

Fire Investigation Report of Club “Santika” in Bangkok

Kyoichi Kobayashi

*Center for Fire Science & Technology, Research Institute for Science & Technology,
Tokyo University of Science, Japan*

1. INTRODUCTION

Before dawn on January 1, 2009, a fire broke out and killed 66 people at Club “Santika” in Bangkok, Thailand (*Image 1*).

The number of deaths in the fire was much larger than any fire accidents occurred in Asia in recent years. Tokyo University of Science of Japan under the Global COE Program (GCOE) of “Center for Education and Research on Advanced Fire Safety Science and Technology in East Asia” conducted a collaborative field survey with National Research Institute of Fire and Disaster (NRIFD) of Japan in the light of its objective “to promote developments in fire prevention and safety measures in rapidly urbanizing and modernizing East Asia.”

Focusing on the fire in Club “Santika” as one of the GCOE fire case studies, this article will sort out fire prevention problems that may cause heavy loss of lives and will examine the possibility of similar disaster in Japan.

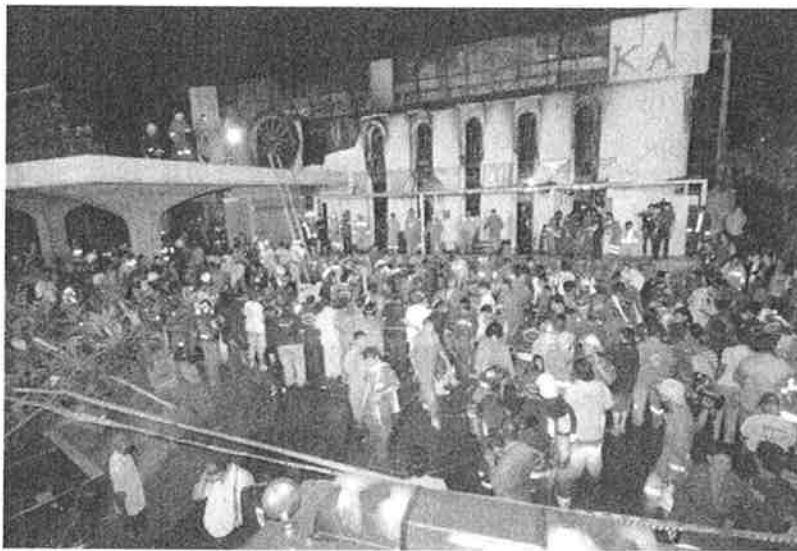


Image 1 The scene of the fire in Club "Santika"

(Provided by General Fire and Rescue Department of Bangkok Metropolitan Administration)

2. THE FIRE IN CLUB “SANTIKA”

2.1 Overview of the Fire Accident

■ Date and time	: January 1, 2009, 0:30 AM
■ Place	: Club “Santika” in Bangkok
■ Building structures	: Steel-frame structure, 2 stories above and a story under the ground
■ Area	: Total 1,683 m ² (estimated based on the plan) 1F 1,212 m ² (same as above) (of these, dance floor 355 m ² , VIP rooms 98 m ²) 2F 318 m ² (same as above) (of these, guest area 263 m ²) BF 153 m ² (same as above) (including restrooms)
■ Damage by the fire (fully damaged area)	: 1F 479 m ² (including seating area, backstage rooms, VIP room) 2F 288 m ² (including guest area, the upper part of VIP room) Total 767 m ²
■ Number of the Dead and the Injured	: Dead : 66 Injured : 236

(As of January 20, 2009)

2.2 Circumstances of the Fire

Summarizing the information obtained from local media reports and the authorities of architecture and fire prevention, the circumstances of the fire might be assumed as follows:

As there is no regulation with regard to interior fireproofing in Thailand, combustible material was used in the interior fittings of the club. Fire extinguishers were equipped but not used. Emergency exit sign lighting was reported to be installed but yet to be confirmed.

(1) Description of the fire accident

It was at midnight of New Year’s Eve and the guest area (*Figure 1* ㉔) was packed full with about 400 people of pairs and groups who were excited about celebrating the New Year together. The club also had a stage and seating area in the terrace on the south side. Thus the club was crowded with almost 1,000 people both indoor and outdoor. In such a fully-packed condition, countdown to the New Year started. Firework display began on the stage and guests were also given sparklers. The movie posted on YouTube shows people swinging around sparkles together just before the fire broke out.

