

**Call for application for research scholarships  
for post-graduate international candidates**

**RESEARCH PROJECT N. 37**

**Title**

**Environmental aspects of soil conditioning of mechanized tunneling (acronimo EcoTun)**

**Scientific responsible (name, surname, role)**

Daniele Peila, Associate Professor ([daniele.peila@polito.it](mailto:daniele.peila@polito.it))

**Short description of the research activity (max 250 words)**

The research activity will concern the study of conditioned ground, typical material obtained from mechanized tunneling excavation process in EPB tunneling process. The EPB tunneling process will manage the excavated soil by adding surfactant to the soil to change its properties. The study of the environment properties of this aspect is a key issue for a correct management of the excavated muck. In the perspective of environmental aspects concerning biodegradation process and ecotoxicology. In last years, the working team of "Tunneling and Underground works" developed scientific activities about that topic, with cooperation of IRSA of CNR and with Mario Negri institute. Environmental aspects are very important issue and researchers and industry are working together in order to developed products and procedure able to reduce environmental impact. The candidate will develop the following steps:

- bibliographic analysis;
- laboratory phase: slump tests conducted on different soils by using different conditioning agents;
- laboratory phase: biodegradation and ecotoxicity tests (*Pseudokircheneriella subcapitata*, *Vibro fischeri*, *Daphnia magna*) performed on conditioned materials;
- development of new conditioning agent for mechanized excavation use, with high biodegradation and low ecotoxicity performance
- That product should have also good geotechnical performance that should be proved by slump test campaign.
- Tests to verify the possibility of conditioning using micronized talc.

Also competent owners are showing, in last period, always more attention to environmental performance of products used in tunneling mechanized excavation.

The research work, will include partnership with MAPEI S.p.A. - industrial partner.

**Specific requirements (experiences, skills)**

Preferably: Skills on environmental engineering, Basic knowledge of tunneling engineering

**Website of the research group (if any)**

[http://www.diati.polito.it/en/the\\_department/internal\\_structures/laboratories/tunnels\\_and\\_underground\\_works](http://www.diati.polito.it/en/the_department/internal_structures/laboratories/tunnels_and_underground_works)

**Keywords (min 3, max 6)**

Tunnelling, conditioning agents, biodegradation, ecotoxicity, EPB

**Research Area (max 1)**

Environment, Land, Infrastructure