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Recycling of quarry waste as part of sustainable aggregate production: Norwegian and Italian point of view

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Resource preservation is one of the main challenges in Europe, together with waste management and recycling; recently several researchers are interested in the recovering of critical raw materials and secondary raw materials from landfill. Aggregate supply, even if it is not “critical” sensus stricto (s.s.), is one of the European priorities (low value but high volume needs).
On the other side, the management of quarry waste , mainly from dimension stones, but also as fines from aggregate crushing, is still a matter of concern. Such materials are managed in different ways both locally and nationwide, and often they are landfilled, because of an unclear legislation and a general lack of data. Most of time the local authorities adopt the maximum precaution principle or the enterprises find it little profitable to recover them, so that the sustainable recycling of such material is not valued. Several studies have shown, depending on the material specific characteristics, the viability of recycling quarry waste into new raw materials used in glass and ceramic industries, precast concrete production, infrastructures etc. (Loudes et al. 2012, Dino&Marian 2015, Bozzola et al 2012, Dino et al. 2012, etc.). Thus, aggregate production may be one of the profitable ways to use quarry waste and is falling under the priority of EU (aggregate supply). Positive economic and environmental effects are likely to be achieved by systematic recycling of quarry waste planned by industries (industrial planning) and public authorities (national and local planning of aggregate exploitation). Today, the recycling level varies to a great extent and systematic recovery is not common among European Countries.
In Italy and Norway no significant incentives on recycling or systematic approaches for local aggregate exploitation exist. The environmental consequences can be overexploitation of the natural resources, land take for the landfills, environmental contamination and landscape alteration by the quarry waste heaps.
The environmentally sustainable management of quarry waste, which aims to recover and recycle both clean and contaminated materials, would therefore help to reduce the pressure on natural resources, reduce the land take and the environmental contamination.
The present paper shows the main challenges connected to quarry waste management, focusing on several possibilities for quarry waste recovering, in order to produce recycled aggregates.