



# ITA and Safety in Underground Facilities

Claude Berenguier, Secretary General  
 Presentation on behalf of ITA  
 ISTANBUL – 06 October 2009

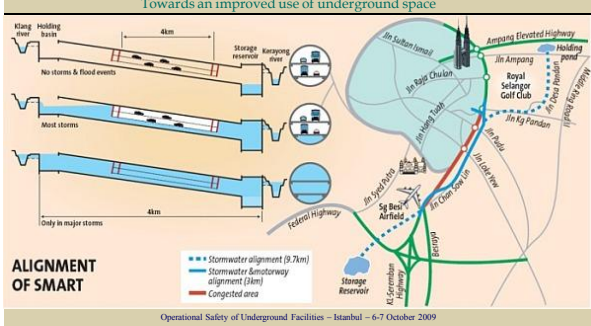
## Everybody knows WHY Transport Facilities have to go Underground in Urban areas

## Why Go Underground ?

Variety of the underground infrastructure in a city

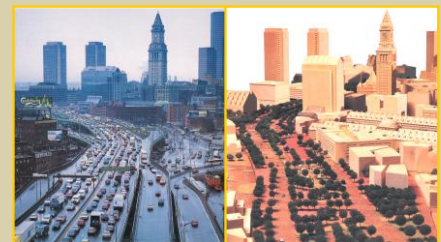


## Why Go Underground ?



## Why Go Underground ?

Central Artery-Boston (USA)



« City traffic tunnels clear vehicles from surface streets, traffic noise is reduced, air becomes less polluted and the surface street areas may partially be used for other purposes »

# Why Go Underground?

Towards an improved use of underground space



Taiwan



El Azhar, Cairo, Egypt

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# TRANSITIONAL STRUCTURES

Towards an improved use of underground space

Relations between underground structures and the ground surface



Paris – Metro Line 1 in Neuilly

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# OUTLETS OF TECHNICAL STRUCTURES

Towards an improved use of underground space

Relations between underground structures and the ground surface



Portal of the Fourvière Tunnel – Lyon ( France)

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# Why Go Underground?

Towards an improved use of underground space

## Car park at the square Estienne d'Orves in Marseilles (France)

Situation «before» and «after» the construction of the underground car park

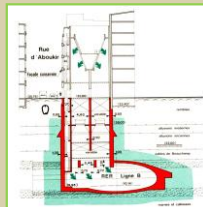


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# OUTLETS OF TECHNICAL STRUCTURES

Towards an improved use of underground space

Relations between underground structures and the ground surface



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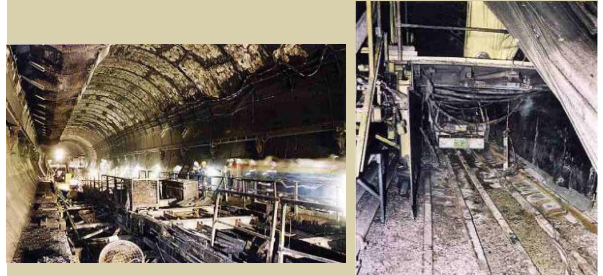
Towards an improved use of underground space

**ITA members know  
 we have to face some  
 Risks  
 in going Underground**

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# Risks during Construction

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Courtesy WDR  
 Running tunnel filled with inflow material

Courtesy STUVA - Crossover superimposed on the collapse  
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## Risk during Operation

### Kobe earthquake – Japan - 1995



Severe damage to the City Hall



Almost no damage to the underground shopping mall

### RISK MANAGEMENT IN TUNNELS UNDER OPERATION



## Risk Management

### All parties have a role to play in Safety and Risk Management

- » - Client
- » - Designers
- » - Coordinator for Health & Safety
- » - Contractors
- » - Manufacturers
- » - Professional Organisations
- » - Regulators and Standards makers
- » - Insurers

## Transfer of knowledge

ITA's mission is to transfer its knowledge for promoting the Use of Underground Facilities

- Non-Profit and Non-Governmental Organization
- Founded in 1974
- Member nations: 55
- Other nations represented by affiliate members: 10
- Corporate affiliate members: 147
- Individual affiliate members: 127
- 12 Prime Sponsors and 5 Supporters

- Owners, Public and Private
- Owner's engineering agencies
- Private and governmental Townplanners
- Architects
- Engineering designers & consultants
- Academia & Researchers
- Heavy construction contractors
- Specialty contractors (microtunnelling, shotcreting, freezing,...)
- Material & Equipment Suppliers
- Lawyers
- Politicians
- Economists
- Financiers
- Mine owners and mining operators

- AITES-ITA annual World Tunnel Congresses
- Training for Young professionals
- Organising international studies and experiments
- Publication of proceedings, reports, documents...
- Organizing Workshops and Colloquia
- Website
- Journal & Newsletter
- Communication with the Decision Makers

