

## 1.3 Fire engineering in airports terminals (short version)

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EUROPEAN COOPERATION  
IN SCIENCE AND TECHNOLOGY

Action TU0904





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### FIRE ENGINEERING IN AIRPORTS TERMINALS



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### Specific challenges

- ✓ Iconic architecture
- ✓ Number of passengers
- ✓ Size
- ✓ Security

⇒ *Fire engineering at the heart of building design*

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### Fire & life safety =

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

⇒ *Fire Safety Report*

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### Project development

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

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### 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

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### 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

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## 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 101 Life Safety Code
  - ✓ **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
  - ✓ ....

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## Prescriptive vs. Performance

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

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

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## 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

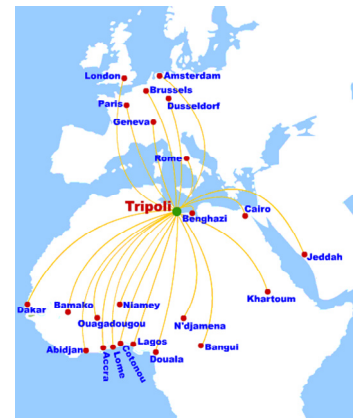
- ✓ Independent
- ✓ Qualified
- ✓ Experienced

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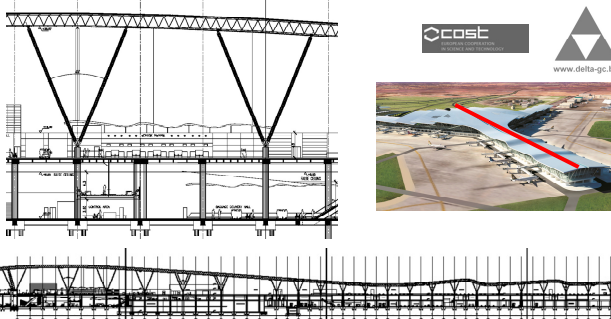
## CASE STUDY: Tripoli passenger terminal



### Afriqiyah Airways



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- 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 -> 10 m
- Large 3D trusses ⇨ Restraints

adpi

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## Which codes/rules are applicable?

- Is it an airport terminal (as per NFPA 415) ?
- What type of occupancy ?

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