

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
Kobe Department Store	Department store	Feb. 17, 1974	Fireproof structure,	All, [Half] , Partial, Small	Fatalities 1
		Breakout at 23:52 (approx.)	7 stories above ground and 1 below		
5-5-12 Udezuka, Nagata, Kobe, HYOGO		Detected at 03:59	Building area 1,861.6m ²	7,090 m ²	Injured 40 (40)
		Notified by Extinguished by 19:32	Total floor area 16,113 m ²	(44%)	

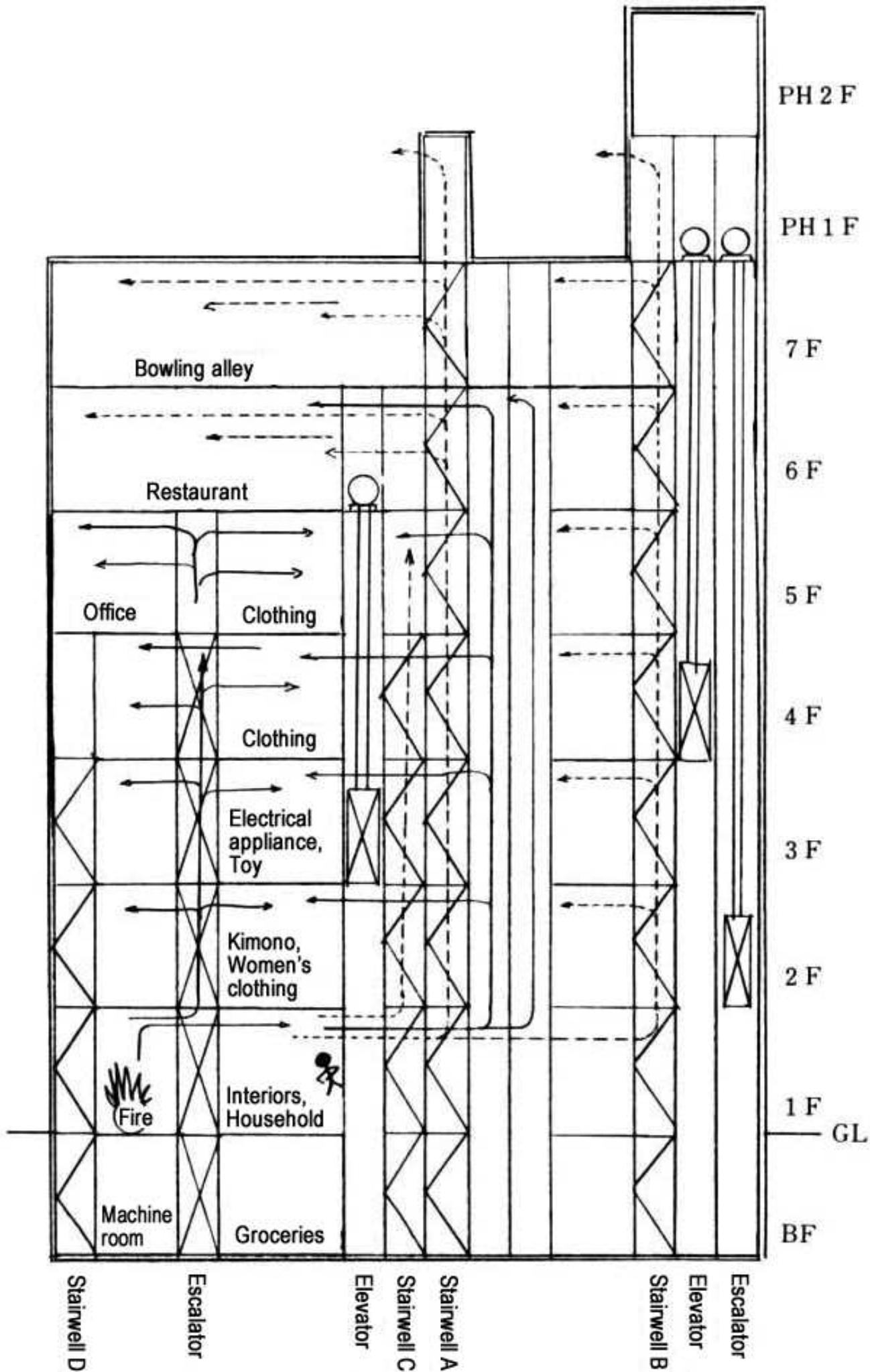
I. Summary of Fire Incident

(1) Summary	This fire was deliberately set by a boy who broke into the Kobe Department Store around 23:52. Firefighters tried to extinguish the fire by asphyxiation, but could not isolate the fire in an enclosed space because of defective construction around the vertical shaft and elevator area. Eventually, the fire burned a total area of 7,090 m ² (from the 1st to 5th floors) and it took more than 19 hours to completely contain the fire.							
