

Building Name Address	Use (as per FSA Annexed Table 1)	Date and Time of Incident	Structure and Stories Area	Extent of Damage (Damaged Area/ Total Area)	No. of Casualties
Taiyo Department Store 1-3-10 Shimotori, Kumamoto, KUMAMOTO	Department store (4)	Nov. 29, 1973	Fire resistive 9 stories above ground and 1 below	All, Half , Partial, Small	Fatalities 103
		Breakout at 13:15 (approx.) Noticed at 13:23 Notified by emergency call Extinguished by 21:19	Building area 2,170 m ² Total floor area 19,074 m ²	12,581 m ² (66%)	Injured 121 (15)

I. Summary of Fire Incident										
(1) Summary	The fire was one of the most catastrophic fire disasters in the history of building fires in Japan. Fire safety measures and management were neglected while the department store carried on business and new construction at the same time. This fire gave crucial momentum to the Construction Standard Law and the Fire Service Law pertaining to firefighting equipment such as sprinkler systems and to existing buildings that need retroactive adjustments from the aspect of fire safety.									
	(2) Conditions per Floor	Floor	Total area	Damaged area	Use (Purpose)	No. of persons	Fatalities	Fire escape equipment	Firefighting equipment	
PH4-1		450,492 m ²	450,492 m ²	Machine room	18	M= male F= female	7 sets of inside stairs (B1 floor to PH1, B1 to 7 th floor, B1 to 4 th floor, B1 to 1 st floor, 1st to 2 nd floors, 2 nd to 8 th floors, and 1st to 8 th floors)	Fire extinguishers Indoor fire hydrants Water pipe connections Emergency alarm system (PA system) * Refer to (5)		
9		504.9	504.9	Under construction (Culture center)	10					
8		1,100.773	1,110.777	Under construction (Office)	51	1(M)				
7		2,084.47	2,084.47	Restaurant, Event hall	257	29 (M8, F21)				
6		2,084.47	2,084.47	Furniture	69	31 (M10, F21)				
5		2,084.47	2,084.47	Sporting goods, Toys, Office supplies	114	1(M)				
4		2,109.46	2,162.7	Women's clothing	82					
3		2,162.7		Furniture, <i>Kimono</i>	103					
2		2,162.7		Men's clothing	137					
1		2,170.85		Household	137					
B1		2,159.158		Groceries	169					
Total		19,074.443	12,581.735		1,166	103				
(3) Origin of Fire		(Floor, Room, Part, Combustibles, Habitable/Non-habitable rooms, Present/Absent)							(A) Cause of Fire	Unknown
	From the 2nd-floor landing of the Stairs C Large amounts of combustible materials (bedding goods and clothing) were piled up on the steps in the stairwell.									

(5) Fire Propagation Path	(Location of Fire Source)	(Propagation from Source)	(Propagation to Adjacent Zones)	(Propagation to Other Floors)
	2nd-floor landing of Stairs C	Ignited combustible materials that were piled in the stairwell	Spread to bedding goods piled on the 3rd-floor landing of Stairs C	Spread to the top floor through unclosed fire doors and shutters in the stairwells and the escalators
	<p>The fire that emerged on the 2nd-floor landing of Stairs C ignited sales goods piled up on the steps and spread to bedding goods on the sales floor of the 3rd floor. Through the unclosed fire doors and shutters in the stairwell and the escalator, the fire further spread rapidly to the upper floors.</p> <p>On Stairs C, the shutter for the 6th floor and the side door for the 7th floor did not close, and therefore the fire propagated to the sales floors on the 6th and 7th floors. On Stairs D, the shutter closed partially on the 3rd floor, but did not close at all on the 4th floor; therefore, the fire spread from the sales floor of the 3rd floor to the 4th floor. On Stairs A, the shutters from the 4th to 7th floors did not close. On the escalator in the center of the floor, the shutter did not close on the 5th floor. Thus, through all these openings, the fire destroyed all the floors above the 3rd floor. Fire also propagated to the 9th floor directly from the pipe shaft in front of the kitchen on the 7th floor.</p>			
<ul style="list-style-type: none"> ○ Main Reasons for Propagation of the Fire <ul style="list-style-type: none"> ○ The fire spread quickly because of the large amounts of combustible sales goods placed in the stairwells and in front of and behind the fire shutters. ○ The fire propagated toward the center of the building through the openings of the stairwells and escalator because most of the fire doors and shutters remained open. ○ Smoke Propagation Path <p>Heavy smoke was produced in Stairs C and ascended rapidly up the stairwell to the 7th floor, descending to each floor gradually. Once the flames had reached the sales floor of the 3rd floor, the smoke ascended along the other stairwells and the escalator and propagated to each of the upper floors almost simultaneously.</p> 				
II. Summary of the Building				
(1) Built	Construction, Completion, and Major Renovations (Completion) July 1951 (Expansion) February 1956 (Under Construction) since November 1973			
	(2) Vertical Shafts		(3) Fire Prevention	
Fire Prevention Management	Stairwells [X]	Duct Spaces [X]	<ul style="list-style-type: none"> ○ A fire-prevention manager was appointed, and the paper work had been submitted to the local fire station, but the fire defense plan was not prepared nor was a fire drill held. ○ Store management was unconcerned about fire prevention. ○ The repeated warnings from the local fire station regarding maintenance of fire equipment were completely disregarded. ○ The building was windowless because most of the windows were boarded up. 	
	Elevators [X]	Pipe Shafts [X]		
	Escalators [X]	Other () []		
<ul style="list-style-type: none"> ○ The vertical shafts were protected by fire compartments, but most of the fire shutters for the stairwells and escalators did not close because of poor maintenance. Only 7 of 23 shutters closed properly. ○ Most of the side doors next to the fire shutters were locked for security reasons. 				
(4) Fire Compartments		(5) Firefighting Equipment		
There was no fire compartment for the sales floor for an area of 1,500 m ² .		<ul style="list-style-type: none"> ○ The firefighting equipment, including an automatic fire detection system, sprinkler system, escape equipment, and guiding lights, were nonfunctional because these were being installed at the time. ○ The store had a PA system; however, no-one utilized it because no-one was able to get "permission" to use it from the supervisor. 		

(5) Evacuation	Means of Escape (No. of Persons)	Obstacles to Evacuation
	<ul style="list-style-type: none"> ◦ Stairs [X] () ◦ Elevators/Escalators [] () ◦ Escape equipment [] () ◦ Directly to ground from windows or openings [] () ◦ Rescued [X] () ◦ Other () [] () 	<ul style="list-style-type: none"> ◦ No windows [X] (boarded up) ◦ Barred openings [] ◦ Locked emergency doors (Exits) [] ◦ Alarm system [X] (Poorly controlled, Malfunctioned, Not installed) ◦ Power outage [X] ◦ Other []
<p>The department store was not completely crowded, but most of the people inside the building did not become aware of the fire until they saw smoke or heard a disturbance because the automatic fire detection system was not functioning due to the construction being undertaken and there was no emergency announcement via the PA system.</p> <p>Refer to Section 1 of the Attachment for the details of the evacuation and rescue activities on each floor.</p>		
(6) Causalities	Healthy individuals 103 (Drunk persons) Individuals in need of assistance Infants Elderly Handicapped Patients/ill persons	Obstacles to Evacuation
		<ul style="list-style-type: none"> ◦ No windows [X] (boarded up) ◦ Barred openings [] ◦ Locked emergency doors (Exits) [] ◦ Alarm system [X] (Poorly controlled, Malfunctioned, Not installed) ◦ Power outage [X] ◦ Other []
<p>This fire resulted in 103 fatalities. With the exception of a few people, most died of carbon monoxide poisoning or lack of oxygen that lead to suffocation. The chemical fiber combustion produced a large amount of black smoke, which caused poor visibility. Customers were trapped while looking for an exit without any help from the store employees. There were no guiding lights or emergency lights. Moreover, most of the windows were boarded up.</p> <p>Refer to Section 2 of the Attachment for the location of the fatalities and the analysis.</p>		
IV. Issues and Lessons Learned		
Refer to Section 3 of the Attachment.		

