

Entrepreneurial ID

«Academy-Industry Training Camp» 2016



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Project name: *MeduSoil*
Short moto: “Petrifying the subsurface”
Industry: Construction, Geo-engineering, Geo-environment



Status of project/science: Idea / Proof of concept / Advanced research

team size: 2



MeduSoil stands for a soil-strengthening mechanism through the biologically driven calcite mineralization. A stronger, more resistant, subsurface is engineered as a result of the formation and growth of calcite mineral crystals inside soils. By altering the biological, chemical and hydraulic conditions involved in the process, we suggest an adaptable mechanism to treat geo-materials that allows targeting a series of geo-engineering and geo-environmental problems.



Soils host any kind of human structures but could also pose limitations to the implementation of engineering works or become major causes of failures. Soil strengthening methods allow engineers to secure the safety and integrity of structures and protect them against environmental threats. A challenge that remains to be addressed in the field, though, is how to efficiently treat soils targeting certain problems and scenarios and how to extend the range of improvement to larger areas. MeduSoil foresees to provide answers towards tackling this challenge.



Nowadays, soil improvement methods are emerging and going hand-in-hand with the majority of foundation works. The conventional technique of cement-grouting claims a predominant position in this growing market despite its limitations which are related to the nature of the employed cementing solutions. In India, especially, the migration of millions every year to bigger cities, the housing shortage and the natural hazards related to soils have generated “perfect storm” conditions that require the conception and implementation of sustainable solutions by engineering and geotechnical companies.



So-far cement grouting has been largely implemented as a soil-strengthening technique despite its rather localized effect, which poses limitations towards improving larger soil volumes. The application we suggest, not only replaces the artificially produced cement with the naturally mineralized calcite crystals, but also redefines the way engineers interfere into the natural subsurface and the overall range of the induced improvement. By controlling and adapting the bio-cementation mechanism to the specific needs of the given engineering problem we suggest a process which incorporates elements of sustainability, economic efficiency and environmental responsibility.



Professor Lyesse Laloui is the principal investigator of the research project entitled “Geo-mechanical investigations of bio-improved soils” and the supervisor of my PhD research on the same topic. Our work has been focused on the mechanical behaviour of bio-cemented soils as well as on the adaptability of the technique to various soil types and configurations. The technical staff of the Laboratory for Soil Mechanics of EPFL has been supporting so-far the research activities.



My main motivation for participating in this training camp was the term “training” itself in the “Academia-Industry Training Camp” call for projects. The goal is thus both to learn and exercise the «know-how» around the technology in the challenging entrepreneurial environment of the Indian market. I strongly believe that forging collaboration with local academic institutions and industrial partners will bring MeduSoil in the forefront of a new paradigm for treating and strengthening soils.