





© IFSC 2004

## FIRE SAFETY IN LATIN AMERICA – PROBLEMS AND POTENTIAL SOLUTIONS

by Jaime A. Moncada, PE

	FIRES SINCE 2000 (MORE THAN 100 FATALITIES)	COUNTRY	DATE	FATALITIES
1	MRTC Church*	Uganda	Mar 00	530
2	Ycua Bolaños Supermarket (Asunción)	Paraguay	Ago 04	400
3	Comayagua Prison (Comayaguay)	Honduras	Feb 12	361
4	Dongdu Disco (Luoyang)	China	Dic 00	309
5	Mesa Redonda Shopping Area (Lima)*	Peru	Dic 01	291
6	Ali Entreprises Garment Factory	Pakistan	Sep 12	289
7	Kiss Nighclub (Santa Maria)	Brazil	Ene 13	242
8	Taegu Subway*	South Korea	Feb 03	198
9	Cro-Magnon Nightclub (Buenos Aires)	Argentina	Dic 04	194
10	Kaprun Train Tunnel	Austria	Nov 00	155
11	Lame Horse Nightclub	Russia	Dic 09	156
12	Higüey Prison (Higüey)	Rep. Dom.	Mar 05	134
13	Jilin Baoyuanfeng Poultry Plant	China	Mar 05	120
14	Tazreen Fashions Factory	Bangladesh	Nov 12	112
15	San Pedro Sula Prison (San Pedro)	Honduras	May 04	103
16	The Station Nightclub	USA	Feb 03	100

\* Arson fire.  
List compiled by Jaime A. Moncada from print papers and other published reports (March 2013)



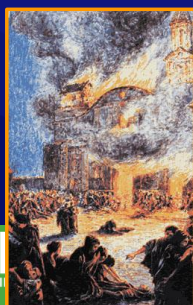

## THE FIRE PROBLEM WORLDWIDE

- Perception that large fire losses are a “developed world problem”
- Of the largest loss-of-life fires, most have occurred in the developing world
- In countries with sub-standard fire codes, little enforcement, and few FPEs






## MANY LARGE FIRES IN LATIN AMERICA...

- Compañía de Jesús Church, Santiago, Chile (between 2000 y 3000 deaths in 1863, probably the largest loss of life fire worldwide)
- Flores Theatre, Acapulco, México (approx. 250 deaths in 1909)
- Nacional Library, Lima, Peru (100,000 vols y 40,000 mans in 1943)
- Vida Store, Bogotá, Colombia (200 deaths in 1958)
- Guatemala City Mental Hospital (255 deaths in 1960)
- Grand North-American Circus, Niteroi, Brazil (323 deaths in 1961)
- Joelma High rise fire in San Paulo, Brazil (188 deaths in 1974)
- Oil Tank Boil-Over, Tocoa, Venezuela (220 deaths in 1982)
- Pemex San Juanico LPG tank farm, Mexico City (400-500 deaths, 1984)
- Dupont Plaza Hotel, San Juan, PR (97 deaths, in 1986)



## JOELMA HIGH RISE (1974)



## # 2 - YCUA BOLAÑOS SUPERMARKET

Asunción, Paraguay – 1 Aug '04



- 400 dead
- 360 injured
- New Supermarket (open Dec 7, 2001)
- Two floors plus mezzanine; 4,000 m<sup>2</sup> on main floor; masonry construction with metal roof structure











### # 3 – COMAYAGUA PRISON FARM Comayagua, Honduras, 16 Feb '12

- 361 dead
- Two mirror 1-story masonry structures with metal roof
- Each structure is  $m^2$  separated by  $m$  walkway
- Each with 5 modules
- Each module housed 100 inmates, designed for 52
- Use Condition V - Contained



## COMAYAGUA PRISON FARM

- Fire origin was at a top bunk bed from unintentional open flame or smoking material
- Delay in notifying guards and opening the cells
- Inmates notified FD via cell phones
- Rapid response by the FD



