

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
Tokyo Takarazuka Theater	Theater (1a)	Feb. 1, 1958	Fire resistive	All, Half , Partial, Small	Fatalities 3
		Breakout at 16:09 (approx) Detected at 16:20 Notified by emergency call Extinguished by 17:45	5 stories above ground and 1 below		
1-12 Uhrakucho Chiyoda-ku, TOKYO			Building area 3,374m ²	3,718m ²	Injured 25 (1)
			Total floor area 15,764m ²	(24%)	

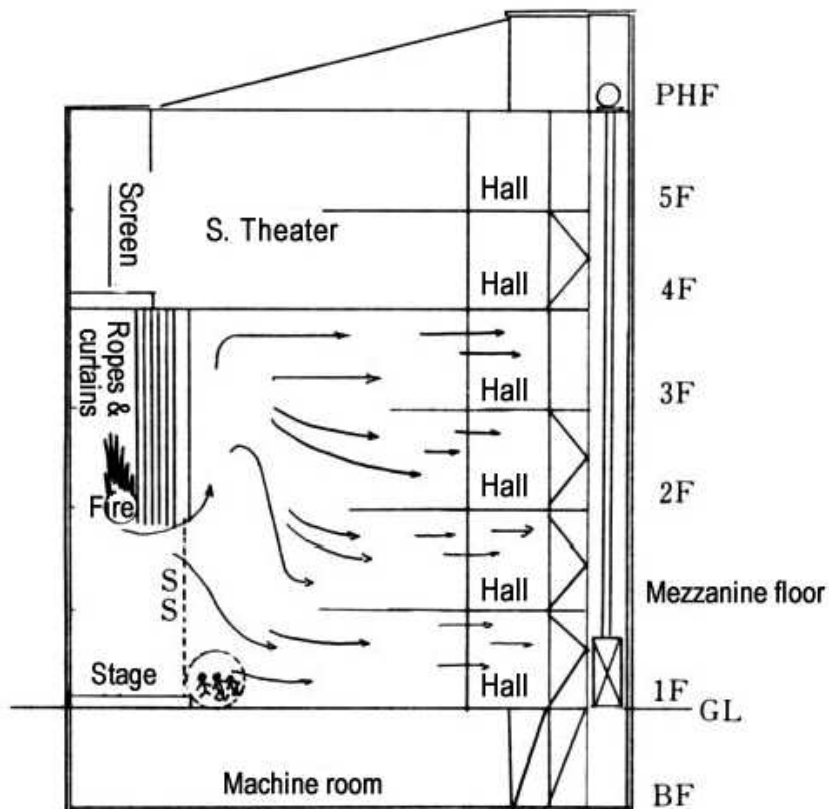
