

rate seems to be slow compared to some of the other, more catastrophic fires that have been presented.

Identified Critical Factors

The fire began when the ceiling materials were ignited by a pyrotechnical device. The choice of materials however did not allow a rapid spread of fire and smoke. The instructions of the staff helped to get every occupant out.



Image 8: Burning debris in the Luna nightclub; Image taken from [71]

3.5 República Cromañón, Argentina, 2004

In the late evening of the 30th of December 2004 a fire broke out in the nightclub República Cromañón in Buenos Aires, Argentina. The nightclub was hosting a popular rock band. The fire broke out due to a flare that was lit by somebody within the crowd of fans. In total 193 people died. The exact number of injuries is unknown and reports vary widely. In the newest

newspaper article 1400 injured people are mentioned [73]. This chapter is mainly based on newspaper articles as well as the official judgment by the jurisdiction of Buenos Aires.

Description of the Building and the Situation Prior to the Fire

The nightclub was located in a two-storey building. The main entrance was located on the lower floor and led to the outside. Right behind the main entrance there were six doors leading to the main area of the nightclub. Four of them were locked. A connection to a nearby hotel was on the same level. The emergency exit on the lower floor was locked with a padlock [74]. This exit was marked with an illuminated exit sign. Another exit was located next to the stage but was not used by many. A fence in front of the stage was blocking the way to this exit.

There are no reports of a detection and alarm system, emergency lighting, an automatic suppression system or a smoke and heat control system. Ten out of the fifteen fire extinguishers that were in the venue were depressurized and could therefore not function. Out of the remaining five, three were sealed and one had expired. The nightclub had a ventilation system that consisted of four fans above the stage designed to exchange air. Two of the fans were sealed by masonry [74].

The club's interior finishings consisted of polyurethane foam, some highly combustible materials and cotton wool. The walls were insulated with a layer of polyurethane foam on top of a layer of highly combustible cotton wool [74]. It is not reported whether the polyurethane foam was flame retardant or not.