	(2) Conditions per Floor	Floor	Total area	Damaged area	Use (Purpose)	No. of persons	No. of fatalities	Fire escape equipment
		m ²	m ²				4 sets of inside stairs	Fire extinguishers
PH2		182.6					1set of fire escape equipment on the 3rd and above floors	Indoor fire hydrants
PH1		242.7						Sprinkler system on the 1st and 7th floors (in the bowling alley)
7		1,830.2					Escape chute	Automatic fire detection system
6		1,885.6						Emergency alarm system (PA system)
5		1,884.9	1,425					Guiding lights
4		1,883.1	1,423					Water pipe connections
3		1,881.0	1,421					
2		1,879.4	1,419					
(1)		1,861.6	1,402		6	1		
B1	2,581.9			2				
Total	16,113.0	7,090		8	1			
(3) Origin of Fire	(Floor, Room, Part, Combustibles, Habitable/Non-habitable Rooms, Present/Absent)				(4) Cause of Fire	Believed to be arson or an accidental fire started by a boy (age 17) who was arrested for robbery.		
	From the interior goods section in the west-central area of the 1st floor							

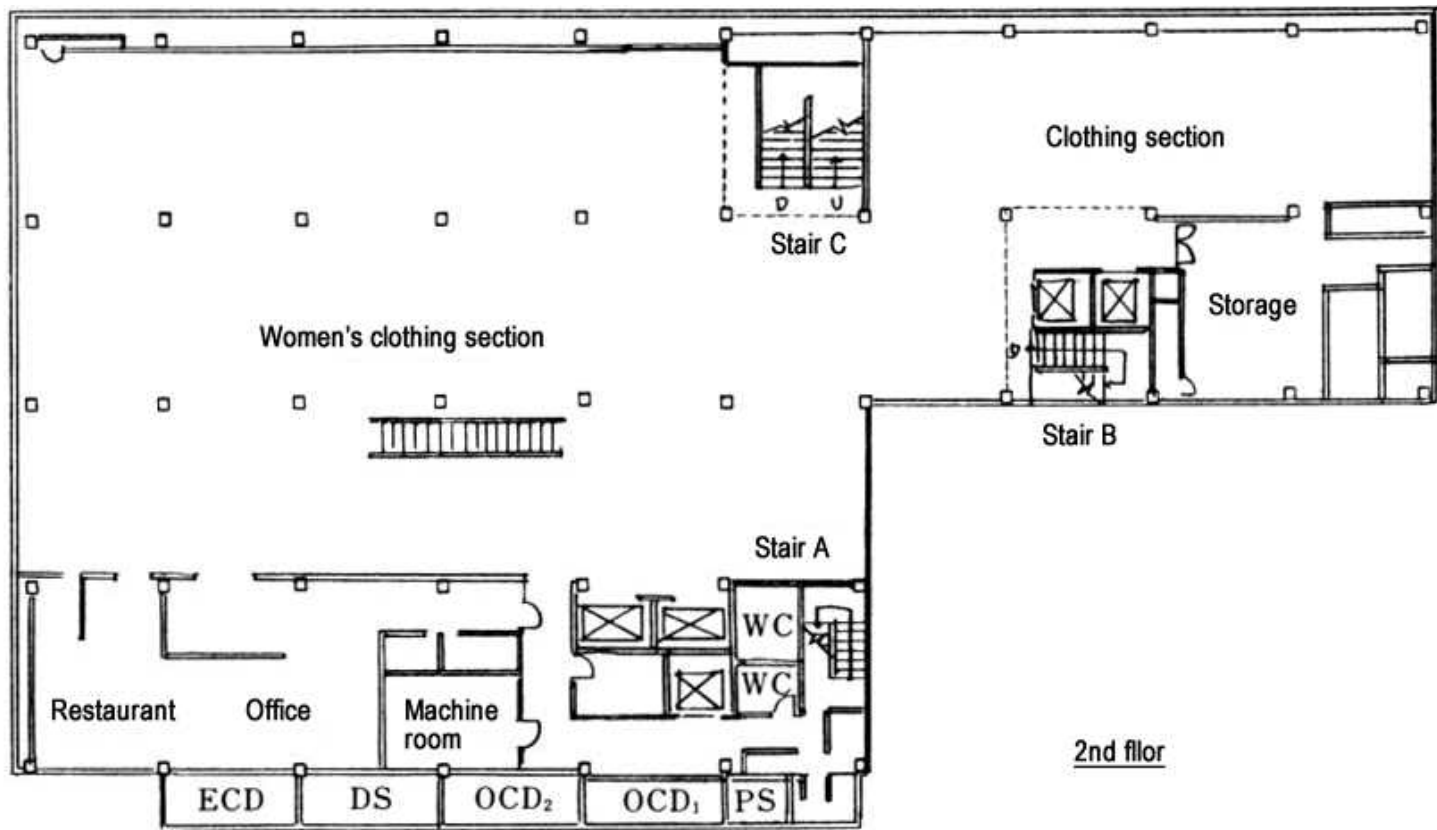
(5) Fire Propagation Path	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <small>(Location of Fire Source)</small> In the west-central area of the sales floor </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <small>(Propagation from Source)</small> Large amounts of combustible materials </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <small>(Propagation to Upper Floors)</small> Through a faulty fire compartment around the escalator Through a faulty partition-wall construction around the duct </div> </div>	
	<p>The fire that emerged from the west-central area of the sales floor on the 1st floor ignited large amounts of combustible materials in the vicinity and then spread to the ceiling and the sales goods. From the 1st to the 2nd floor, the fire mainly propagated through a faulty fire compartment around the escalator and then spread to the 3rd and 4th floors in a similar manner. In addition, through a faulty duct space (where the unsealed opening was facing the sales floor), the fire spread directly from the 1st to the 4th and 5th floors. The fire that burned on the 3rd floor also eventually spread to these floors.