## # 6 BOATE KISS Santa Maria, Brazil - 13 Jan '13



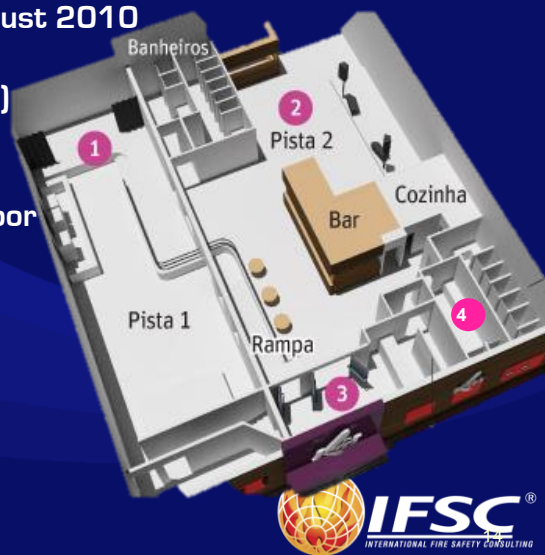
## BOATE KISS

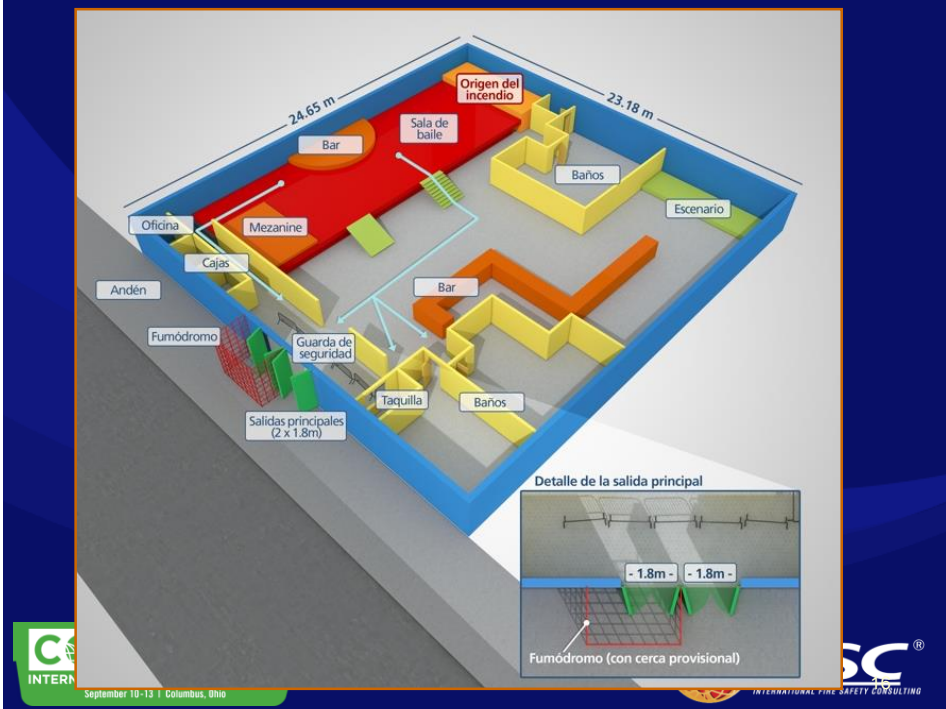
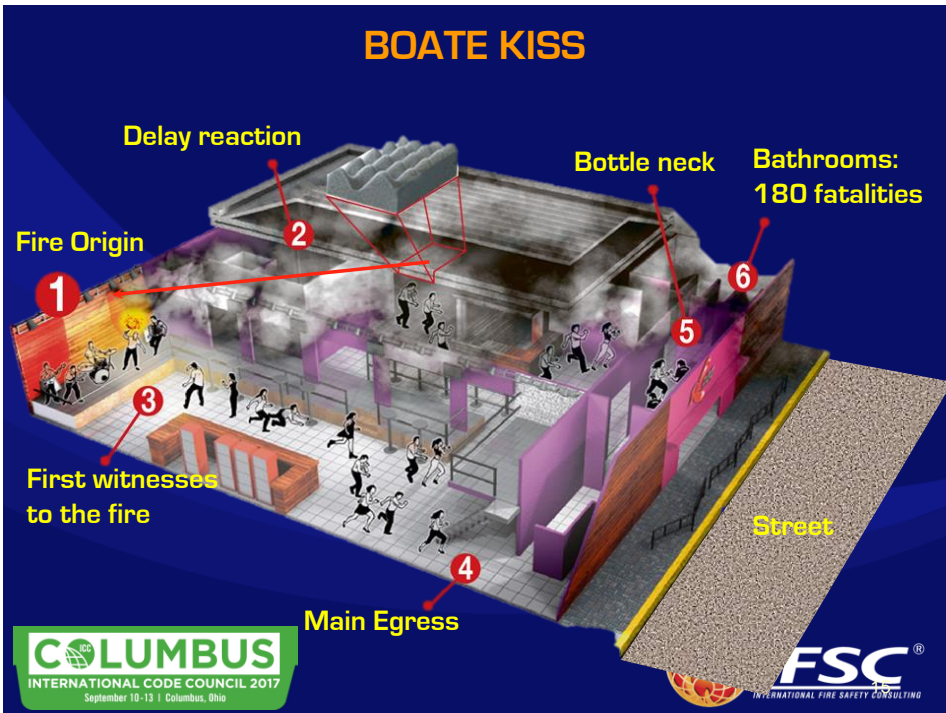
- 242 fatalities, 123 injured
- Santa Maria is a university town
- 3:00-3:15 am
- Band uses fireworks
- Polyurethane foam around band's stage