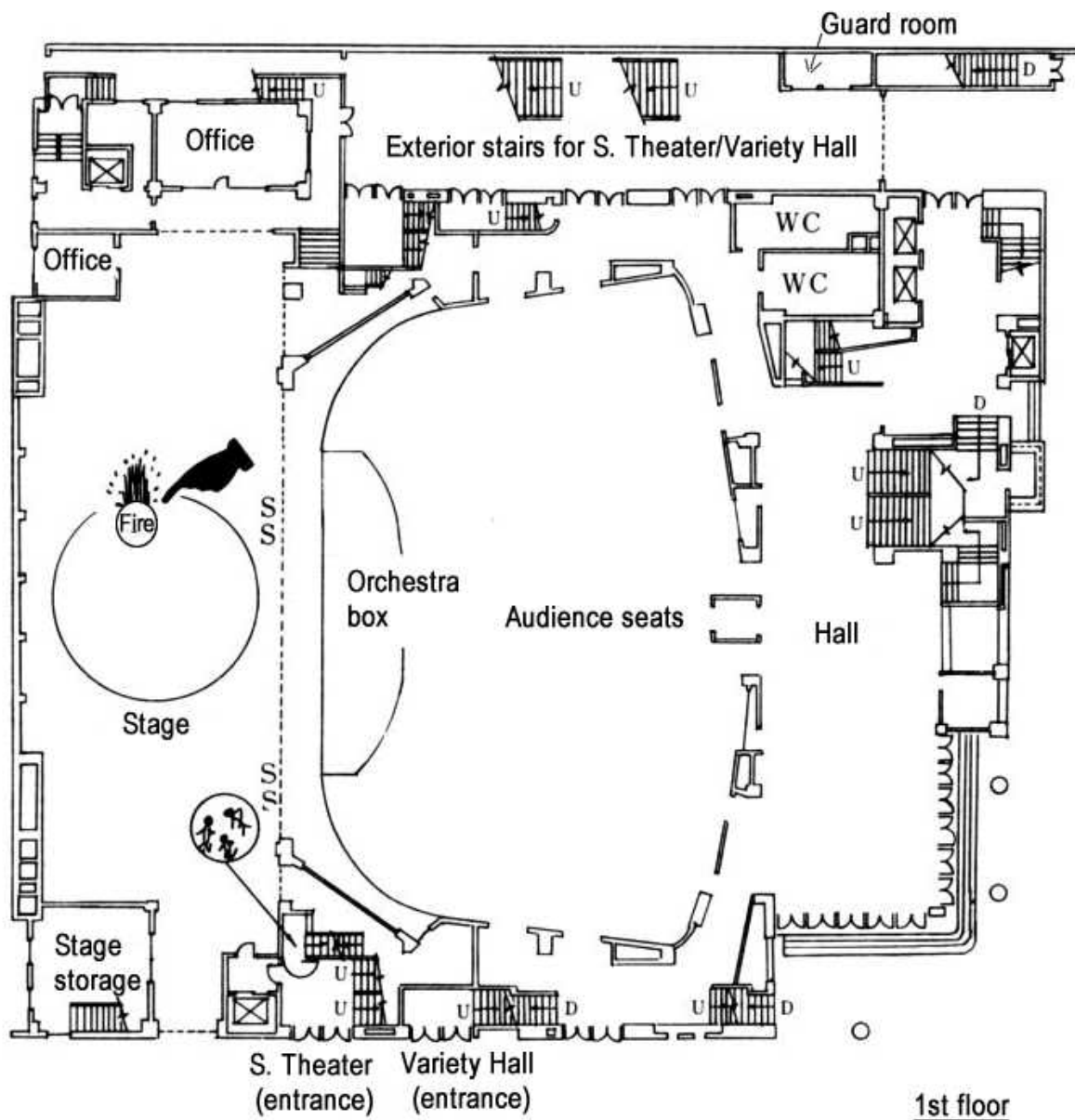
I. Summary of Fire Incident

(1) Summary (2) Conditions per Floor	The Takarazuka Theater fire was the largest theater fire in Japan. It started from the stage where the actors were performing. The theater was well equipped with firefighting and evacuation equipment; however, the flames and smoke instantly spread to the entire theater. The fire burned 3,718m ² (1st to 3rd floors), killing 3 persons and injuring 25.							