Attachment

1. Details of the evacuation and rescue operations on each floor

[3rd floor]

- ① Approximately 10 employees used the escalator to descend to the 2nd floor and then ran down Stairs A to the 1st floor.
- ② With the employees' assistance, 56 persons (customers and employees) ran down Stairs A.
- ③ Via Stairs B, 4 employees who helped in the initial firefighting activities and 3 telephone operators evacuated.

[4th floor]

- ① From Stairs B, 23 employees evacuated.
- ② The construction workers rescued 15 people by knocking out a window in the bathroom and the north-side door on Stairs B that led to the construction site.
- ③ The electricians rescued a few people by knocking down a door (plywood) in the north-east corner of the floor.

[5th floor]

- ① Through the north-side door on Stairs B, approximately 22 employees evacuated to the construction site.
- ② Firefighters rescued a few individuals by knocking out the window of the employee bathroom, which was accessible from the landing of Stairs B.
- ③ A few employees and customers evacuated via a connecting corridor to another building.
- ④ From the window of the east-south corner, 2 employees jumped down to the arcade's roof, and 1 of them climbed down a plastic water hose that was thrown by someone.

[6th floor]

- ① Two employees descended via Stairs B to the 5th floor and then escaped to the construction site through the door on the north side of the floor.
- ② By breaking through the plywood on the north-side wall, 4 escalator workers escaped to the construction site, followed by 1 female employee.
- ③ From a window in the south-east corner, 1 person was rescued to the arcade roof by rope. Also through use of a rope, 4 people were rescued by a snorkel truck.

[7th floor]

- ① With help from the employees, 60 employees and 70 customers escaped to the roof from the stairs leading to the roof portion of the 8th floor.
- ② With the help of construction workers, approximately 10 customers escaped from Stairs A.
- ③ The construction workers rescued 1 person by knocking down the door for Stairs B.

[8th floor (Roof floor)]

- ① 67 persons were rescued by ladder truck.
- ② Using the construction scaffolding on the south side, 25 persons escaped.
- ③ Using a slow descending device, 6 people landed on the roof of the arcade and 2 people landed on the ground and were rescued.
- ④ 60 people were rescued to the construction site.

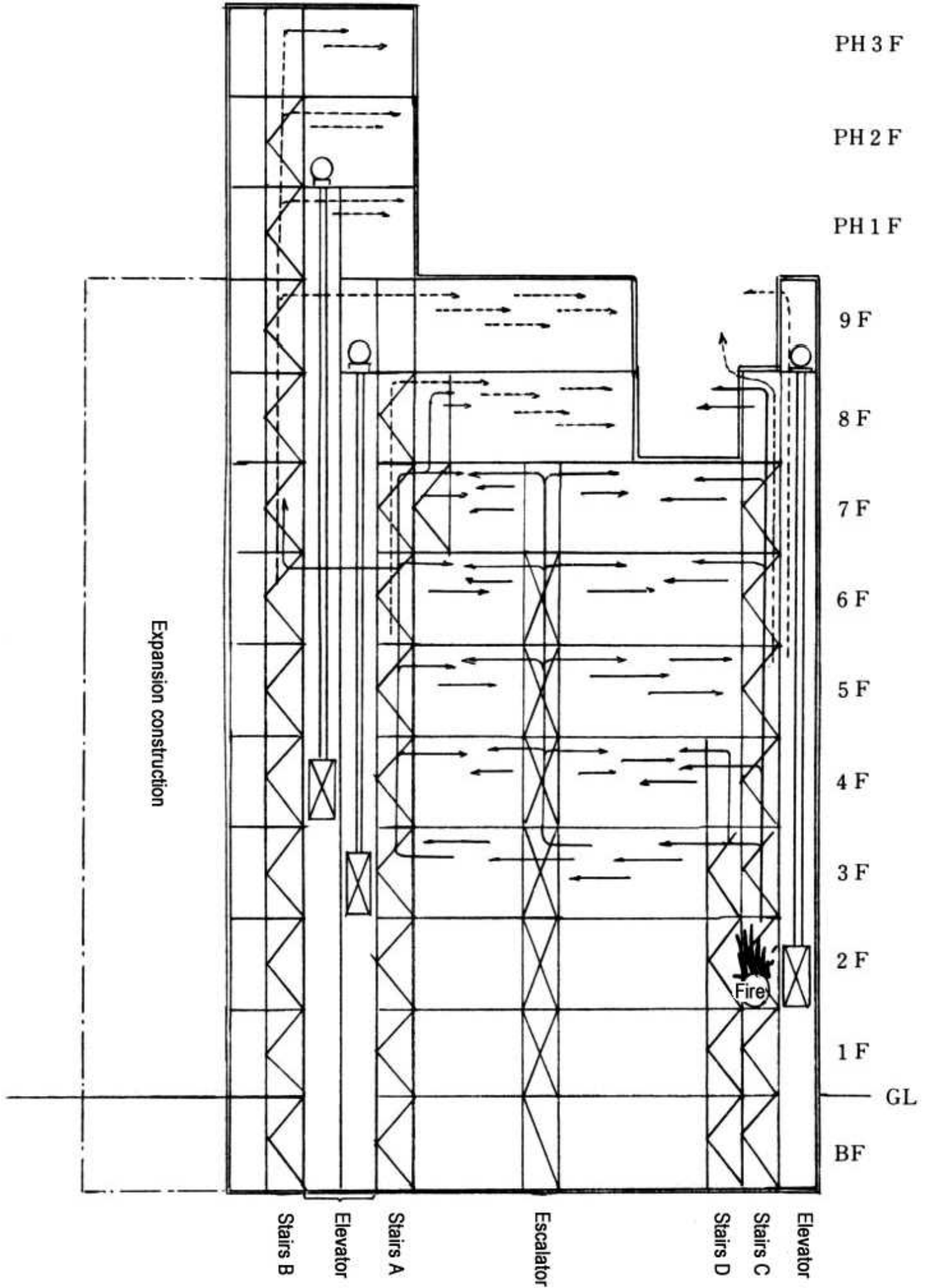
2. Location of the fatalities and probable circumstances

Floor (Total fatalities)	Customers	Employees	Construction workers	Gender		Location of the fatalities	Probable path and circumstances
				Male	Female		
8 Total		1		1		In between 7th to the roof floor of Stairs K	Probably 1 of the evacuees from the 6th floor who was the last person waiting to be rescued.
7 (29)		1	1	2		In between 7th and 8th floor on Stairs K	
	13	11		4	9	In front of Stairs A, 24 people collectively	Trapped (people who were originally on the 7th floor or ascended from other floors).
	1	1		2		Landing of Stairs A	Unable to find Stairs K and trapped while running away from the 7th and 4th floors.
		1			1	Entrance to Stairs B	Trapped while running away from the 6th floor.
Total	14	14	1	8	21		Trapped while running away from the special event (Hokkaido Exhibition) on the 7th floor.
6 (31)	21	4		7	4	25 collective fatalities in the east-south corner	Overcome by smoke and heat on Stairs A, C, and E. Trapped on Stairs A and C. Overcome by smoke and heat on Stairs A, C, and E.
	2	2		1	1	4 fatalities near the west-center wall to outside	
	1		1	1	2	2 fatalities near the south wall to outside	
Total	24	6	1	10	21		
5			1	1		In front of Stairs A	Trapped while running away from the 3rd floor.
4 (40)	8	21		3	18	29 people on Stairs B	Most of them were from the 4th floor and were overcome by heat and smoke. Overcome by heat and smoke in front of Stairs B. Trapped by the walls to the construction site.
	1	8		2	6	9 fatalities in front of Stairs B	
	1	1		2		Center and north-east side	
Total	10	30		9	31		
3		1		1		In front of Stairs B	People from the 3rd floor, trapped while running away toward the south-east corner.
Total 103	48	52	3	30	73		

3. IV. Issues and Lessons Learned

- (1) This fire occurred in a department store that holds an unspecified number of people and a large amount of combustible material that was on display, stored, and sold. In such an environment, a fire should be able to be contained in the incipient stage, otherwise many people will become victims of fast spreading fire and smoke.