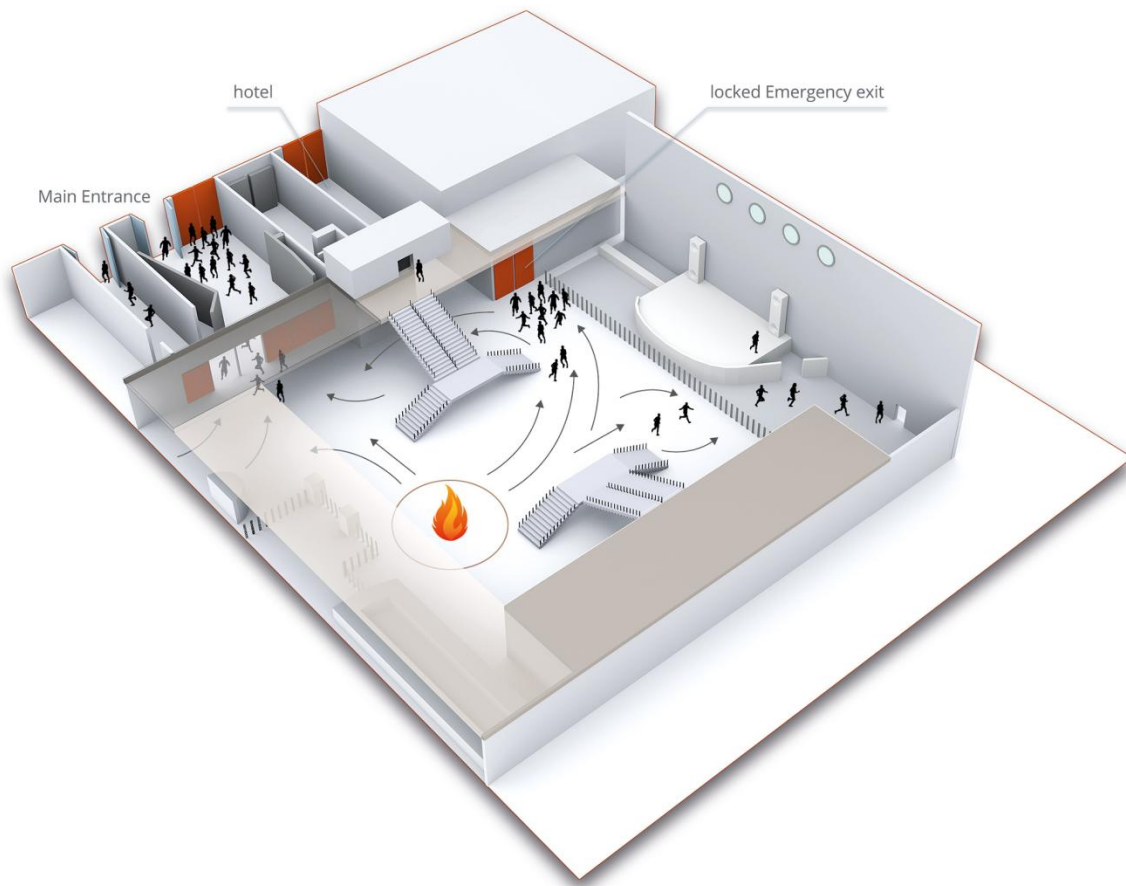


Figure 6: Layout of the República Cromañón nightclub; The flame indicate the origin of the fire; Figure based on [75]

On the particular night there were approximately 3000 people in the venue while the nightclub was allowed to host a maximum of 1031. The minimum number of occupants within the venue was found to be 2811 [76]. Other sources indicate an allowed number of 1300 but also indicate more occupants [77]. In [74] it is stated that three times as many people as allowed entered the venue. Witnesses stated that it was very crowded and that moving was partly not possible. Also minors were granted permission to enter the nightclub by the guards even though the nightclub sold alcoholic drinks and was therefore not allowed to let minors enter [76]. The nightclub's fire safety license had run out in November and needed to be renewed by the fire department. This did not happen.

Description of the Incident and Human Behaviour

Somebody within the crowd lit a flare which ignited the ceiling. When the combustible materials caught fire, toxic gases were produced and quickly spread through the venue. The

technical institution INTI calculated the level of toxicity based on the materials and volume of the building [74]. They found a level of 225 ppm of cyanide in the air. A lethal dose for lab rats lies in between 150 ppm and 220ppm. The light went out shortly after the fire started. It is unknown whether this happened due to the fire or if someone switched them off purposefully [74].

Witnesses reported that people were jumping over each other and that some occupants fell on the ground and were trampled. Those who managed to exit the venue tried to help the fire fighters and paramedics [77]. Many people were attracted by the emergency exit sign light above the locked door. According to survivors, the firefighters opened this door 40 minutes after the fire began, however, the firefighters state it was less. Most of the victims were found around that area [74]. A lot of people were under the influence of alcohol [78]. Many people ran towards the toilets on the upper floor instead of trying to make their way towards the exits. Most of the fatalities were due to smoke inhalation [77].

Identified Critical Factors

The nightclub did not have an approved fire safety concept. The fire was started by a pyrotechnical device. The choice of materials led to an easy ignition as well as to a fast spread of fire and smoke. There was no evidence of a detection and alarm system, an automatic suppression system or a smoke and heat control system. The fire extinguishers, except for 1 out of 15, were not functioning. The nightclub was overcrowded. The emergency exit on the lower level was locked. Of the 6 doors leading to the main entrance four were locked which hindered the evacuation even further. The exit at the stage was blocked by a fence. Shortly after the fire started the lights went out making orientation and evacuation more difficult.

It is mentioned that a lot of people were under the influence of alcohol. It is not known if this had a negative effect on the evacuation or not.

3.6 The Station, U.S.A, 2003

On the 20th February 2003, a fire broke out in The Station nightclub in West Warwick in Rhode Island in the U.S.A. The Station was hosting several bands. The fire broke during the main act of the night. The band started their performance with a pyrotechnic display which