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Land reclamation through recycling and stabilization of contaminated soil: the role of High Performance Solidification/Stabilization (HPSS) processes

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Remediation of contaminated soils is often realised with very impacting techniques of soil stripping. This can generate substantial volumes of wastes, with a subsequent problem of disposal and soil consumption. From the end-of-waste perspective, as required by European directives [1], it is necessary to develop techniques able to facilitate and promote beneficiation and recycling, for providing both environmental protection and economic benefits.
The High Performance Solidification/Stabilization (HPSS) process is an eco-improved technology for treating soils, which has been recently improved, engineered, and applied to several large remediated sites. Similarly to traditional solidification/stabilization (S/S) processes, it has the aim of trapping contaminants by means of mixing soil with a binder (Portland cement), with the advantage of generating a centimetre-sized granular material characterised by good physical and mechanical properties [2]. The pellet products, composed of soil-binder stabilized mixture, could be recycled for different applications or reused as filling material directly in the reclaimed area to avoid new soil consumption. The design of the process is flexible and it can be optimized so that during the treatment and pelletization of the soil specific contaminants may be removed. Active research is in progress to explore the limitations of the method and the applicability to different kinds of soil contamination.

[1] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008.
[2] Ferrari G., Artioli G., Parisatto M. (2010). “From HPC to HPSS: The use of superplasticizers for the improvement of S/S technology. S/S TECH”. International Solidification/Stabilization Technology Forum, 193-203. Cape Breton University, Sydney, Nova Scotia, 14-18 June 2010.