- **Committee on Operational Safety of Underground facilities**
  - Research
  - Contractual practices
  - Health & safety in works
  - Maintenance & repair
- **Committee on Education and Training**
  - Immersed & floating tunnels
  - Use of shotcrete
  - Mechanised tunnelling
- **Committee on Underground Space**
  - Underground works & environment
  - Long tunnels at great depth
  - Training
  - Conventional Tunnelling
  - Urban Underground solutions

### Committee on Operational Safety of Underground Facilities

Chaired by Felix AMBERG (Switzerland)

Vice-chaired by Didier LACROIX (PIARC)

- To help for Safe Operation
- Open for all interested parties dealing with design, construction, operation, use and research
- Organize thematic workshops and tests

**ITA COSUF is to be developed into a Centre of Excellence for world-wide exchange of information and knowhow regarding Safety and Security of Underground Facilities**

- **Forum for Road Tunnel Safety Officers:**
- Safety Officers introduced by EU Directive 2004/54/EC
- ITA-COSUF will organise and run jointly with the EU "European Forum of Road Tunnel Safety Officers" Date: 4.- 5.11. in Lyon
- ITA-COSUF Workshop on: 'Safety Challenges' at 5.11.2009 in Lyon

- Sponsoring of an ITA COSUF prize for outstanding activities and to support dedicated work of students within the scope of ITACOSUF
- Training courses within ITA-CET
- Specialised technical workshop co-organised with ISTSS

### Committee on Education and Training

Led by Andre ASSIS (Brazil)

and

WG 18 : Training

Led by Daniele PEILA (Italy)

- To coordinate the exchanges among the members
- To establish the contents and requirements of the Master courses endorsed by ITA
- To disseminate training and educational materials

### Committee on Education and Training and Working Group Training

- ITA-endorsed Master Courses
- Short Courses for Young Professional
- National and Regional Workshops
- Training Material from the Working Groups results on the ITA Website

- Why Go Underground in Urban Areas
- Health and Safety during Construction and Operation
- Risk Management
- Mechanized Tunnelling
- Conventional Tunnelling
- Waterproofing
- Sprayed Concrete

### UN-ITA Workshop on Underground Space Use in Developing Countries ("Group of 77") New-York - 14 December 2007

- Tunnels and Underground Space Use for:
- Clean and waste water
  - Energy efficiency and conservation
  - Foods and Goods storage in rural areas in harsh climates
  - Public Use and bulk storage in Mega cities
  - Safety during natural and manmade Hazards including Earthquakes
  - Multiple Use of Lands and Preservation of world heritage sites

ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN  
**ITA**  
 AITES INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

## 3 Committees and 12 Working Groups

Towards an improved use of underground space

- Committee on Operational Safety of Underground facilities
- Committee on Education and Training
- Committee on Underground Space
- **Research**
- Contractual practices
- **Health & safety in works**
- **Maintenance & repair**
- Immersed & floating tunnels
- Use of shotcrete
- Mechanised tunnelling
- Underground works & environment
- Long tunnels at great depth
- Training
- Conventional Tunnelling
- Urban Underground solutions

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## WG 2 - Guidelines for Tunnelling Risk Assessment

Towards an improved use of underground space



- To present a guideline for designers to prepare comprehensive tunnelling risk assessment
- To indicate to owners what is accepted industry practice for construction risk analysis
- Does not include contractor's risk management
- Published in `TUST` and in ITA Website

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## WG 05 Health and Safety in Works

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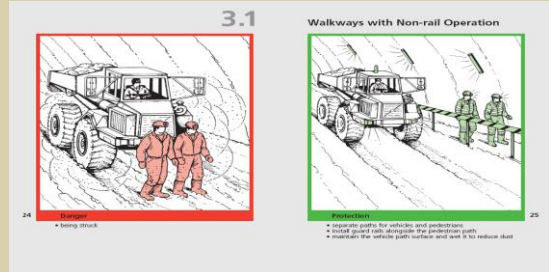


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## Example page: ITA Safety Book

Towards an improved use of underground space

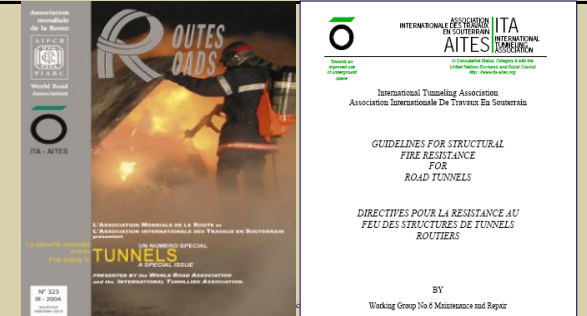


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## WG 06 STRUCTURAL FIRE RESISTANCE

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## WTC 2010

Towards an improved use of underground space

**VANCOUVER**  
 MAY14 - 20, 2010

**VISION 2020 POUR LES TUNNELS**

**TUNNEL VISION TOWARDS 2020**



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