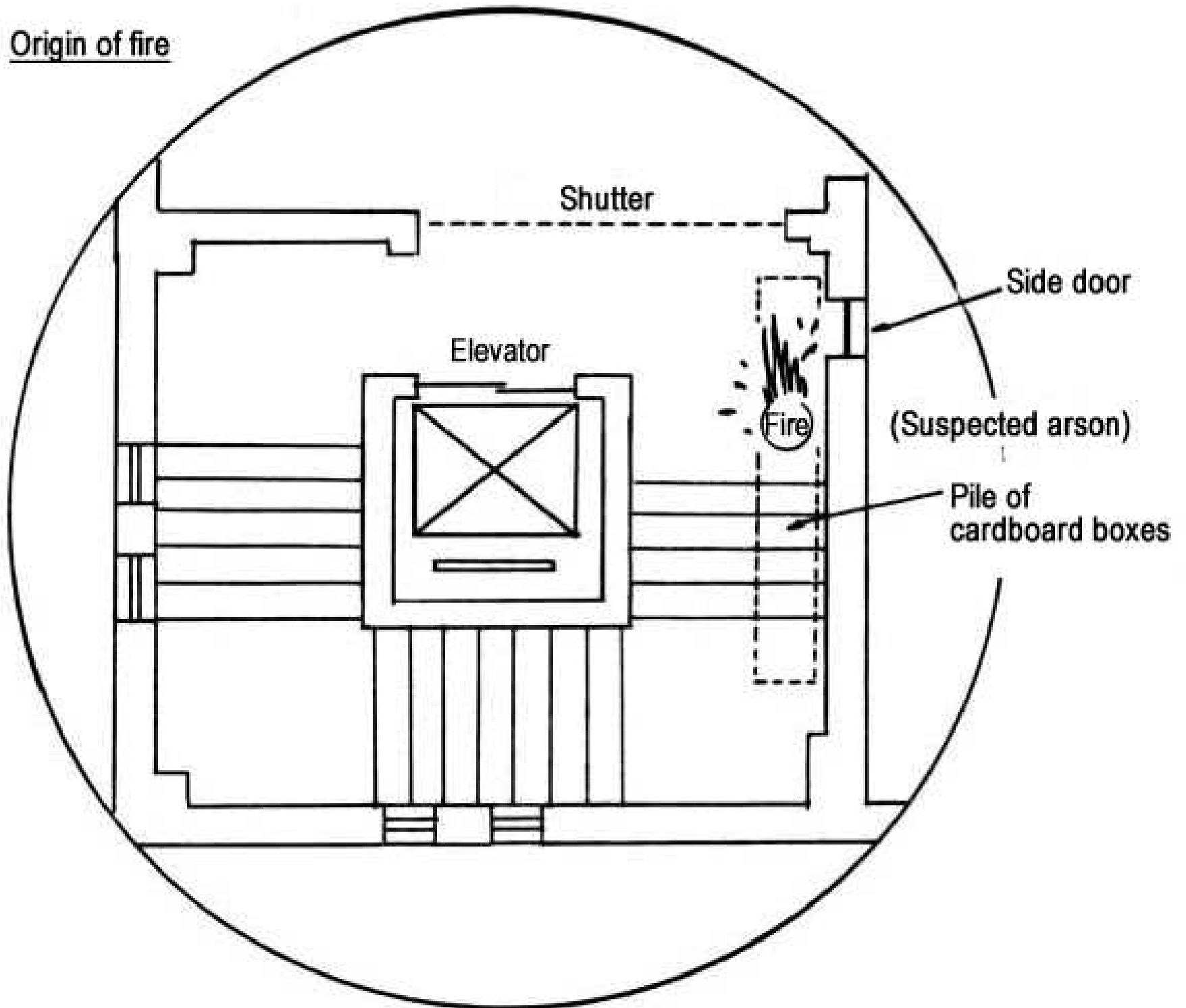
- (2) Even if a tall building were constructed with multiple stairs in easy-to-locate places, many people could die unless the stairs are equipped with a smokeproof system, because people will have to evacuate from the upper floors within a short period of time, otherwise pervasive smoke will ascend rapidly from the lower floors and make evacuation impossible.
- (3) No special escape stairs or outside stairs will be safe or effective if the doors are locked or blocked for maintenance or security reasons. Any stairs will be meaningless if a vertical duct that could become an ascending path for pervasive smoke runs along the escape route to the stairs or if the stairwell is next to a defective opening.
- (4) Notification of any fire should be conveyed immediately and accurately, especially to upper floors if it occurs on a lower floor, otherwise people will lose the chance to escape and be trapped by sudden smoke which creates chaos and leads to death.
- (5) The main cause of the great number of fatalities appears to be poor management that allowed the staircase to be a showcase for sales goods. In addition, the side doors next to the fire shutters on the fire escape stairs were locked and the shutters did not close because of objects placed under or near them. Given this case, store management should maintain necessary measures in a more safety-oriented manner so that the lives of people can be protected in case of an emergency.
- (6) A department store will be particularly vulnerable if any construction is carried out alongside normal business operations. This fire occurred while the fire preventive equipment was being renovated alongside expansion construction. At that time, the safest outside stairs were removed and the remaining passage was blocked by a stack of combustible goods, which allowed the fire to propagate faster, making evacuation difficult.