Reportedly, the cause of the fire is that fireworks displayed on the stage ignited combustible material near the ceiling (*Figure 1* ㉓).

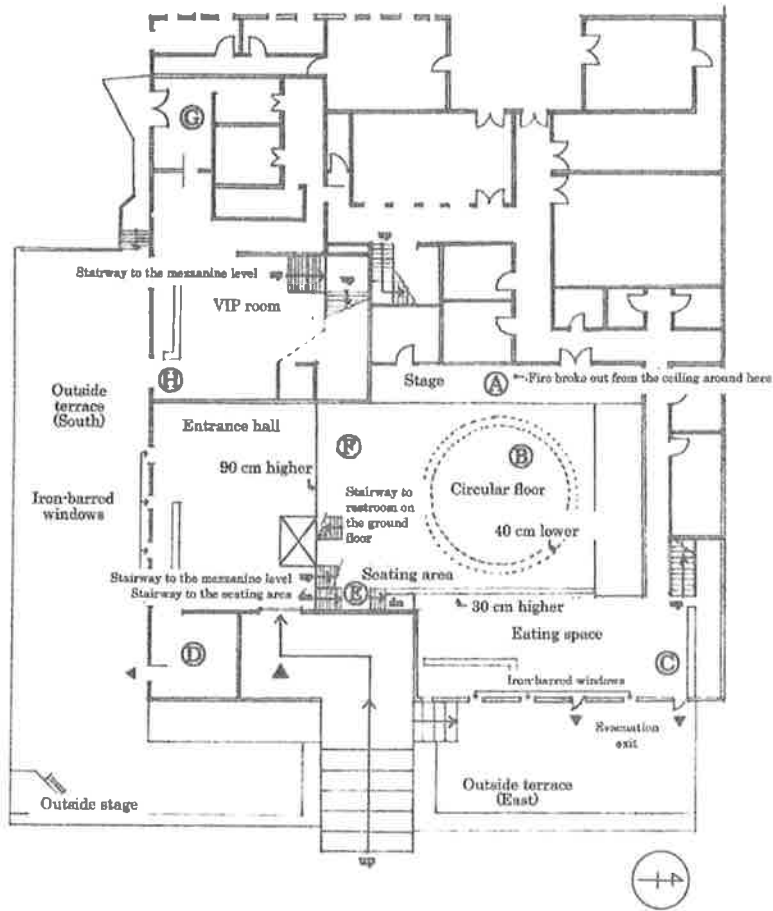


Figure 1 Floor plan of 1F in Club "Santika"

(2) Conditions of evacuation

Right after the outbreak of fire, most of guests either did not notice it or believed it to be a part of the show. Therefore, few people started evacuating immediately.

Performers had already started evacuating at that time through the evacuation route in the back area. Nobody including club staff tried initial firefighting or provided the guests with evacuation guidance.

As the flames from combustible material near the ceiling rapidly spread out to the sides, many guests noticed the fire by radiant heat from the top of them and thick cloud of black smoke. Then they rushed to exits all together.

Lights went out soon, then after a while, a chandelier with a diameter of nearly 10 m fell down. (A considerable number of people were crushed to death under the chandelier but details are unknown.)

2.3 Evacuation Routes from the Guest Area

(1) Conditions of evacuation routes

Except for the main entrance, there were two major evacuation routes from the guest area that had exits of 70 cm wide each leading to the terrace on the east side (Figure 1 ©).

There were hallways from the stage or the side of the stage toward the back area that could serve as evacuation routes, but they ran to the direction of the fire. Therefore, it was difficult to escape through these routes without appropriate guidance by those who were familiar with the structure of the building.

Windows of the guest area were tall and about 70 cm wide each. Among six windows on the east, two also served as doorways and thus was used as evacuation exits. Although the other four windows were fixed, they were broken and people escaped through them.

Four windows on the south were all fixed and iron-barred, so they could not be used as evacuation exits.

Also there was a lobby by the front door next to the entrance hall that led to the terrace on the south side (Figure 1 ①). Some escaped through this way and it also worked for rescue efforts.

To summarize, three exits (main entrance and two windows on the east terrace) and a lobby by the front door were the only evacuation routes from the guest area. As a result, the crowd rushed for these limited ways to flee for safety.

