



Segurança contra Incêndios Fire Safety

I Conferência NFPA - Portugal



Arthur Cote

Segurança Contra Incêndios em Edifícios de Grande Altura Após o 11 de Setembro

Seguridad Contra Incendios en Edificios de Gran Altura Después del 11 de Septiembre

High Rise Fire Safety Post 11th September

NFPA - National Fire Protection Association (USA)

High-Rise Fire Safety

Post 9-11-01



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Has the potential for a terrorist attack changed our perception of the fire risk in high-rise buildings?



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September 2005

National Institute of Standards and Technology (NIST) released Final Report of the National Construction Safety Team on the Collapse of the World Trade Center Towers (DRAFT)



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- ◆ **The loss of life from fire in high-rise buildings has been historically very low**
- ◆ **Does current high-rise fire protection design take into account inoperable fire protection systems due to terrorist attack?**
- ◆ **Should we design for commercial aircraft flying into a major high-rise building?**



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Key components of modern high-rise fire protection design philosophy are:

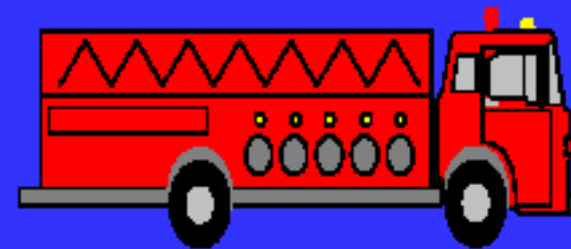
- ◆ **Fire protection design is independent of height**
- ◆ **Automatic sprinklers**
- ◆ **Open floor design (no compartmentation)**
- ◆ **Light weight (minimum fire resistance) structural elements**



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Key Components (cont'd)

- ◆ **Fixed standpipes for fire department use**
- ◆ **Fire alarm and evacuation notification systems**
- ◆ **Partial or staged evacuation (not full evacuation)**
- ◆ **Minimal or no use of elevators for evacuation or fire fighter use**



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Assumptions that form the basis for the design philosophy:

- ◆ **Automatic sprinklers are so reliable that there is no need for compartmentation or passive fire resistance based on sprinkler failure.**
- ◆ **All fire events can be contained and will be of insufficient magnitude to threaten the structural integrity of the building (i.e. no collapse).**



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Assumptions (cont'd)

- ◆ **It is not necessary or practical to totally evacuate a high-rise building in a fire emergency (including mobility impaired).**
- ◆ **It is not safe to use elevators in a fire emergency.**
- ◆ **The fire department can transport all of the fire fighting equipment it needs to the fire except for the water supply provided by the standpipe system.**



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Assumptions (cont'd)

- ◆ **Emergency communications systems can inform occupants of the emergency situation and provide accurate information including whether or not to remain in the building.**
- ◆ **The occupants of the building are familiar with the exits and have practiced an emergency plan.**



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- ◆ **The World Trade Center event brings into question many of these assumptions.**
- ◆ **What does NIST recommend with respect to high-rise fire safety design?**



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NIST Recommendations:

- ◆ **Prevent structural collapse**
 - **increase structural integrity**
 - **enhance fire resistance**
 - **performance design for total burnout without sprinklers**



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Caracas Venezuela, October 2004



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Caracas Venezuela, October 2004

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Madrid Spain, February 2005

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Madrid Spain, February 2005

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Madrid Spain, February 2005



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NIST Recommendations (cont'd):

- ◆ **Develop new fire resistive coating materials and high performance building materials**
- ◆ **Increase active fire protection as height of building increases (over 20 stories) for greater:**
 - **reliability**
 - **redundancy**
 - **reduction of potential single point failure**



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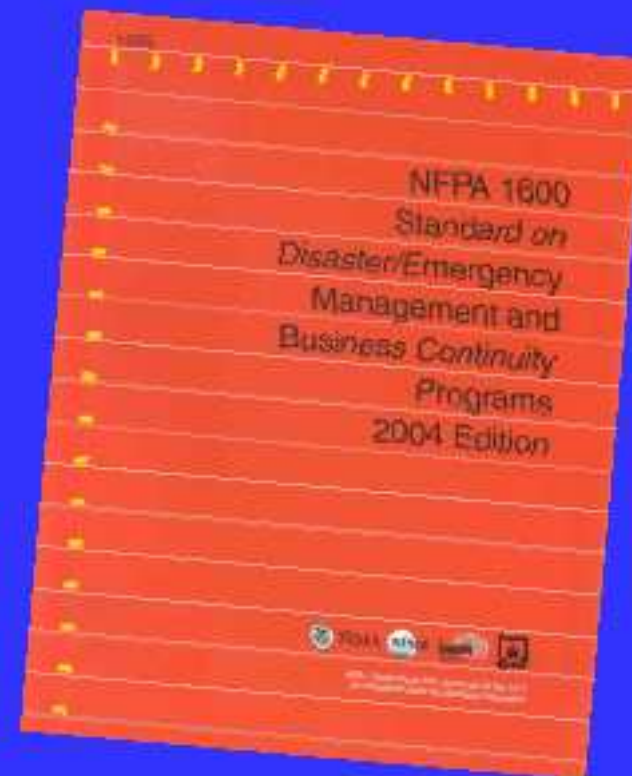
NIST Recommendations (cont'd):

- ◆ **Improve building evacuation**
 - **Conduct public education campaigns to improve building occupants preparedness**



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**NFPA 1600 has
been adopted by the
Department of
Homeland Security
as the National
Preparedness
Standard**



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NIST Recommendations (cont'd):

- ◆ **Design tall buildings (over 20 stories) for full building evacuation**

Consider:

- 1. Mobility challenged occupants**
- 2. Remoteness of exits**
- 3. Structural integrity of egress paths**
- 4. New evacuation technologies**
- 5. Elevators**



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- ◆ **Improve Emergency Response**

Install fire protected and structurally hardened elevators in 20+ story buildings for use by emergency responders

- ◆ **A fire protection engineer should be part of the design team for structures that employ innovative or unusual structural or fire safety systems**



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- ◆ **Is the added risk of a potential terrorist attack sufficient to warrant the added cost of these recommendations?**
- ◆ **High-rise fire safety design will change as a result of 9-11 especially in buildings over 20 stories in height**



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