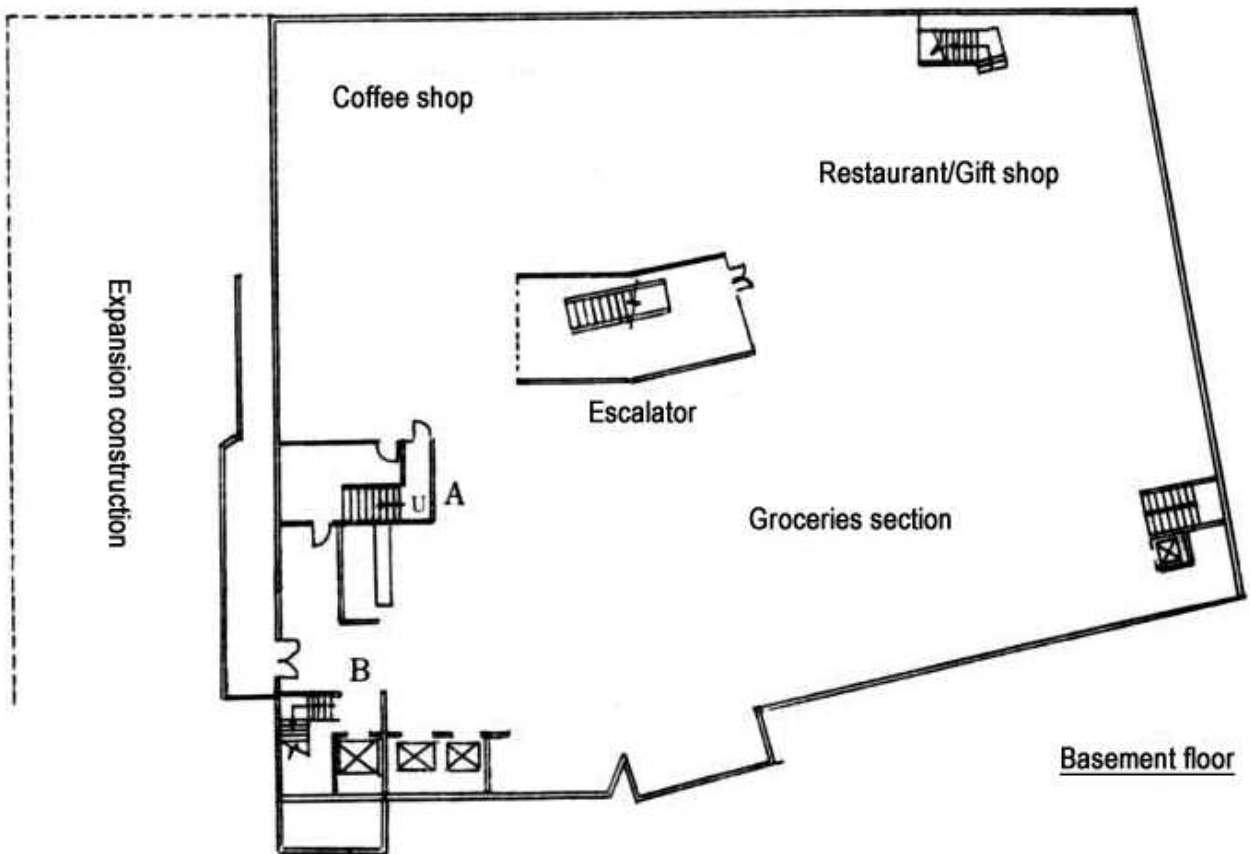
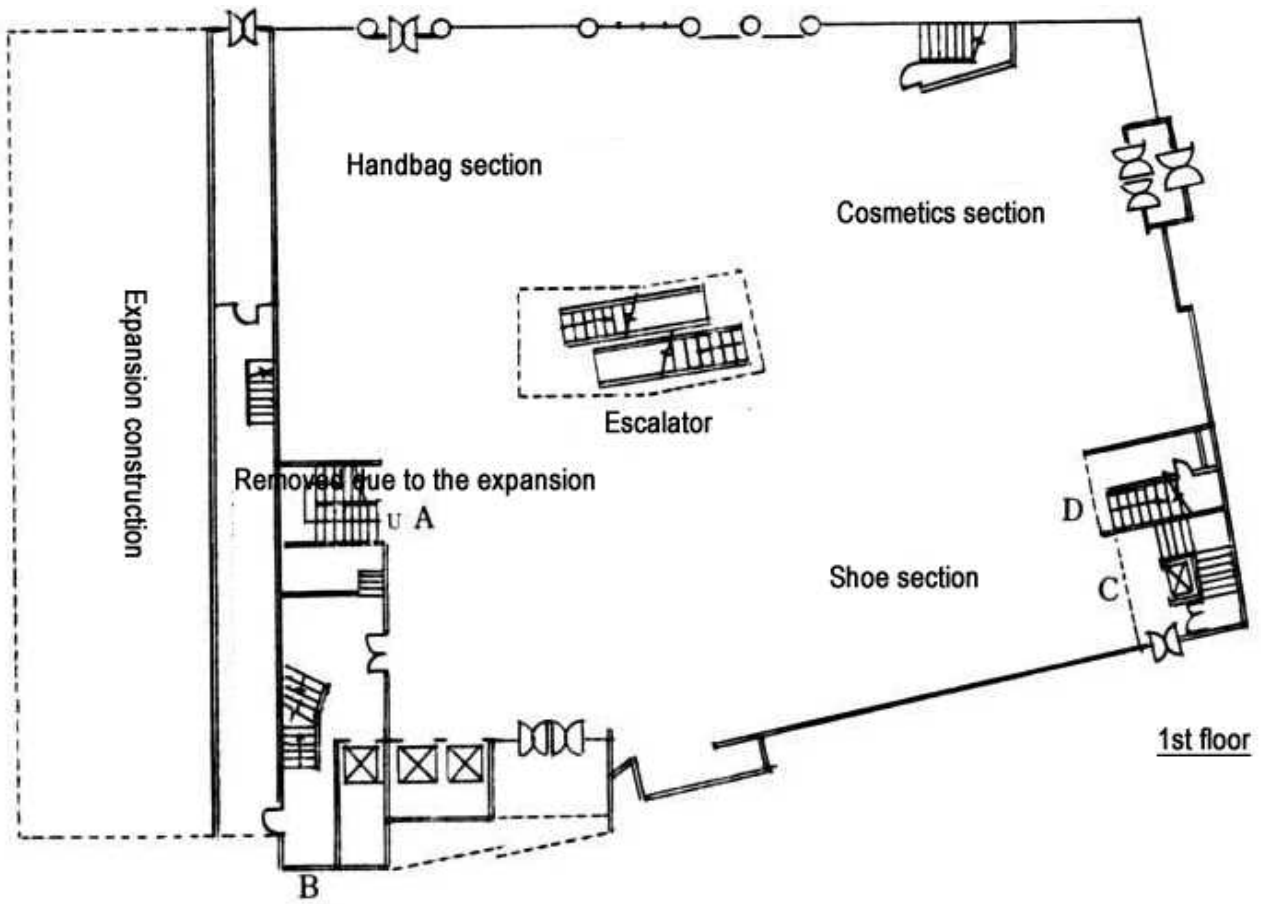