	Floor	Total area	Damaged area	Use (Purpose)	No. of persons	No. of fatalities	Fire escape equipment	Firefighting equipment
		m ²	m ²				<Inside stairs> 2 sets from B1 to 5F 4 sets from B1 to 1F 2 sets from 1F to 2F 2 sets from 1F to 3F 4 sets from 1F to 4F	28 sets of indoor fire hydrants 12 sets of firefighter dedicated outlets Fire extinguishers
	PH2	201.49		Machine room			From 1F to 5F	Automatic fire alarm system
	PH1	198.95		Machine room, Projection room	(4)		<Outside stairs> 2 sets (Exclusive for 4th and 5th floors)	2 sets of fire alarms
	5	1,275.61		La Scala Theater, Variety theater	908(11)			Fire signal device
	4	2,661.61	6.60	La Scala Theater	731(8)			
	3	1,809.45	953.96	Takarazuka Theater	150(13)			
	2	1,809.45	1,320.49	"	200			
	S2	860.14	60.19	"	(12)	3		
①	3,374.74	1,377.28	"	900(76)			2 sets of Siamese Connections (stand pipes)	
B1	3,572.94		Restaurant, Machine room, Electrical room	(12)				
Total	15,764.38	3,718.52		2,889(138)	3		2 sets of fire hydrants	
(3) Origin of Fire	(Floor, Room, Part, Combustibles, Habitable/Non-habitable Room, Present/Absent) When the fire emerged from the curtain that was suspended from the upper side of the stage on the 1st floor, the actors were performing a musical show on the stage that was filled with the stage settings and decorated with large amounts of various fabrics.				(4) Cause of Fire	In order to create scenic effects of a blaze, the staff used a special device (a large cigarette pipe-like device that is filled with a mixture of gunpowder and ash. After the mixture was lit, the pipe was blown by air and a fire spark from the device landed on the net that was used for the background of the stage. However, they rolled it up without knowing about the spark.		

(5) Fire Propagation Path	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>(Location of Fire Source)</p> <div style="border: 1px solid black; padding: 5px; width: 150px;">Curtain on the stage on the 1st floor</div> </div> <div style="text-align: center;"> <p>(Propagation from Source)</p> <div style="border: 1px solid black; padding: 5px; width: 150px;">Various curtains</div> </div> <div style="text-align: center;"> <p>(Propagation to Adjacent Zones)</p> <div style="border: 1px solid black; padding: 5px; width: 150px;">Spread from the unclosed fire shutter to the guest rooms</div> </div> <div style="text-align: center;"> <p>(Propagation to Other Floors)</p> <div style="border: 1px solid black; padding: 5px; width: 150px;">Spread from the walls and ceiling of the open ceiling space to the 2nd and 3rd floors</div> </div> </div>														
	<ul style="list-style-type: none"> ◦ The fire emerged from the curtain that was suspended from the stage installations and it spread rapidly to various curtains that were being used across the stage. The speed of the fire spread disabled the fire shutter that was located on the right side of the stage in order to separate the stage and the audience area. From this portion, the fire reached the audience area and then spread to the 3rd floor from the open ceiling space of the stage and the audience area. 														
<ul style="list-style-type: none"> ○ Main Reasons for the Propagation of the Fire <ul style="list-style-type: none"> ◦ Since the fire broke out from the curtain above the stage, immediate attempts to extinguish the fire failed. ◦ Large quantities of the curtains were not flame-resistant. ◦ The flames penetrated from the disabled fire shutter that was located on the right side of the stage due to the roaring flames. ○ Smoke Propagation Path <p>The smoke successively propagated to the open ceiling on the stage, the disabled fire shutter, the open ceiling of the audience section, the stairwell and vertical shafts, and each floor.</p> 															
II. Summary of the Building															
(1) Built	Construction, Completion and Major Renovations (Completion) 1933, (Expansion) April 1955														
	(2) Vertical Shafts		(3) Fire Prevention												
Fire Prevention Management	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Stairs</td> <td style="padding: 2px; text-align: center;">[X]</td> <td style="padding: 2px;">Duct Spaces</td> <td style="padding: 2px; text-align: center;">[X]</td> </tr> <tr> <td style="padding: 2px;">Elevators</td> <td style="padding: 2px; text-align: center;">[X]</td> <td style="padding: 2px;">Pipe Shafts</td> <td style="padding: 2px; text-align: center;">[X]</td> </tr> <tr> <td style="padding: 2px;">Escalators</td> <td style="padding: 2px; text-align: center;">[]</td> <td style="padding: 2px;">Other ()</td> <td style="padding: 2px; text-align: center;">[]</td> </tr> </table>		Stairs	[X]	Duct Spaces	[X]	Elevators	[X]	Pipe Shafts	[X]	Escalators	[]	Other ()	[]	The store had appointed a fire prevention manager and submitted a fire defense plan; however, they downplayed the emergency evacuation drill to the extent of just guiding the audience in and out of the building during a regular show.