(2) Problems with the evacuation routes

When the guest area is considered as a part of evacuation routes, the following problems arise:

(i) At the center of the guest area, the floor lowered by about 40 cm in a circle. On the contrary, the floor by the east terrace got higher by about 30 cm. The guest area was lower by about 90 cm than the entrance hall. In order to bridge between different levels, two to five steps were installed. The complicated uneven structure of the guest area made evacuation behavior seriously difficult and complex.

(ii) Tables placed in a semi-circular way around the circular lower level in the center of the guest area obstructed escape to the entrance hall. Small counters to put on drinks and foods were placed close together that also became huge obstacles.

(iii) The passage from the seating area to the entrance hall was limited and narrow because it was blocked by stairway to the mezzanine level. It had enough space for ordinary use but must have been a bottleneck in the case of a mass evacuation.

(iv) As the club had few exit sign lighting nor emergency lights, people could not find evacuation routes when the lights inside the rooms was cut off due to the power failure.

Because of the above mentioned reasons, evacuees fell over one on top of another at the space going up into the entrance hall and the largest number of victims died here.



Image 2 Stairway from the seating area to the entrance hall (Figure 1 (E))

2.4 VIP Room, the Terrace on a Mezzanine Level and Restroom on the Ground Floor

The guests were located in one of the following three areas except for the seating area when the fire started.

One of them was VIP room at the back of the stage. There is a wall between VIP room and the entrance hall or the seating area on the plan, but actually the wall between VIP room and the seating area was left open (Figure 1 (F)).

We were unable to identify why the opening was there; it could be made because the wall was fallen down in flames or it was just because the actual structure was different from the plan.

VIP room had a two-layer structure with stairway within the room. The doorway for exclusive use of VIPs was at the back of the terrace on the south side and it was served as an evacuation exit. Being next to the origin of the fire, VIP room was burning fiercely. However, less fell victim to the fire (yet to be confirmed) because they were easily able to find their evacuation route. In addition, windows on the south terrace were broken and left open. It is unknown when the windows were broken, either by evacuees or rescue team, but it seems that the victims were escaped or rescued through those windows.

Another place where guests stayed at the time of fire was the mezzanine level above the seating area. The mezzanine level was installed along the inner wall aside from the stage into a U-shape terrace, from where guest could look down at the stage and the seating area. There were some windows on the wall of the east and the south side.

However they were barred and could not be used as evacuation exits. Accordingly, the stairway down to the entrance hall and the seating area was the only route for evacuation. As those who escaped downstairs to the entrance hall joined other evacuees from the seating area on the first floor, there was no way to avoid blocking the flow of the crowd.

The third place was the ground floor including restroom, where twenty to thirty people who overflowed from the first floor had already stayed. Then the fire broke out and they were trapped in. As the fire broke out at the ceiling and spread downward, the impact to the ground floor seemed to be less dangerous. The active behaviors of people who tried to lock themselves in by preventing invasion of smoke also worked and many of them were rescued by firefighting team when the fire went down.

3. CAUSE AND PROBLEMS OF HEAVY LOSSES

3.1 *Causes That Took a Heavy Toll of Lives*

Based on the field survey and discussion with Office of the Building Control Committee Board and the Fire and Rescue Department, I personally think the reasons why so many people died in the fire were attributable to the following conditions:

- (1) Fireworks displayed carelessly in the fully-packed night club.
- (2) Combustible insulating material was used in the upper part of the stage.
- (3) The flame spread rapidly.
- (4) A large group of people who were densely-packed needed to escape.
- (5) Insufficient number of evacuation exits as well as the difference in levels and other obstacles prevented people from getting out of danger.
- (6) No automatic fire alarm was installed.
- (7) The club was not equipped with enough emergency lights or exit sign lighting to secure luminance in case of power failure.
- (8) Staff did not provide guests with appropriate guidance for evacuation.
- (9) Reasons mentioned in above (3) to (8) caused delay in evacuation or people could not escape even though they tried.

3.2 *Discussion from the Perspective of Japanese Regulations for Fire Prevention*

The building structure and planning of Club "Santika" are as common as those seen in Japan. Although it did not have plenty of evacuation routes, it can be considered as legal in the light of the Japanese Building Standards Act.

There was a high possibility that the complicated structure of different levels in the seating area as well as the bottleneck created by stairways up to the entrance hall increased the number of deaths. However, even in Japan, the structure is compliant

with the Building Standard Act. It seems difficult to attribute the cause of the disaster to technical criteria derived from related regulations. Rather, it can be viewed as owing much to planner's consideration.