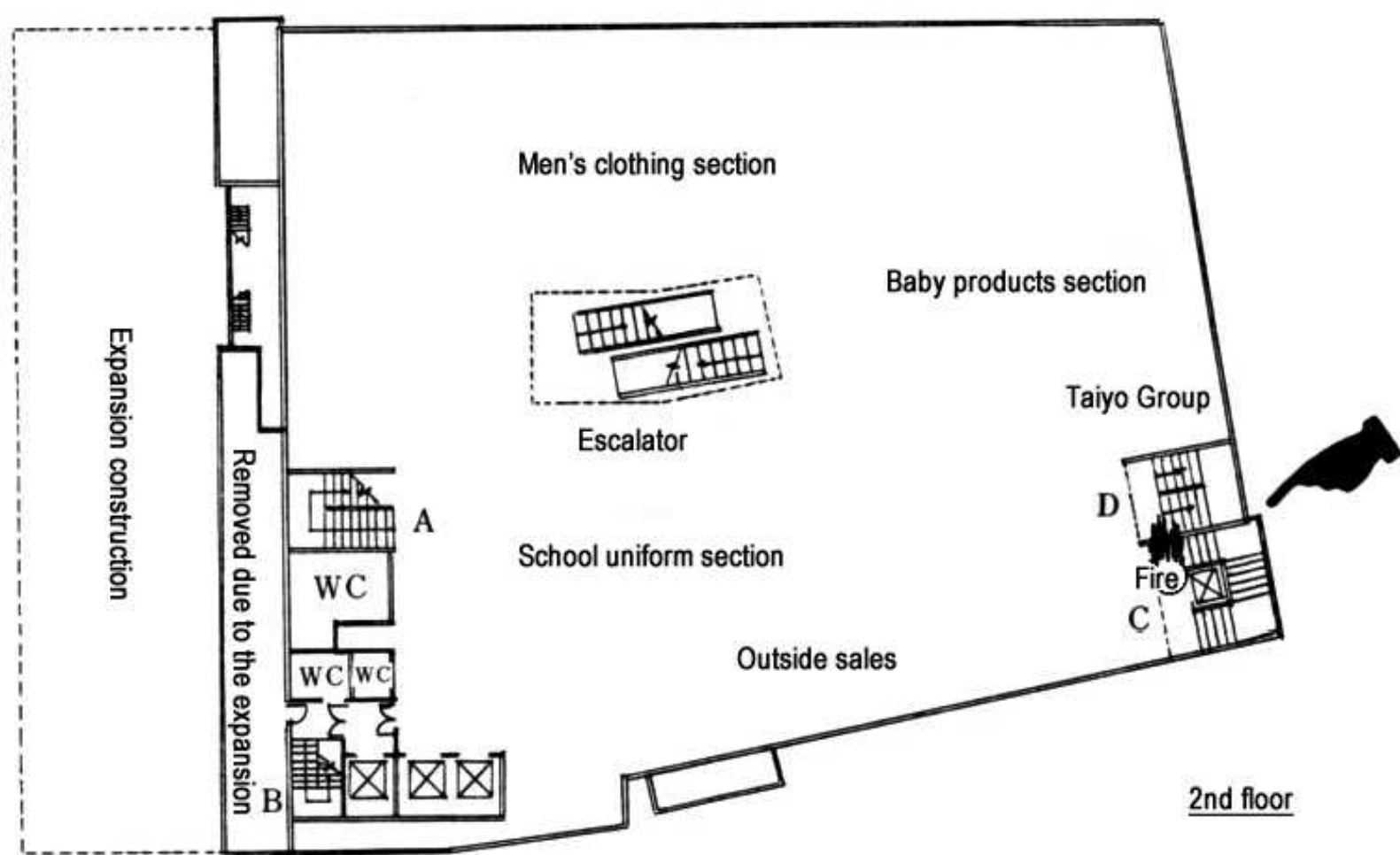
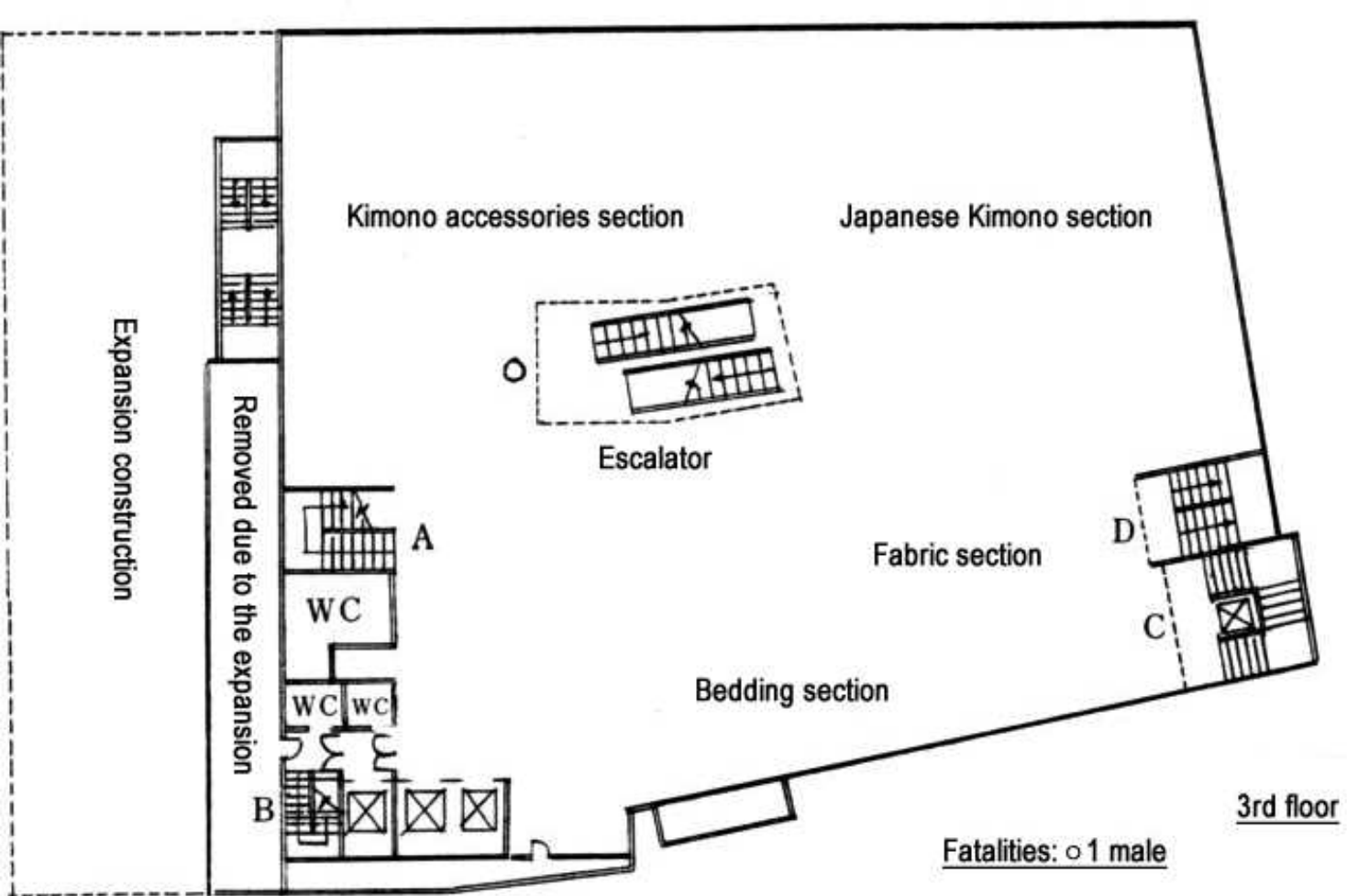
- ← Fire propagation path
- ←····· Smoke propagation path