	Stairs	[X]	Duct Spaces	[X]											
Elevators	[X]	Pipe Shafts	[X]												
Escalators	[]	Other ()	[]												
Type-B fire shutters on the stairwell and duct space															
(4) Fire Compartments		(5) Firefighting Equipment													
Type B fire shutter were placed on: <ul style="list-style-type: none"> ◦ Fire compartments according to application ◦ Fire compartments on the stage, backstage and audience seat ◦ Fire compartment on each projection room and machine room 		The alarm equipment was inspected daily by the guard and monthly by the vendor.													

III. Actions Taken after the Fire was Detected		
(1) First Detected	<ul style="list-style-type: none"> ◦ Detected by (2 flymen) ◦ How and why (The flymen noticed the curtain was on fire from backstage) ◦ Action taken (They shouted out to lower the curtain and tried to put out the fire) 	
	<p>When 2 flymen were hiding behind one of the stage settings (a Japanese ship) during the show, they noticed the edge of the curtain had caught fire and yelled out "Lower the curtain!" They got on the deck of the ship on the stage setting and tried to extinguish the fire with hammers. However, the curtain burst into flames and the flames spread rapidly to the other 46 curtains that were suspended all across the stage.</p>	
(2) Emergency Call	Emergency Call	Yes <input checked="" type="checkbox"/> (by one of audience) Time elapsed since detection (8) minutes No <input type="checkbox"/> by the flymen
	<ul style="list-style-type: none"> ◦ A fireman happened to be in the audience. When he saw a piece of the burning fabric falling from the top of the stage and two men running in that the direction and trying to pull the curtain down, he realized the fire by instinct and made a 119 call (fire emergency call) from the phone in the hall entrance. During this time, all the audience was still enjoying the show and no-one even stood up. No announcement was made over the PA system. ◦ 2nd call to the fire station - made by the guard on the Kyobashi watchtower, 30 seconds after the 1st call (16:20:30) ◦ 3rd call to the fire station - made by the fire detector in the guard room of Takarazuka Theater (16:23) 	
(3) Initial Firefighting Activities	Initiated	Successful <input type="checkbox"/> Failed <input checked="" type="checkbox"/> ◦ Extinguished time <input checked="" type="checkbox"/> ◦ Firefighting difficulty <input checked="" type="checkbox"/> ◦ Firefighting method <input type="checkbox"/>
	Not Initiated	◦ Extinguished time <input type="checkbox"/> ◦ Firefighting difficulty <input type="checkbox"/> ◦ Firefighting method <input type="checkbox"/> ◦ Other <input type="checkbox"/>
(Reasons or Conditions) <ul style="list-style-type: none"> ◦ A theater staff member rushed to the site with a foam extinguisher, but since he held it side ways, the content was released unintentionally and the extinguisher was no longer usable. ◦ Attempts to control the fire with a dry chemical extinguisher and indoor fire hydrants failed since the fire broke out at approximately 10m above the ground, and the release pressure was not effective enough to control the fire. ◦ Attempts made by 4 to 5 audience members on the west side of the seating area by using the indoor fire hydrant from the lobby of the 1st floor also failed due to heavy smoke and the intensive combustion. ◦ The theater staff member continued to prevent the fire from spreading by using 3 indoor fire hydrants until the firefighters arrived. 		
(4) Summary of Firefighting Activities	(Obstacles or Difficulties in Fire Control) <ul style="list-style-type: none"> ◦ When the fire broke out, the audience and the spectators created total chaos on the street, which interfered with incoming fire engines and the allocation of the firefighters to the water facilities to set things up for operation. ◦ When the first team of firefighters arrived onsite, black smoke was pouring out of the windows on the south and north sides of the 2nd and 3rd floors. The flames on the stage were at a peak and were still growing in the audience seats on the 1st to 3rd floor level. Because of the heavy smoke and heat inside the building, the firefighters could not go enter further inside. 	
