if smaller (100-500 m^2) fire compartment is employed.)
	1972		Article 12, Item 1, Paragraph 2	Expands requirements for sprinkler system installation to special fire prevention buildings with over 6000 m^2 total floor space (previous requirements for department stores were for 9000 m^2 for stores with 4 floors or less, 6000 m^2 for those with 5 floors or more)
			Article 12, Item 1, Paragraph 5	Requires the installation of sprinkler systems in multipurpose buildings that contain special fire prevention designated usage with total floor space over 3000 m^2 on the floor that contains the section in question
			Article 12, Item 1, Paragraph 6	Expands (for theaters, restaurants, special bathing facilities, and multipurpose units) and strengthens (for restaurants, hotels, and hospitals, etc.) requirements for sprinkler systems in basements, windowless floors, and 4th–10th floors with floor space of 100–1500 m^2
	1974		Article 12, Item 1, Paragraph 2	Addition of requirement for sprinkler systems in the 10th and lower floor of 11 story and higher buildings that are subject to specific fire protection
			Article 12, Item 1, Paragraph 5	Requirement of sprinkler systems for underground malls with 1000 m^2 or greater total area
Emergency alarm systems	1969		Article 24	Strengthened installation and equipment standards for emergency alarm systems in large buildings (hotels and hospitals with capacity exceeding 300 persons, or other building usage types that might pose risk)
	1972		Article24	Expanded the scope of requirements for installing emergency alarm systems in department stores, and expanded the scope of emergency alarms for installation in inns, hotels, hospitals, special bathing facilities, and multipurpose buildings.

Retroactive application	1966		Article 34, Paragraph 2	Added fire alarms to the list of equipment for which retroactive application is required in buildings of cultural significance
	1969		Article 34, Paragraph 2	Added inns, hotels, and hospitals as buildings requiring retroactive application of standards for alarm systems
	1972		Article 34, Paragraph 2	Expands retroactive application of requirements for alarm systems from "inns, hotels, and hospitals" to "buildings with uses that could result in extensive loss of human life in the event of a fire" (buildings subject to specific fire protection)
	1974	Article 17-2, Item 2, Paragraph 4; Article 17-3, Item 2, Paragraph 4		Retroactive application of technical standards for installation and maintenance of fire prevention equipment in buildings subject to specific fire protection
Others	1964		Article 26, Item 1	Set requirements for guidance lamps and signage in buildings exceeding 10 floors
			Article 27, Item 1	Required water supply for firefighting in large buildings exceeding 31 m
			Article 29	Established and strengthened requirements for coupled water system pipes and pressurized delivery in buildings exceeding 70 m in height
			Article 29-2	Required installation of emergency power outlets in buildings exceeding 10 floors
	1968	Article8-1		Expanded the role of fire prevention managers
		Article8-2		Established a system for joint fire protection management
		Article8-3		Established regulations about flame retardant
	1972		Article 1, Item 1	Expanded the target for application of fire prevention management systems for buildings subject to specific fire protection from places holding over 50 people to those holding over 30 people for department stores, underground malls, multipurpose buildings, inns, hospitals, and other locations that pose a risk for extensive loss of life in the event of a fire.
			Article 3	Strengthening qualifications and responsibilities of fire prevention manager
			Article 28-2	Required installation of and sets technical standards for consolidated sprinkler systems in buildings with a 700 m^2 or larger basement.
	1974	Article 17-3-2		System for inspection of fire prevention equipment by fire chief at time of installation
		Article 17-3-3		System for periodic inspection of fire prevention equipment by licensed inspector, and system for notification to fire chief
			Article 9-2	Comprehensive regulation of sprinkler systems, fire alarms, and emergency alarm systems for buildings with basements forming part of an underground mall
			Article 29-3	Requirements for installing wireless communications antennas in underground malls exceeding 1000 m^2 floor space

APPENDIX 3

Comparison of usage categories between Annual Fire Report usage classifications and classification by the Order for Enforcement of the Fire Code, Supplemental *Table 1*

Annual Fire Report usage classifications		Classification by the Order for Enforcement of the Fire Code, Supplemental Table 1	Annual Fire Report usage classifications		Classification by the Order for Enforcement of the Fire Code, Supplemental Table 1
Buildings subject to specific fire protection	Restaurants	Item (3)	Buildings not subject to specific fire protection	Factories or assembly plants	Item (12)a
	Department stores, markets	Item (4)		Warehouses	Item (14)
	Other stores	Item (4)		Garages	Item (13)a
	Inns, hotels, and lodging places	Item (5)a		Livestock pens	Item (15)
	Live theaters, movie theaters, and other entertainment venues	Item (1)a		Schools	Item (7)
	Hospitals and clinics	Item (6)a		Government offices	Item (15)
	Social welfare facilities	Item (6)b		Shrines, temples, and churches	Item (11)
	Dwellings	No category for houses; apartments classified as Item (5)b		Bathing facilities	Item (9)b
				Other special buildings	No category
				Associated buildings	No category
	Offices	Item (15)		Unknown/other	No category

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