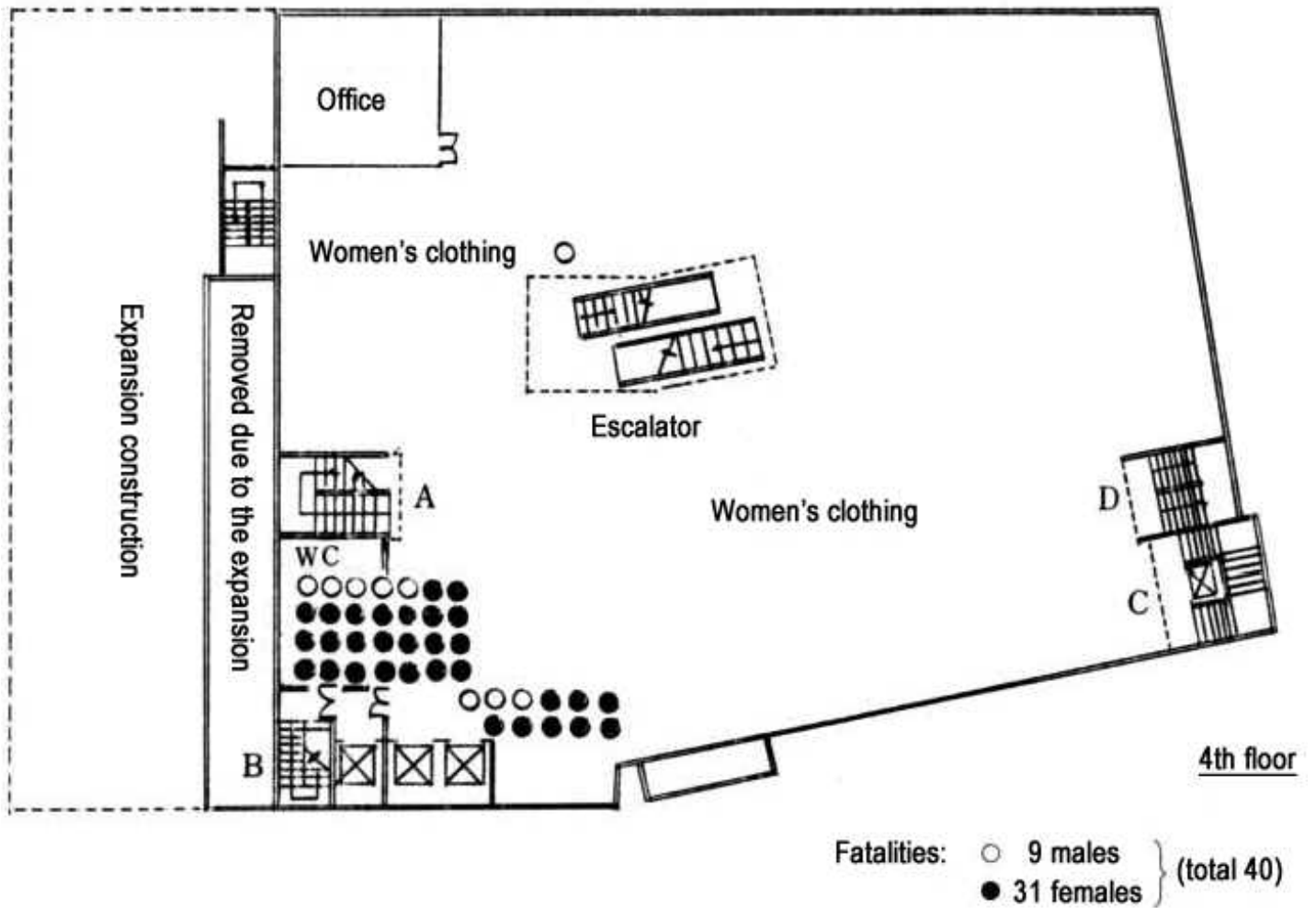
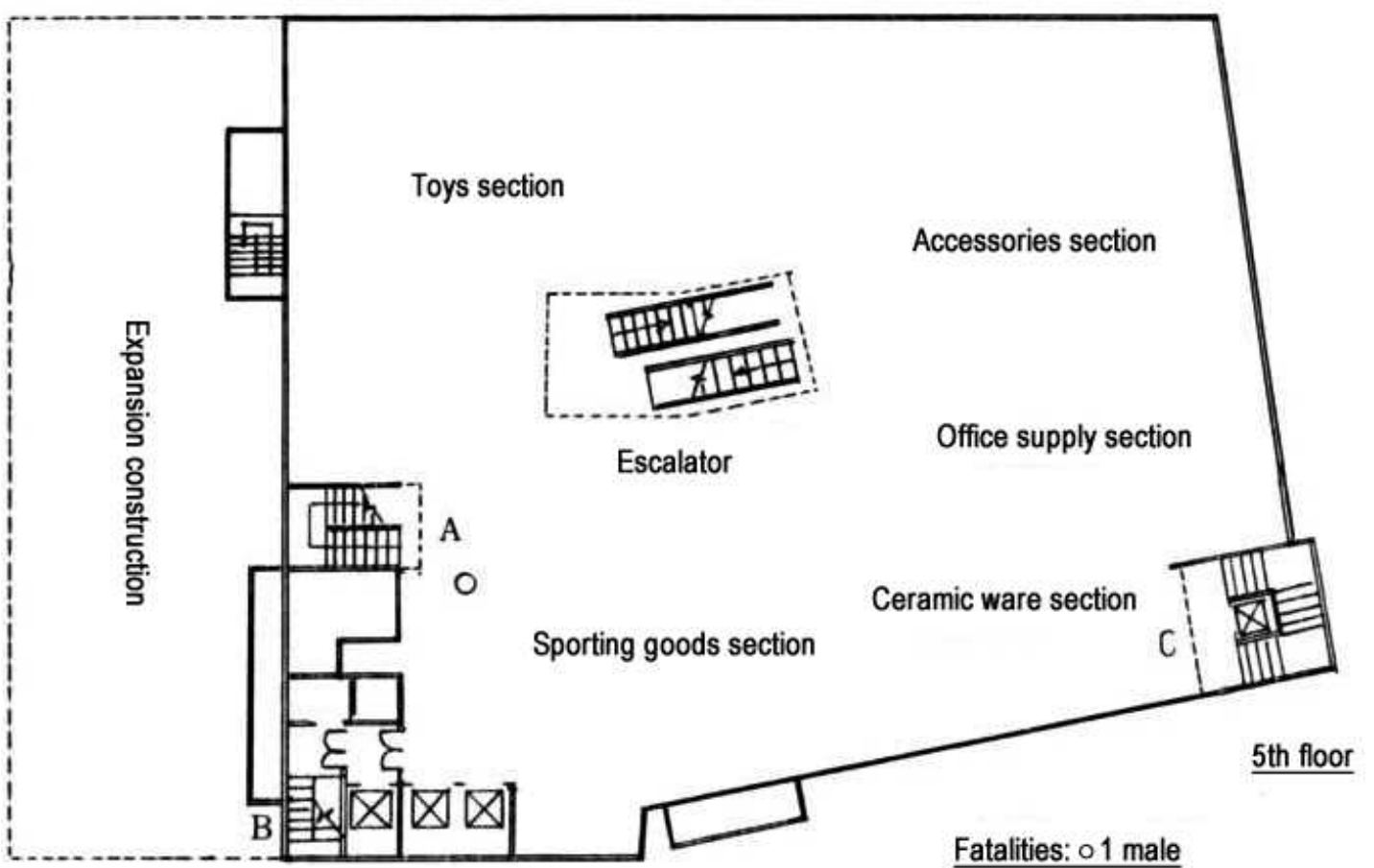
※ Refer to plane view for details of casualties