</p> <p>○ Main Reasons for Propagation of the Fire The fire spread to the upper floors through faulty or incomplete structures around the escalator, horizontal shutter, and duct space. Large amounts of combustible materials including the ceiling were present.</p> <p>○ Smoke Propagation Path Through the unsealed opening of the partition wall in the duct space, heavy smoke was drawn into the duct running to the 5th floor without any exhaust connection, and therefore the smoke drifted through the louver doors and filled the 5th and 6th floors. The smoke also propagated from the open escalator where the fire compartment was incomplete.</p>	
II. Summary of the Building		
(1) Built	Construction, Completion, and Major Renovations (Inspection upon completion) November 20, 1965 (Grand opening) December 1, 1965	
Fire Prevention Management	(2) Vertical Shafts	(3) Fire Prevention
	Stairwells <input type="checkbox"/> Duct Spaces <input checked="" type="checkbox"/> Elevators <input checked="" type="checkbox"/> Pipe Shafts <input type="checkbox"/> Escalators <input checked="" type="checkbox"/> Other () <input type="checkbox"/>	The store's maintenance manager was the appointed the fire-prevention manager and the fire defense plan had been submitted to the local fire station. The nighttime security team consisted of 5 security guards and 2 electricians (total of 7) who carried out nightly patrols. The members of this security team comprised of 1 store employee and 4 guards from a building maintenance company, all of whom were elderly.
	The openings of the vertical shafts (stairwell, duct, and elevator) were protected by a fire shutter and compartment on each floor. The HVAC for the basement to 4th floors was controlled by a centralized system, and that for the 5th to 7th floors was controlled individually on each floor.	
	(4) Fire Compartments	(5) Firefighting Equipment
The 1st basement to 2nd floors were protected by fire compartment systems on each floor, but none of the other floors had such a system.	The existing firefighting equipment was well maintained, except for the sprinkler system that needed to be installed throughout the building. The inspector also recommended installation of an escape bridge to the 5th floor and a set of outside stairs to the 6th and 7th floors, but the store had not made these improvements.	

