

Tunnelling 4.0: New Technologies and Future Perspectives for Maintenance, Upgrading and Refurbishment of Tunnels.

Every year more than 2 000 km of tunnels in Italy and more than 10 000 km worldwide, belonging to the widespread existing network of infrastructure, undergo to daily maintenance, and some of them undergo to significant renewal or enlargement works, often without interrupting the serviceability to maintain operational and structural safety a regular inspections, monitoring and maintenance activities are required.

The monitoring consists of inspections, visual and measurement control, function and material tests often carried out during closure periods or during night shifts.

For safety and economic reasons, the reduction of time spent in the field as well as the increase of the effectiveness of the maintenance works are nowadays primary goals for large infrastructure owners.

Innovation has always characterized the Tunnelling industry. The research and development of new machinery and materials in the recent years have had a great impact in terms of safety, risk management, cost effectiveness and constructability. Challenging projects have been made possible and computer-aided tools for survey activities and data analysis were successfully developed, driving a sensible growth of the tunnelling industry worldwide.

The time ahead will be characterized by a technological revolution. We will see a radical and rapid change of design and construction practices as well as new innovative ways in using the underground space in a smart manner. This evolution must not lead to forgetting the enormous number of existing tunnels in Italy which terribly needs important control and maintenance works. And recent facts, bring us back to the need to tackle this important challenge with new resources and technologies.

The **International Tunnelling Association (ITA)** and the **Italian Tunnelling Society (SIG)** recognize such projected transformation and encourage knowledge sharing, research and synergies within the Industry in order to guide Tunnelling into the future. In this regard, **SIG Young Member Group decided to organize an International Conference in Bologna**, during SAIE 2020, on “Tunnelling 4.0: New Technologies and Future Perspectives for Maintenance, Upgrading and Refurbishment of Tunnels”.

The conference, which will take place on the 15nd and 16rd of October 2020, will explore the latest advances and future challenges in maintenance, in monitoring and prediction technologies, in the automation of the inspection of Tunnel and Underground Spaces and it will be an opportunity to learn about the recent projects and innovations through the presentation of interesting case studies from infrastructure owners and managers, from engineering company in charge for the inspection, monitoring and refurbishment projects (“diagnosis” and “therapy”), from specialists that will illustrate the innovation in in surveying and monitoring techniques and material and from construction company in charge of the rehabilitation works often performed under exercise.

Speakers will represent both national and international experiences . The main topics, which will be discussed during the conference, are the following ones:

- inspection and monitoring of tunnels: new technologies, digital image processes and digital visual inspections, predictive monitoring;
- maintenance of tunnels: new technologies and automatic processes;
- upgrading and refurbishment of tunnels: new technologies, materials and applications.

Besides the individual presentations, the event will give the possibility for the industry players to gather together and discuss about potential ideas which will take tunnel design and construction to new levels in the next future.

In addition to the opportunity to attend the presentations of the speakers, the event will allow the players of the sector to meet, update and discuss, integrating approaches and experiences in a field, that of the maintenance and preservation of existing galleries, which is rapidly changing towards automated approaches systems capable of using the new frontiers of analysis (Big data analysis, IoT, Digital twins).

The Italian Tunnelling Society awaits you numerous!