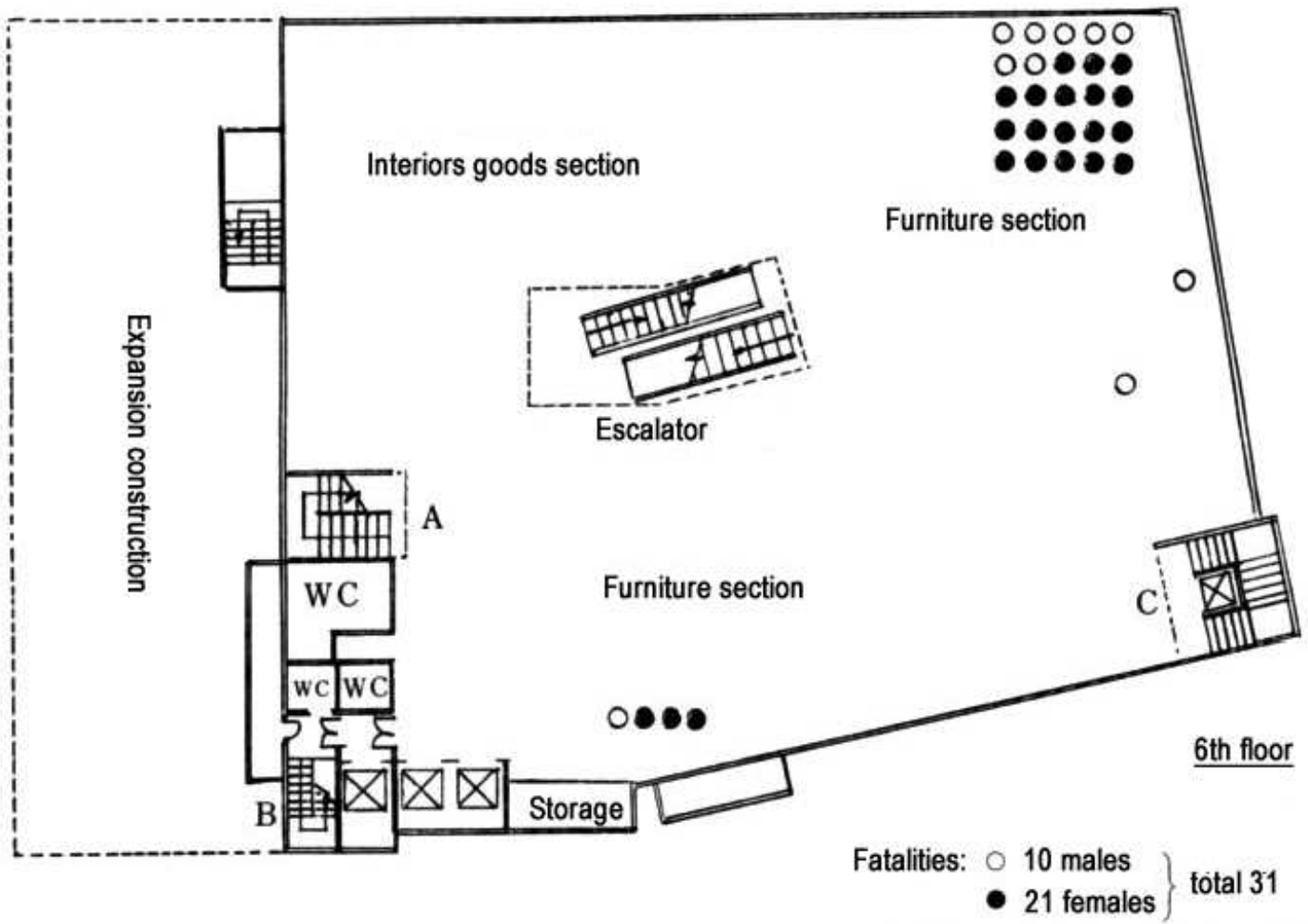
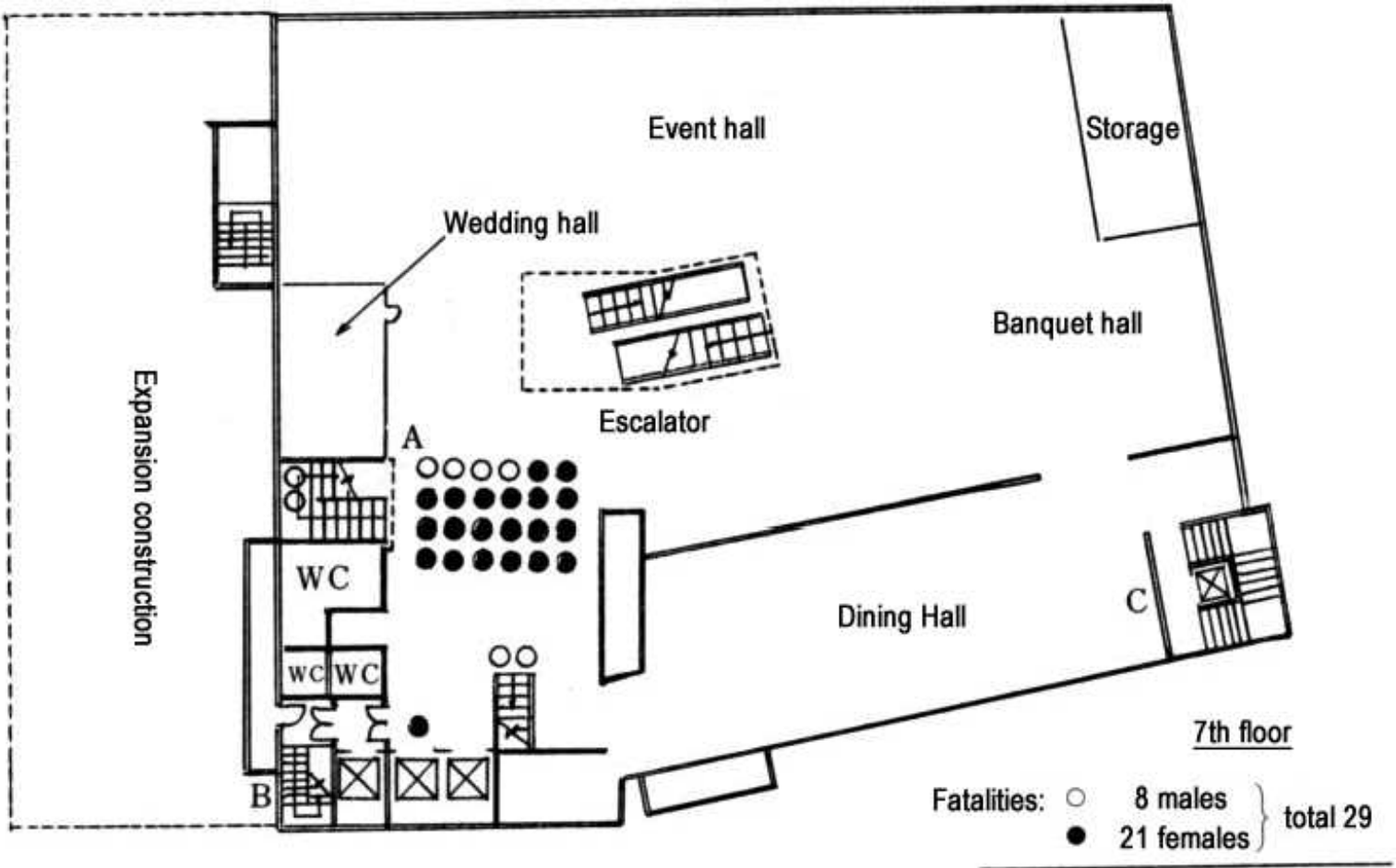
Origin of fire