III. Actions Taken after the Fire was Detected		
(1) First Detected	<ul style="list-style-type: none"> ◦ Detected by (Security guard and electrician) ◦ How and why (Alerting sound of the fire alarm) ◦ Action taken (Rushed to confirm the fire) 	
	<p>Around 11 pm, 3 security guards completed their night patrol that was started from the 1st floor. On the way back to the office, 2 of them stopped by the bathroom on the 2nd floor, which was near the stairs, and 1 guard returned to the office without going to the bathroom. When they were in the bathroom, they heard the alerting sound of the local fire alarm, so, they ran down to the 1st floor. At the same time, the electricians on duty also heard the the main fire alarm on the basement floor and rushed to the 1st floor with a fire extinguisher. The security guard and 2 electricians found flames in the west-central area of the floor and went to have closer look from the hallway of the main entrance. When they confirmed that there was a fire near the accessories shop "Muramatsu", the flames were about to ignite the ceiling.</p>	
(2) Emergency Call	Emergency Call Yes [X] (Security manager)	Time elapsed since the discovery (7) minutes
	No []	
<p>The 2 electricians tried to extinguish the fire with fire extinguishers, but their attempts failed, and the security manager who saw this made a 119 call.</p>		
(3) Initial Firefighting Activities	Successful [] Failed [X]	(Reasons or Conditions) Two electricians used 2 dry-chemical extinguishers, but they could not control the fire. They then tried to use the indoor fire hydrants on Stairs A and D, but could not get to either of them because of the pervasive smoke and flames, and therefore failed to control the fire.
	Initiated <ul style="list-style-type: none"> ◦ Extinguished timing [] ◦ Firefighting difficulties [] ◦ Firefighting method [] 	
