

Building Name Address	Use (as per FSA Annexed Table)	Date and Time of Incident	Structure and Stories Area	Extent of Damage (Damaged Area/ Total Area)	No. of Casualties
Shirokiya Department Store  1-9 Tohri Nihonbashi TOKYO	Department store (4)	Dec. 16, 1932	Fire resistive	All, <u>Half</u> , Partial, Small  13,140m <sup>2</sup>  (38%)	Fatalities 14  Injured 40 (14)
		Breakout at 09:18 (approx.) Notified at 09:23 Detected by fire watchtower Extinguished by 12:30	8 stories above ground and 2 below  Building area 3,409m <sup>2</sup>  Total floor area 34,305m <sup>2</sup>		

### I. Summary of Fire Incident

<b>(1) Summary</b>	This fatal fire was the first high-rise building fire recorded in modern Japanese history and strongly highlighted the necessity of fire prevention as well as methods of escape and evacuation equipment. Further, it revealed the scientific and mechanical problems with fire fighting and rescue operations in high-rise buildings.							
<b>(2) Conditions per Floor</b>	Floor	Total area	Damaged area	Use (Purpose)	No. of people	No. of fatalities (male/female)	Fire escape equipment	Firefighting equipment
		m <sup>2</sup>	m <sup>2</sup>				On the stairs (6 sets of through stairs, 1 set of through stairs from 1st floor to 4 <sup>th</sup> floor)	7 sets of indoor fire hydrants per floor  Fire extinguishers
	Roof			Machine room				
	8	292.1		Employee cafeteria				
	7	1,805.0	2,996.4	Dining hall, hall	150			
	6	3,368.6	3,385.4	Sales, Office	200	6 (M1, F5)		
	5	3,385.4	3,385.4	Sales, Meeting room	110	6 (M2, F4)		
	④	3,385.4	3,373.5	Sales, Dentist, Hair salon	200	1(M)		
	3	3,373.5		Sales, Japanese room	180	1(M)		
	2	3,373.5		Sales	180			
	S2	771.8		Office	30			
	1	3,409.5		Sales	200			
	B1	3,846.5		Sales, Restaurant	180			
	B2	3,930.7		Machine room, Restaurant	170			
	Total	34,305.5	13,140.6		1,600	14 (M4, F9)		
<b>(3) Origin of Fire</b>	(Floor, Room, Part, Combustibles, <u>Habitable</u> /Non-habitable room, <u>Present</u> /Absent) <ul style="list-style-type: none"> <li>○ This fire emerged from the Christmas tree displayed in the toy section of the 4th floor, and the source of fire was surrounded by celluloid toys.</li> <li>○ The fire broke out immediately after the store opened. The persons inside the building were mostly store clerks and a few customers.</li> </ul>					<b>(4) Cause of Fire</b>	When an electrician began repairing some decorative miniature bulbs for the Christmas tree, he saw a spark emerge from them, and the spark ignited the decorative gold braid on the tree.	