The Building Control Act in Thailand provides no restriction of interior material. One of the causes of the fire breaking out and spreading rapidly is considered to be the use of combustible interior material in the stage, and especially, spray urethane that are quite easy to burn used as heat-insulation material in the ceiling (the local people called it "sound-insulation.")

Given the above mentioned understandings, we can find problems in the fire prevention of Club "Santika" by comparing with the Japanese fire prevention laws and regulations.

(1) Restriction on the use of fire

In Japan, the use of fire is controlled by the Fire Prevention Ordinance. The Fire Prevention Ordinance (referred to as "the Ordinance") is typically applies to stages and seats in theaters or selling and exhibition spaces in department stores, while usually there is no specified requirements for stages and seats in discos or night clubs.

However, the Ordinance may cover "the places that might have risk of losing human life in case of a fire." Therefore most municipalities that have discos or night clubs within the area apply this restriction on the use of fire to stages and seats of facilities such as discos and night clubs. Thus in Japan, the use of open flame or firework display in such places is basically prohibited.

(2) Restriction on interior material and flame retardation regulations

When we apply Japanese Building Standard Act to Club "Santika," it seems very possible that the club is subject to the restriction on interior material because the room where fire broke out is regarded as one "without windows or any other openings." In that case, it is unlikely that just firework display directly ignited the ceiling.

Yet, although the ceiling and wall were finished with incombustible material, sometimes they are decorated too much with combustible material after completion. Even if the decoration can be also regarded as "finishing" and thus covered by the restriction on interior material, controlling before interior finishing as part of building confirmation is virtually difficult.

Curtains and carpets as well as thick curtains, stage curtains and plywood used in settings that are often used on the stage are all required to be flame retardant. Decoration equivalent to this equipment is of course subject to the flame retardancy restriction. But there must be considerable amount of decorative material that is not considered to come under the restriction.

Based on the above, if we apply Japanese restrictions on interior material or flame retardancy to discos and night clubs, ignition risk of ceiling, walls, furniture and decoration can be greatly decreased although it is hard to remove the risk completely.

(3) Sprinkler system

Stages in theaters have been strongly required to install sprinkler system. This is because when a fire breaks out on the stage, successful evacuation from the seating area is extremely difficult.

Fire accidents in stages of discos or night clubs occurred in some countries have shown similar or more dangerous possibilities, but these establishments are not required to install sprinkler system.

However, installation requirement of sprinkler for theaters only applies to those with 300 to 500 square-meter stages. Therefore, even if the regulation also applies to discos and night clubs, they have smaller stages and thus have no obligation to install sprinkler system.

(4) Evacuation control

When a fire breaks out in discos or night clubs, excessive noise and special lighting tend to impede people inside from being aware of the fire, resulting in delay in starting evacuation. For this reason, enforcement regulations related to the Fire Service Act requires to turn off special lighting and sound, and then secure enough brightness to help evacuation behaviors. This regulation was added in September 1991 after they become aware of the danger of a fire in discos or night clubs. If the requirement had been applied to Club "Santika," it would have had a certain level of effect.

The Ordinance also requires cabarets and restaurants to secure effective evacuation routes from the seating area and make sure that people either on chairs or at tables or in box seats can easily get to the routes.

It also provides that spaces that may be used to escape including evacuation exits, hallways, stairways, and evacuation routes must be kept tidy so that evacuees will not be trapped or slide, and that the doors of evacuation exits basically should open outwards and should not have locks. However, this applies to evacuation routes only. Therefore even if it is applied to Club "Santika," it cannot control the club's complicated structure and difference in levels between seating area to evacuation exits.

(5) Capacity control

While the Ordinance provides capacity of theaters based on certain circulation method and requires not to exceed the capacity, there is no specific criterion for other types of facilities.

One of the causes of the fire in Club "Santika" is said to be the high density of guests inside the club. They have pointed out similar problems in most fire accidents occurred in discos or night clubs in other countries. These facilities seem to need capacity control as theaters do.

(6) Other fire prevention laws

When we apply Japanese fire prevention laws and regulations to Club "Santika," it obviously has legal obligation to install automatic fire alarm, emergency exit sign lighting and emergency lights. Adequately equipped, this equipment could help guests to notice the need of escape earlier and make their evacuation easier.