(4) Summary of Firefighting Activities	Not Initiated <ul style="list-style-type: none"> ◦ Extinguished timing [] ◦ Firefighting difficulties [] ◦ Firefighting method [] ◦ Other [] 	
	(Obstacles or Difficulties in Fire Control) When firefighters arrived, they could not see any flames on the 1st floor, but it was impossible to enter the building because of heavy smoke and intensive heat. Since spraying water was ineffective, they used high-expansion foam, which was also ineffective because the partition walls were blocking the way. Again, they started spraying water and it worked against the flames on the 1st floor, but the fire was still smoldering in blind spots. Fire had spread to the upper floors through the faulty fire compartments. The windows were boarded up and slowed the firefighting operation. Eventually, the fire spread throughout the building and the firefighters switched the plan of attack to a defensive one.	

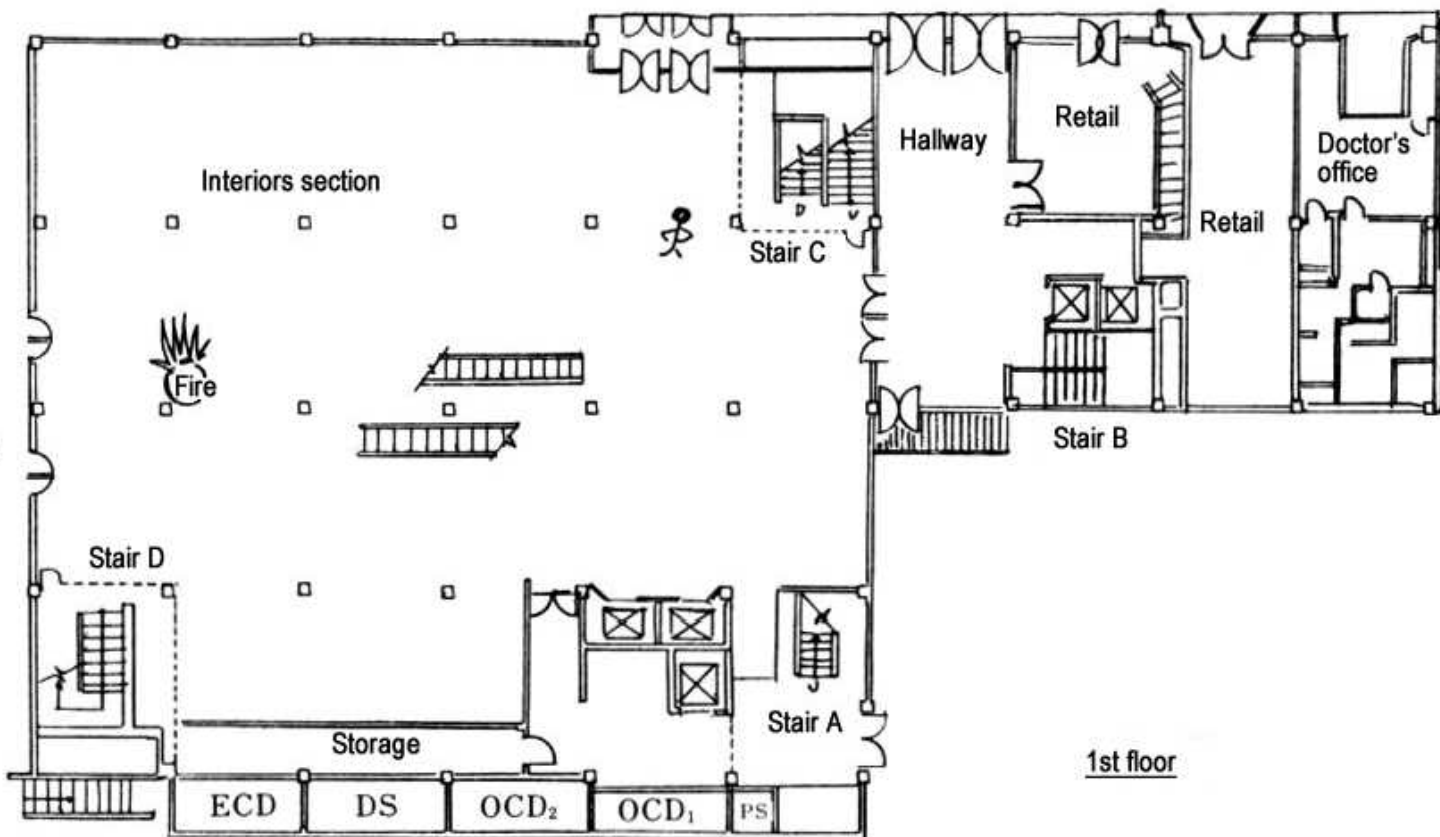
(5) Evacuation	Means of Escape (No. of Persons)	Obstacles to Evacuation
	<ul style="list-style-type: none"> ◦ Stairs [] () ◦ Elevators/Escalators [] () ◦ Escape equipment [] () ◦ Directly to ground from windows or openings [] () ◦ Rescued [] () ◦ Other () [] () 	<ul style="list-style-type: none"> ◦ No windows [] ◦ Barred openings [] ◦ Locked emergency doors (Exits) [] ◦ Alarm system [] (Poorly controlled, Malfunctioned, Not installed) ◦ Power outage [] ◦ Other []
N/A		
(6) Casualties	Healthy individuals 1 (Drunk persons) Individuals in need of assistance Infants Elderly Handicapped Patients/ill persons	Obstacles to Evacuation <ul style="list-style-type: none"> ◦ No windows [] ◦ Barred openings [] ◦ Locked emergency doors (Exits) [] ◦ Alarm system [] (Poorly controlled, Malfunctioned, Not installed) ◦ Power outage [] ◦ Other []