(5) Fire Propagation Path	エラー! 参照元が見つかりません。		
	<ul style="list-style-type: none"> <li>○ The fire that emerged from the toy section on the 4th floor (old building) spread in every direction and also to the new building. As the goods that were piled up for the end-of-year sale were burning, the fire sequentially spread to the 5th, 6th and 7th floors at high speed via the vertical shafts such as stairs, spiral chutes, and escalators.</li> <li>○ Assuming from the stop time of the electric clocks and the damage on each floor, one floor was enveloped in flames within 10 to 15 minutes. In other words, presumably, the 4th floor became engulfed in considerably high heat at about 09:40, and each floor from the 5th to 7th floors was engulfed in flames by about 10:20.</li> </ul>		
<ul style="list-style-type: none"> <li>○ Main Reasons for the Propagation of the Fire <ul style="list-style-type: none"> <li>○ The source of the fire was surrounded by a number of highly flammable items such as celluloid toys.</li> <li>○ A number of goods were piled up on each floor, which accelerated the fire spread.</li> <li>○ The stairs, escalator, and spiral chute near the fire were not partitioned by fire preventive materials, which also served to accelerate the fire spread to the upper floors.</li> </ul> </li> <li>○ Smoke Propagation Path <ul style="list-style-type: none"> <li>○ The heavy smoke that was generated from the celluloid toys near the fire source propagated horizontally along the ceiling on the 4th floor before moving rapidly upward and to each floor through the stairs, escalators, and spiral chutes that acted as chimneys.</li> </ul> </li> </ul>			
<b>II. Summary of the Building</b>			
(1) Built	Construction, Completion and Major Renovations (Completion) Nov. 1928, (Expansion) Sept. 19, 1931		
	Fire Prevention Management	<b>(2) Vertical Shafts</b>	<b>(3) Fire Prevention</b>
Stairs <input checked="" type="checkbox"/> Duct Spaces <input checked="" type="checkbox"/> Elevators <input checked="" type="checkbox"/> Pipe Shafts <input checked="" type="checkbox"/> Escalators <input checked="" type="checkbox"/> Other ( ) <input checked="" type="checkbox"/>		<ul style="list-style-type: none"> <li>○ There were no regulations for fire prevention in that era.</li> <li>○ Two weeks after the fire, the department store held a "fire prevention day" and performed a fire drill and rescue exercise.</li> <li>○ The department store had provided education and training to the employees regarding emergency procedures; however, it was not sufficient.</li> </ul>	
<ul style="list-style-type: none"> <li>○ There was no fire compartment for vertical openings. (No regulations.)</li> <li>○ A few fire shutters that were installed in certain portions of the stairs were inadequate for fire control use. (None of the fire shutters were closed with respect to this fire.)</li> </ul>			
<b>(4) Fire Compartments</b>		<b>(5) Firefighting Equipment</b>	
<ul style="list-style-type: none"> <li>○ The design of each floor was open plan and there were no partition walls for each sales section. (No regulations).</li> <li>○ Wooden partition walls divided all other spaces such as the hair salon, common room, and telephone operators' office.</li> </ul>		<ul style="list-style-type: none"> <li>○ Firefighting equipment was well maintained. However, some of the indoor fire hydrants were inaccessible because of goods and other items piled up in front of them.</li> </ul>	

III. Actions Taken after the Fire was Detected																						
(1) First Detected	<ul style="list-style-type: none"> <li>○ <b>Detected by</b> ( Electrician who was repairing decorative miniature bulbs for the Christmas tree )</li> <li>○ <b>How and why</b> ( He noticed a spark from the miniature bulbs )</li> <li>○ <b>Action taken</b> ( He shouted to alert other store clerks nearby )</li> </ul> <p>-----</p> <p>The decorative miniature bulbs that someone had placed on a Christmas tree in the toy section on the 4th floor a few days earlier had malfunctioned, so an electrician was repairing them. When he saw the bulbs spark and ignite a decorative gold braid on the tree, he shouted "Fire" and notified the other store clerks nearby.</p>																					
(2) Emergency Call	<table border="0" style="width: 100%;"> <tr> <td style="width: 20%;"><b>Emergency Call</b></td> <td style="width: 40%;">           Yes <input checked="" type="checkbox"/> (The staff made a call through the dedicated fire emergency phone line (Third incoming call received by the fire station))         </td> <td style="width: 40%;">           Time elapsed since detection ( 7 ) minutes         </td> </tr> <tr> <td></td> <td>           No <input type="checkbox"/> </td> <td></td> </tr> </table> <p>-----</p> <ul style="list-style-type: none"> <li>○ The discoverer of the fire and other store clerks panicked. Since they focused on evacuating their customers, the emergency call to the fire station was seriously delayed.</li> <li>○ Approximately 5 minutes after the fire emerged, the first call to the fire station was made by the guard on the fire watchtower of Nihonbashi fire station, who spotted smoke coming out of the building (09:23).</li> <li>○ The second call to the fire station came from a fire alarm that was installed in the street in front of Shirokiya Department Store (09:23:20).</li> <li>○ 7 minutes after fire emergence and discovery, the third call to the fire station came from the department store's dedicated fire emergency phone (09:25)</li> </ul>	<b>Emergency Call</b>	Yes <input checked="" type="checkbox"/> (The staff made a call through the dedicated fire emergency phone line (Third incoming call received by the fire station))	Time elapsed since detection ( 7 ) minutes		No <input type="checkbox"/>																
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(4) Summary of Firefighting Activities	<p><b>(Obstacles or Difficulties in Fire Control)</b></p> <ul style="list-style-type: none"> <li>○ When the firefighters arrived on site, smoke was pouring out of the windows on each floor and flames were also emerging from the windows on the 4th floor. As many people were calling for help from the balcony on each floor, the main force of the firefighters was focused on rescue operations, which were remarkably carried out with an escape chute attached to a ladder truck, a escape net, and a rescue rope.</li> </ul> <p>Firefighting was performed in parallel with lifesaving, but the store clerks failed to guide the firefighters, which resulted in the fire spreading to upper floors. (When the first teams of firefighters ran up one of the stairways, they realized that the stairway ended at the 4th floor and therefore they turned back to the 3rd floor to run up the other stairway to the upper floors. During this time, the fire and smoke spread, making it impossible to penetrate the floor further.</p> <ul style="list-style-type: none"> <li>○ 39 firefighting units entered the building, but they struggled with the hoses extended from each floor as it required a great amount of manpower to do so.</li> <li>○ Only 3 ladder trucks were available, which are not long enough to rescue the evacuees on the roof floor of the building (height 33m).</li> </ul>																					