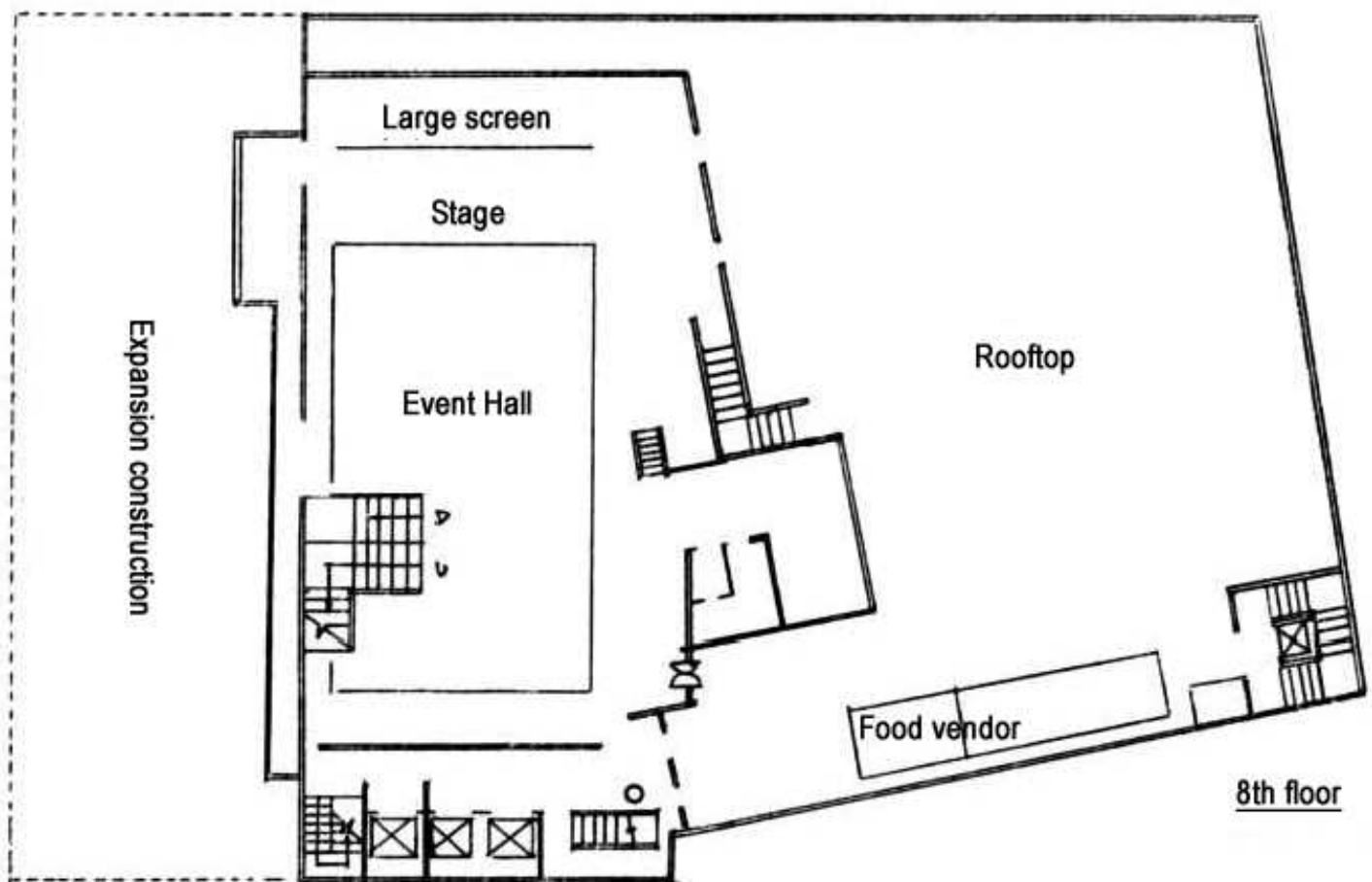
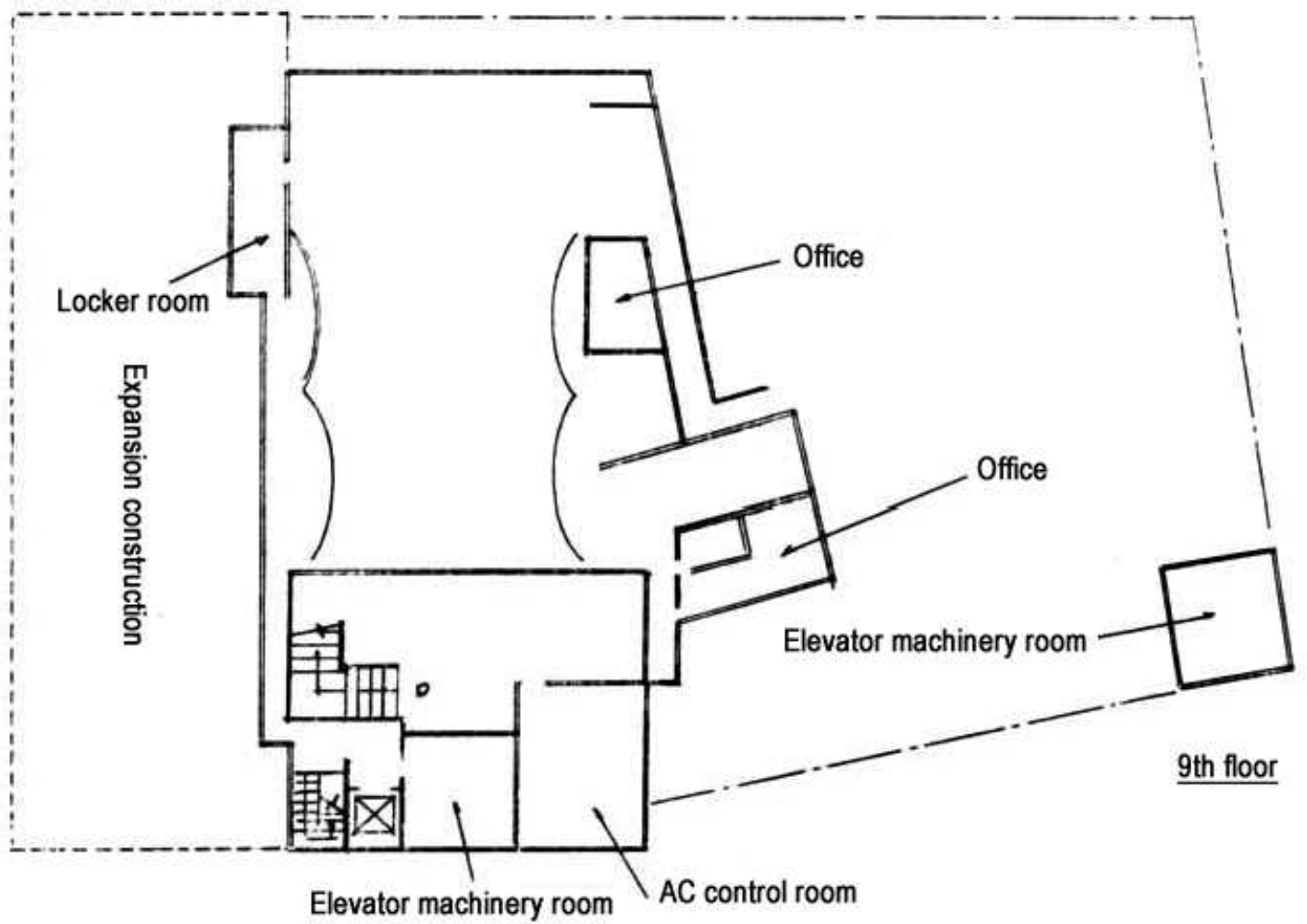




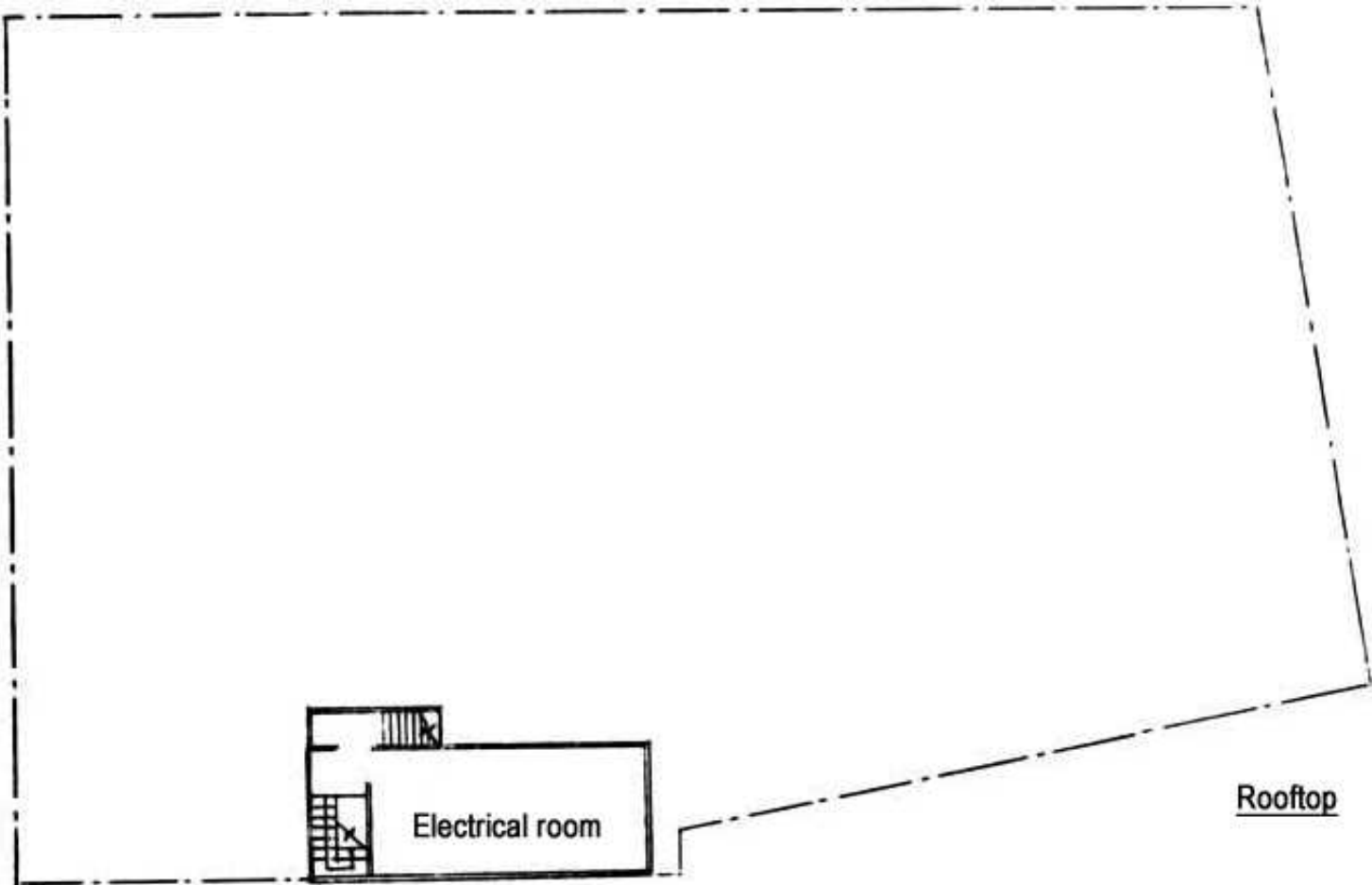








Fatalities: ○ 1 males



※ Layout of the 3rd and 4th floor rooftops are omitted