As a part of obligations of fire prevention management provided by Japanese laws, they must appoint the fire prevention manager, prepare fire prevention plan, organize self-firefighting team that will work in case of fire, and conduct firefighting/evacuation exercises. Even in Japan, these soft measures are not sufficient. Therefore, it is uncertain whether they had worked well in Club "Santika" fire, but more appropriate response to the fire might have been possible.

4. SUMMARY

Late at night on January 31, 2009, while our survey team stayed in Thailand, a fire occurred in Fuzhou, Fujian in China, which was quite similar to the one in Club "Santika." In this fire, 17 people including guests died and 22 was injured.

If we go back in the history of fire, there were 22 cases occurred in discos or night clubs that involved a large number of deaths and often resulted in more than 100 fatalities.[1]

The reasons why fire in discos or night clubs takes so many tolls of lives are considered as follows:

- (1) Guests are fully-packed inside the buildings.
- (2) Evacuation exits are not enough considering the large number of guests.
- (3) There is only small number of windows, and when lights go out, people cannot find their evacuation routes.
- (4) People are likely to lose their self-control due to drinking and noise.
- (5) Sometimes excessive performance is shown.
- (6) Rooms are decorated too gaudy often with combustible material.
- (7) Fireworks are sometimes displayed inside rooms as a part of show. The flame may spread to the ceiling and cause a fire breaking out (reportedly, the fires occurred in discos or similar places in recent years that killed many people, including those in Club "Santika" and Fuzhou, China, were all caused by firework display.)

In recent years, these kinds of fire accidents have increased in Asia. Without doubt it can be said that one of the causes is increase of these facilities in major cities in Asia. However, we cannot overlook the fact that high risk of fire in these places has not been recognized and thus, careless use of fire is allowed.

As mentioned in the chapter 3, we believe that requirements provided by fire prevention laws and regulations secure the safety of buildings in Japan to a certain level. Given the risk of fire in these facilities, however, it is far from being perfect. If a fire breaks out and they fail to put out the fire, similar disaster may happen.

Still, fire that involves a great number of deaths rarely occurs in Japan. This is because most Japanese people are very careful about the use of fire. At least, it is quite unlikely that they would enjoy firework display in overcrowded rooms regardless of whether there are regulations or not.

ACKNOWLEDGEMENTS

Dr. Masayuki Mizuno and Mr. Masahiro Nagaki from Tokyo University of Science, Japan, and Prof. Tokiyoshi Yamada, Mr. Akihide Uchiyama and Mr. Daijiro Hayashi from National Research Institute of Fire and Disaster (NRIFD), Japan participated in and contributed to the survey and the report. Mr. Tomohiro Hasegawa at the Building Center of Japan also helped us in arranging our visits to local facilities and collecting information by making great use of his experiences and personal contacts during 4 years of stay in Thailand, mainly working for Office of the Building Control Committee Board in Department of Public Works and Town & Country Planning (DTP), Ministry of Interior. He helped developments of fire prevention criteria for buildings in Thailand.

The overview of the fire was grasped by the field survey at the scene of fire. With considerable help from Mr. Hideki Kizaki, a JICA senior volunteer and former head of Komatsu Fire Department who replaced Mr. Hasegawa and Thai Ministry of Interior, we were able to conduct the field survey.

Mr. Sinit Boonsit, deputy manager who are in charge of Office of the Building Control Committee Board, provided us with information about the relation between the conditions of the fire and the Building Control Act in Thailand, giving accurate and detailed understanding of the fire. Mr. Sinit Boonsit also allowed us to talk to a young technical officer, Mr. Surapong Teawsuwan, who were at the scene of fire and thus could tell us every detail of the conditions from the time of breaking out of the fire to evacuation. This was extremely helpful for us to understand the circumstances of the fire precisely.

I would like to express my gratitude to all of them for their tremendous support. (Titles of those who mentioned above are as of February 1, 2009.)

Note: Each municipality can enact the Fire Prevention Ordinance in its own right unless the ordinance is illegal, but most municipalities tend to set the ordinance by simply adopting the sample presented by Commissioner of the Fire and Disaster Management Agency or by partly modifying it according to the characteristics of their area. For this reason, this article assumes the related Fire Prevention Ordinance is mostly as same as the sample.

REFERENCE

1. Kyoichi Kobayashi, Fire in Club "Santika" and Circumstances of Fire Prevention in Thailand, Part II, Figure 1: Fires in Night Clubs and Discos (main fire accidents after 1970 and fires before 1970 to be mentioned), *The Firefighter*, 46-48, May 2009