<b>(5) Evacuation</b>	Means of Escape (No. of Persons)	Obstacles to Evacuation															
	<input type="radio"/> Stairs [ X ] (1,171) <input type="radio"/> Elevator/Escalators [ ] ( ) <input type="radio"/> Escape equipment [ ] ( ) <input type="radio"/> Directly to the ground from windows or openings [ ] ( ) <input type="radio"/> Rescued [ X ] ( 395 ) <input type="radio"/> Other (Climbed down rainwater gutters and lightning rods) [ X ] ( 20 )	<input type="radio"/> No windows [ ] <input type="radio"/> Barred openings [ ] <input type="radio"/> Locked emergency doors (Exits) [ ] <input type="radio"/> Alarm system [ ] (Poorly controlled, Malfunctioned, Not installed) <input type="radio"/> Power outage [ ] <input type="radio"/> Other [X]															
<p> <input type="radio"/> Because of the location where the fire emerged, the initial smoke ascended through the stairwell of the old building, so occupants ran and evacuated to the new building, which was in the opposite direction of the smoke.  <input type="radio"/> The persons trapped evacuated to the roof floor or to the balcony on each floor and were rescued by the firefighters.  * Rescued by firefighters <ul style="list-style-type: none"> <li>● 130 persons from the roof floor (firefighters guided them to the outside stairs and rescued them from there)</li> <li>● 25 people from the 7th floor, 145 from the 6th, and 55 from the 4th (by ladder trucks and firefighter escape chutes)</li> </ul> A few persons rushing to escape tired due to an unusual means of escape, such as climbing down the rainwater gutters, the ropes of the flag, and the braces for lighting rods, and many of them were killed or injured. </p>																	
<b>(6) Casualties</b>	Healthy individuals 14 (Drunk persons ) Individuals in need of assistance Infants Elderly Disabled Patients/ill persons	Obstacles to Evacuation <ul style="list-style-type: none"> <li>○ No windows [ ]</li> <li>○ Barred openings [ ]</li> <li>○ Locked emergency doors (Exits) [ ]</li> <li>○ Alarm system [ ] (Poorly controlled, Malfunctioned, Not installed)</li> <li>○ Power outage [ ]</li> <li>○ Other [X]</li> </ul>															
	Most of the fatalities occurred prior to the firefighters' rescue operations. Except for the store clerk killed in the early stage of the fire, unusual means of escape resulted in all the other fatalities as follows:																
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<b>IV. Issues and Lessons Learned</b>																	
<ol style="list-style-type: none"> <li>1. Many people believed that the building was safe because the building was a fire resistant construction.</li> <li>2. In that era, there were no regulations requiring fire compartments for vertical shafts (stairwells and escalators) and for each floor/section.</li> <li>3. There was no fire alarm system installed or fire escape equipment available, which resulted in late recognition of the fire and many trapped people and casualties.</li> <li>4. The department store held a fire drill every year and was aware of fire prevention, however it was just pro forma and employee training was lacking. Therefore, in this actual fire incident, most of the store clerks panicked and failed to control the fire before it spread to the flammable celluloid toys, and failed to notify the fire station and to systematically guide the evacuees.</li> <li>5. The firefighting equipment available (water canons, smoke masks, high-pressure hoses) were ineffective for the high-rise building and lacked in the pressure and amount of water from the fire hydrants, which caused a delay in the firefighting operations.</li> <li>6. There were 3 ladder trucks available in Tokyo at that time, which needed to be enhanced in terms of the numbers and capabilities of the trucks for effective rescue and firefighting operations in high-rise buildings. (The height to the top floor of the Shirokiya Department Store was 33m, which was too tall for the 28m-ladder truck.)</li> </ol>																	



