1.3 Fire engineering in airports terminals (short version)
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FIRE ENGINEERING IN AIRPORTS TERMINALS

Specific challenges

- Iconic architecture
- Number of passengers
- Size
- Security

⇒ Fire engineering at the heart of building design

Fire & life safety =

- Passive fire protection
- Active fire protection
- Prevention/Management
- Intervention

⇒ Fire Safety Report

Project development

- Authority Having Jurisdiction
- Requirements
- NFPA: National Fire Protection Association-US
- Prescriptive vs. Performance
- Peer review

Authority having jurisdiction (AHJ)

- Define & enforce requirements
- Approve concept, design, materials…
- Who?
  - Ministry of Transport;
  - Civil Aviation Authorities;
  - Civil Defence;
  - Fire brigade;
  - Airport Authorities;
- What to do?
  - Find the AHJ
  - Meet AHJ as early as possible
  - Confirm which codes/standards are applicable
  - Collect any specific requirements
  - Explain the project and its special features

Requirements

- Law
- Associated countries
- National
- Regional
- Local
- International standards:
  - International: ISO
  - National but international use:
    - NFPA: National Fire Protection Association (US)
    - IBC: International Building Code (US)
    - BS: British Standard (UK)
- Corporate
- Owner
- Insurance
NFPA Standards
- Consistent set of more than 250 different standards
- World-wide used standards and largely accepted
- Specific standard for Passenger Terminal Building

Which NFPA Standards?
- Requirements
  - NFPA 415 Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways
  - NFPA 5000 Building Construction and Safety Code
- Design of Systems
  - NFPA 13: Standard for the Installation of Sprinkler Systems
  - NFPA 252: Standard Methods of Fire Tests of Door Assemblies
  - NFPA 92B: Standard for Smoke Management Systems in Malls, Atria, and Large Spaces

Prescriptive vs. Performance
- Prescriptive design
  - Architects and engineers
  - Based on prescribed requirements in regulations and referenced standards
  - Review by AHJ
- Performance design
  - Engineers
  - Based on agreed performance objectives and engineering analysis
  - Verified by peer review
  - Review by AHJ

For large airport projects: mix of the 2 approaches
- 95% prescriptive + 5% performance

Peer review:
Why?
- Building complexity – Large airport projects
- Fire safety engineering is a young and emerging engineering discipline
- Codes & standards are large, complex and intermingled
- Simulations are complex / results are difficult to interpret

Who?
- AHJ
- Third party architect/engineer; panel

Reviewer shall be
- Independent
- Qualified
- Experienced

CASE STUDY: Tripoli passenger terminal
Afriqiyah Airways

Which codes/rules are applicable?
- Is it an airport terminal (as per NFPA 415)?
- What type of occupancy?

NFPA: Roofs > 6.1 m Above Floor Below ☝ NO fire protection

Steel temperature?
- Localised fire calculation (EUROCODE 1 part 1.2): 5MW ok
- Bus fire: up to 20/30 MW: up to 10 m

Large 3D trusses ☞ Restraints