

**Training session: *Main opportunities and technical issues in tunnelling***  
**Dubai 2018 – 21-22 of April**

**Objective:** After a first day dedicated to a general introduction on the advantages and main features related to tunnels and underground space use, especially in urban areas, the second day will focus on several technical topics of particular interest in a sustainable approach of the underground infrastructures.

**Saturday, the 21<sup>st</sup> of April:**

**Session 1: Introduction to underground solutions planning**

08.45-09.00: Welcome and Opening: ITA and country representatives  
09.00-09.45: Advantages and disadvantages of underground solutions  
09.45-10.30: Illustrated examples of opportunities and solutions  
10.30-11.00: Coffee Break  
11.00-11.45: Underground sustainable solutions for urban planning  
11.45-12.30: Key stakeholders in design, construction and operation  
12.30-13.30: Lunch

**Session 2: Decision process and project management**

14.00-14.45: Key planning and design issues  
14.45-15.30: Legal and compensation issues for underground space  
15.30-16.00: Coffee Break  
16.00-16.45: Case study 1: Singapore: underground planning and project management  
16.45-17.30: Case study 2: Key elements in a decision process  
17.30-18.00: Discussion

**Sunday, the 22<sup>nd</sup> of April:**

**Session 3: Technical aspects**

08.45-09.30: Investigations and main parameters for design  
09.30-10.15: The construction methods and their fields of application  
10.15-10.45: Coffee Break  
10.45-11.15: Case study 3: Launch of TBM in shallow tunnels  
11.15-11.45: Case study 4: Waterproofing: state of the art and new developments  
11.45-12.15; Case study 5: Short and long-term effectiveness of rockbolting  
12.15-12.30: Discussion  
12.30-13.30: Lunch

**Session 4: Specific underground structures**

14.00-15.00: Underground space use for energy storage  
15.00-15.45: Underground utility tunnels for a sustainable city  
15.45-16.15: Coffee Break  
16.15-16.45: Case study 6: Environmental impacts of tunnel construction in urban area  
16.45-17.15: Case study 7: Operation and asset management of underground space  
17.15-17.45: Discussion and closing remarks