	<p>Boy A (age 17), who set the building on fire, died. Originally, he stayed inside the store until the door closed for the day and changed his clothes that he just stole from the store (jacket, underwear, shoes, etc). When he was about to run away with 3 lighters, he realized all the floor shutters were closed and the only exit near the security office was also locked. So he probably set the fire to divert attention. As he planned, the exit was opened because of the fire; however, his burned body was found in front of the camera shop near Stairs C on the 1st floor.</p>	
IV. Issues and Lessons Learned		
<p>1 The fire prevention manager was not aware of the faulty opening in the duct shaft above the ceiling of the sales floor, and this opening became the propagation path to the upper floors. The fire inspectors did not pay attention to this issue either because they were more focused on the fire shutters/doors. Learning from this, people who are involved in fire prevention should be more attentive to fundamental issues such as the configuration of fire compartments and be able to detect faulty portions on inspection.</p> <p>2 A centrally controlled HVAC duct system is usually accompanied by a long duct shaft that requires large clearance; however, such a shaft creates a propagation path throughout the building. Based on this, it is necessary to find alternative solutions that can reduce the duct space such as a single-zoned system or a system that can be managed per floor.</p> <p>3 Firefighting activities would be more successful if a personal oxygen mask was available for this lengthy attack under the heavy smoke.</p> <p>4 The firefighting activities were significantly challenging because all the fire shutters were closed on every floor and the large glass window above the 2nd floor was blocked by a stack of sales goods inside, which almost created an enclosed space without any opening.</p>		



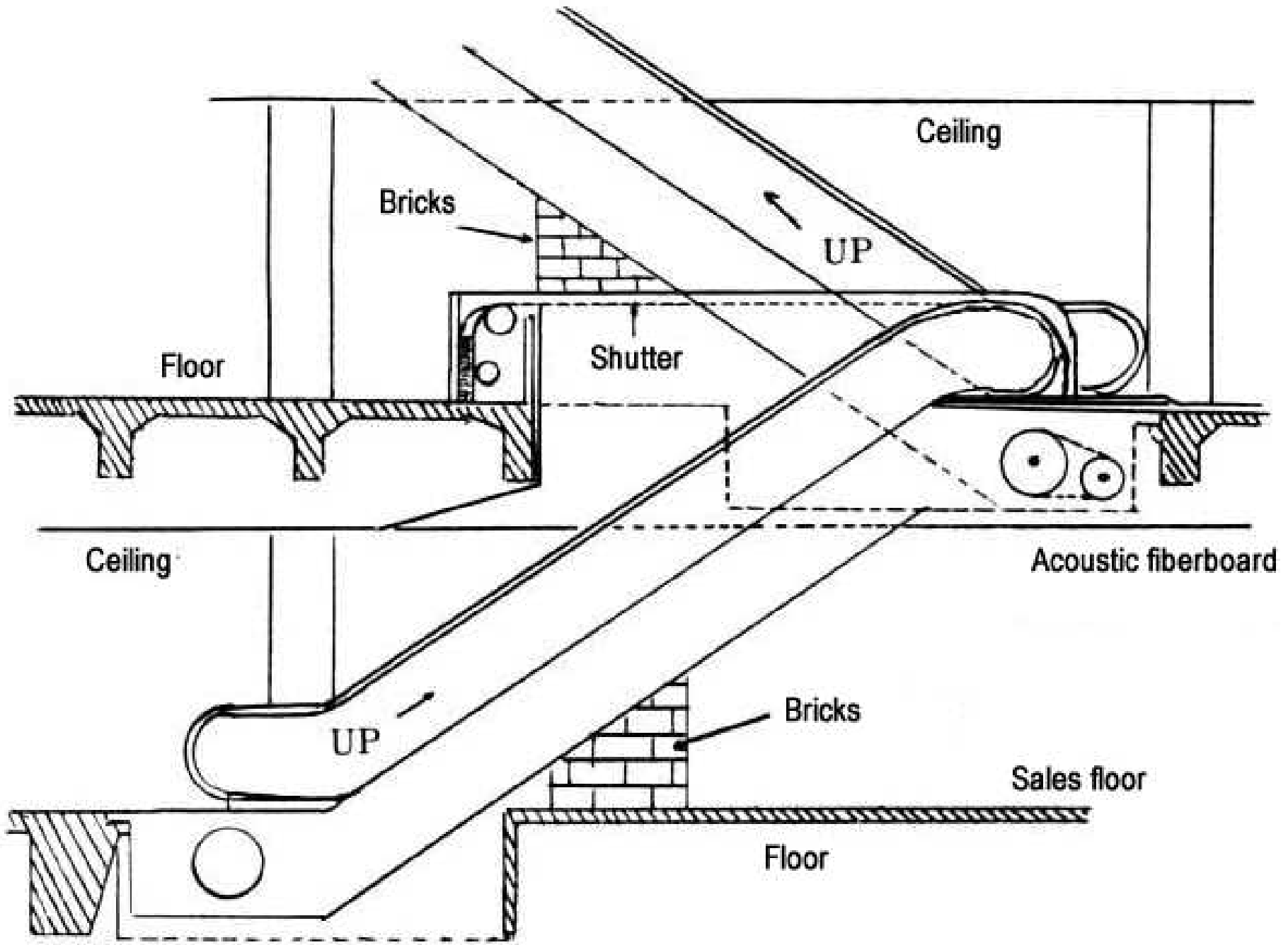
Symbols —→ Fire propagation path
 - - - - - Smoke propagation path



2nd floor



1st floor



Cross-sectional layout of the escalator