	Rescue <ul style="list-style-type: none"> ◦ By people - From the building construction site that was west of the theater, approximately 245 construction workers came to help. They used their ladders and lumber and rescued 1 audience member from 1st floor, 37 theater staff members from the 2nd floor, 12 theater staff members from the 3rd floor and 15 people from the roof. ◦ By firefighters - Rescued 31 people from the 2nd floor and 4 people from the roof. 	

(5) Evacuation	Means of Escape (No. of Persons)	Obstacles to Evacuation
	<ul style="list-style-type: none"> ◦ Stairs [X] (approx. 2,000) ◦ Elevators/Escalators [] () ◦ Escape equipment [] () ◦ Directly to ground from windows or openings [] () ◦ Rescued [X] (35) ◦ Other (Rescued by general public) [X] (65) 	<ul style="list-style-type: none"> ◦ No windows [] ◦ Barred openings [] ◦ Locked emergency doors (Exits) [] ◦ Alarm system [] (Poorly controlled, Malfunctioned, Not installed) ◦ Power outage [] ◦ Other () []
<ul style="list-style-type: none"> ◦ There were approx. 1,300 audience members in Takarazuka Theater. Some of audience and the theater staff opened all the emergency exits, and 4 firemen who happened to be there as part of the audience and the theater staff guided the evacuation. Because of these actions, most of the people on the 1st floor were able to evacuate from the hall entrance, and 17% of them evacuated from the north- and south-side emergency exits. Most of the audience on the 2nd and 3rd floors evacuated from the center stairs, and 8 of them evacuated from the south-side stairs. ◦ Because of the appropriate evacuation instructions given by the theater staff, out of approx. 1,500 audience members who were at La Scala Theater (4th and 5th floors), 90% of them evacuated using two outside stairs and approx. 10% of them using the through stairs without any panic. ◦ Approx. 500 audience members who were at Toho Theater (5th floor) found out about the fire from the theater staff and evacuated using the outside stairs without panic. 		
(6) Casualties	Healthy individuals 3 (drunken persons) Individuals in need of assistance Infants Elderly Disabled 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 () []
<ul style="list-style-type: none"> ◦ 3 actors (1 male and 2 females) were killed (by asphyxiation during the evacuation and/or full-body burn) ◦ They were all found in the same place, the landing of the emergency exit next to the stage on the 1st floor (south/ Imperial Hotel side of the theater). ◦ Their dressing rooms were on the mezzanine and the 2nd floor. It was assumed that they came down after being notified of the fire, but had become trapped by smoke. 		
IV. Issues and Lessons Learned		
<ol style="list-style-type: none"> 1. 10 outlets were connected to the indoor fire hydrant whose outlet capacity was 5, which resulted in lowered pressure and water. 2. The fire shutter that was installed as a fire compartment to the stage was electrically operated, which would be damaged during a fire and stop working. At least two sets of fire shutters should be installed as a fire compartment and such shutters should be remote-controllable from one place. 3. Noncombustible materials should be used for the ceiling and interior walls of any audience area. No combustible materials should be used as a fire compartment for the stage. 4. The emergency exits for the audience were well prepared, but insufficient backstage. 5. Many evacuees stumbled on the slope around the seating area, in the corners of the inside stairs and in the exit around the stairs. In contrast to this, on the outside stairs (long through stairs) from the 4th and 5th floors, no-one stumbled. Given this fact, it is ideal to design an evacuation route to be simple as possible. 		



Note: Those who died in this fire were all actors and all were found on the 1st-floor landing of the dedicated stairs to the dressing room on the 2nd and 3rd floors.