## BOATE KISS

- In operation since August 2010
- 23.2 m de wide by 26.5 m long (6,600 sf)
- Max capacity: 691 p
- 1. Fire Origin
- 2. Secondary dance floor
- 3. Only exit 1.8 m x 2
- 4. Bathrooms







## BOATE KISS

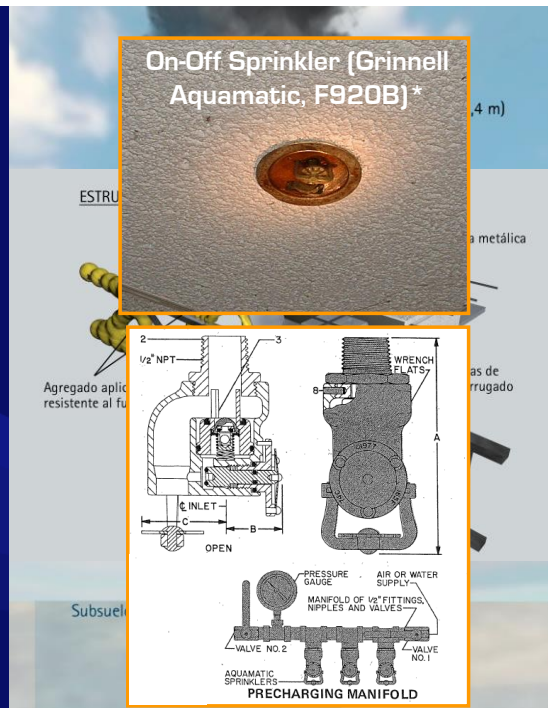
### Chronicle of a Death Foretold

- Overcrowding
- Expanded Polyurethane
- Lack of sprinkler protection
- Inadequate egress
- Fireworks



## PARQUE CENTRAL TORRE ESTE

- At the time, tallest in Latin America
- 55 floors
- 4 underground
- Built in 1982
- With AS



## GAS & CONDENSATES RECEPTION CENTER PEMEX - REYNOSA

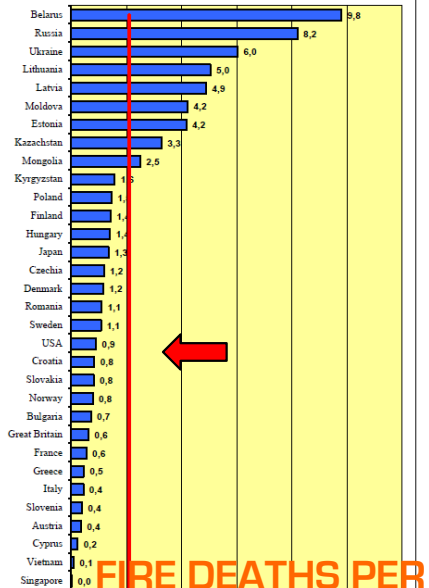
**Sep 18, 2012**  
**31 dead**  
**42 injured**



