

Fire in dancing club with 194 deaths caused by toxic gas inhalation

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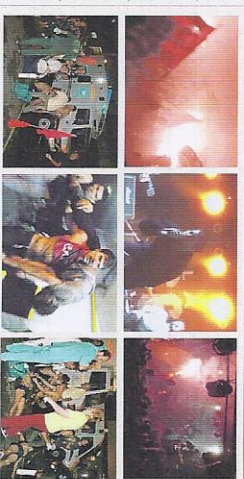


INTRODUCTION

BUENOS AIRES, Argentina, Dec. 31, 2004. A rock concert performed by the local band "Los Callejeros" (*street people*) was taking place at a dancing hall called "Cromagnon Republic" (1500 m²). The place was overcrowded, there were over 4500 concertgoers, far beyond the site's capacity of 1100. People attending these shows frequently set off flares (hand pyrotechnic aerial device). The deflagration of a "three shoots" flare launched by a fan ignited the flammable acoustic material in the ceiling, sparking a blaze that killed 194 people and injured more than 700, thus causing one of the worst disasters in Argentina. The fans fought to reach the exits while burning debris were falling on them just to find that at least four escape doors had been locked in an apparent attempt to prevent people from entering the place without paying. Meanwhile a hot black cloud of poisoning gas was spread over the crowd. Although many people could be carried out of the building and were laid in the street while helpers tried to fan them in an effort to revive them, many victims died from smoke inhalation. Hospital lists showed that most of the victims were in their teens and 20's. Even some fans had brought their little children to a makeshift nursery that had been set at the ladies room, while some others were holding their babies in their arms during the concert.



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PROBLEMS IN THE BUILDING

- Overcrowding with inadequate exits
- No fire suppression system
- No active municipal fire detection system
- Delay in acknowledging the "problem"
- Limited knowledge of the building
- Blocked and hidden doorways
- Smoke obscured all visibility, "lights out!"
- Flame spread at high velocity

THE BIG KILLER - Ceiling coverings (177 m²)

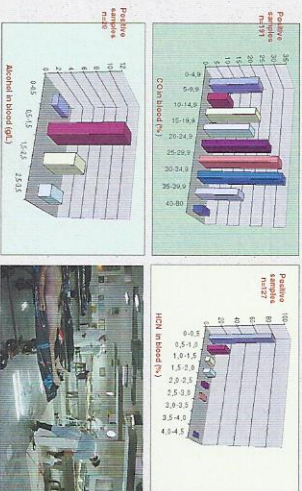
Poly-urethane Foam
"Guata" Poly(ethylene terephthalate) PET
"Media sombra" Polyethylene resin

- The combustion of these synthetic materials produced flame spreads at high velocity
- The concentration of gaseous products released under the fire conditions were:
 - Hydrocyanic acid (HCN): the theoretical combustion of total poly-urethane produced 1,45kg HCN
 - Carbon monoxide (CO): the thermal decomposition of the three polymers under low oxygen content produces CO concentrations at fatal levels
 - Others irritant gasses: oxides of carbon and nitrogen, acrolein, hydrogen fluoride
- Particulate matter: small particles of carbonaceous matter

CONCLUSIONS

- ✓ The results of the autopsies presented correlate with multiple causes of death
- ✓ Most of the fatal victims were inside the building and in the first 10 minutes after fire
- ✓ Patients treated in area hospitals improved (many with respiratory and neurological sequels)
- ✓ All of the survivors exhibited the syndrome of posttraumatic neurosis and continue a long term follow up

TOXICOLOGICAL RESULTS



MECHANISM OF DEATH

- Anemic hypoxia carbon monoxide poisoning which inhibits the ability of haemoglobin to bind oxygen.
- Histotoxic hypoxia the cells are unable to effectively use the oxygen due to hydrocyanic acid.
- Mechanical asphyxia obstruction of the respiratory tract by deposition of carbonaceous lamellar particles
- Metabolic acidosis aggravate the synergism of both hypoxias.



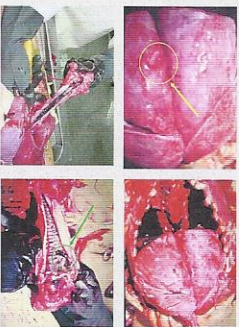
Disposition of victims on the caulsically established (pre-mortem) procedures.



Masculine victim with face covered with solid soot particles and respiratory tract injuries



Feminine victim (19 years old) with intense cherry-red skin colour associated with severe carbon monoxide poisoning observed in face and ears. Thermal burns and solid soot particles in the respiratory tract.



Lungs with intense bright red coloration and petechial rash due gaseous poisoning. The opening of trachea - larynx shows deposits of carbon black particles and several tissue burns.