**ICC COLUMBUS**  
INTERNATIONAL CODE COUNCIL 2017  
September 10-13 | Columbus, Ohio

**IFSC**  
INTERNATIONAL FIRE SAFETY CONSULTING

Europe and  
Rus  
Esto  
Bela  
Lithua  
Ukra  
Kazakhs  
Hung  
Kyrgyzs  
Finkl  
Denm  
Norw  
Pola  
Bulge  
Cro  
Slove  
Swe  
Irel  
Czech Repu  
Fra  
Geo  
Roma  
Aus  
Germ  
Se  
Gre  
Netherla  
Switzer  
Ice  
Is



IS PER  
ATION

**FIRE DEATHS PER  
100,000 POPULATION**

FIGURE 3  
included  
Statistics

Fig. 3: Average number of fire deaths per 100,000 inh. (2012)  
Рис. 3: Среднее число погибших на 100,000 чел. (2012)  
Bild 3: Mittlere Brandtodenanzahl je 100,000 Einwohner (2012)

Countries were  
Statistics, Fire

**ICC**  
INTERNATIONAL  
September

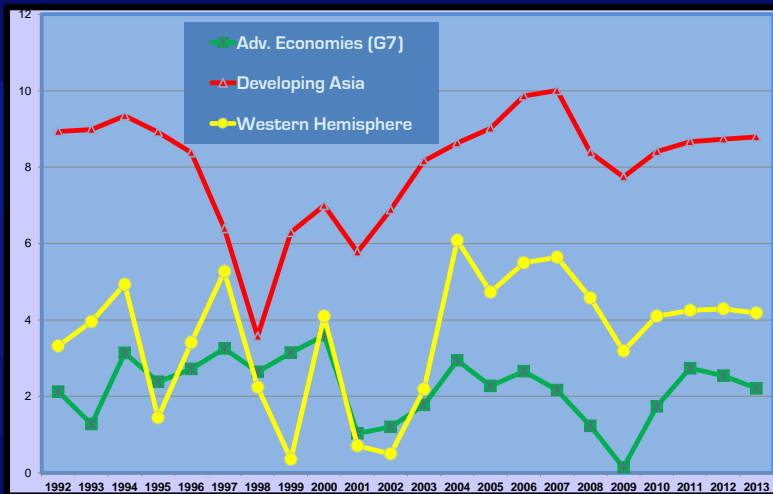
**IFSC**  
INTERNATIONAL FIRE SAFETY CONSULTING

## REGION IN TRANSITION

- ✓ Many years of uninterrupted growth
- ✓ Newer fire codes and some adoption of NFPA codes
- ✓ Extensive use of NFPA standards



## GDP GROWTH





## MOST COMMON PROTECTION

- Fire hose cabinets
- Extinguishers
- Smoke detectors
- Sound alarms
- Reflective exit signs



## LESS COMMON PROTECTION

- Automatic Sprinklers
- Egress/Compartmentation analysis
- Limited combustibility interior finishes
- Central station



## ÍCONO LOFTS, ASUNCIÓN

- Finished in 2011
- 32 apartments
- 40 stories, 492 ft high
- ≈ 5000 ft<sup>2</sup>/floor
- One exit
- No sprinkler protection



## LOCAL FIRE CODES

- Mostly local ordinances
- Overly simplistic, incomplete, hard to follow
- Limited enforcement
- Owners of large projects seek to comply with NFPA codes and standards



## CAN YOU RUN BEFORE YOU WALK?

- Need to understand what qualifies as “minimum acceptable”
- Need solid knowledge of prescriptive solutions
- Is it reasonable to believe that we can solve the fire problem by “jumping” ahead into PBD?



## UNDERLYING ISSUES

- Very few fire protection engineers  
Who can perform peer review?
- Limited code enforcement:  
Who approves?
- Open license to lower cost at the  
expense of “accepted fire safety”?



## SOLUTIONS

- Education, education, education
- NFPA: industry push
- ICC: Code enforcement community?
- IBC/IFC abbreviated?



**IFSC**<sup>®</sup>  
INTERNATIONAL FIRE SAFETY CONSULTING

**THANK YOU**

Jaime A. Moncada, PE

Tel +1 301 490 7803

Cel +1 301 674 2515

[jam@ifsc.us](mailto:jam@ifsc.us)

[www.ifsc.us](http://www.ifsc.us)



WASHINGTON - BOGOTÁ - GUAYAQUIL - LIMA - MÉXICO DF -  
MONTEVIDEO - SANTIAGO - SANTO DOMINGO