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Sustainable Recycling of Concrete Fine from Demolition

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In Switzerland, concrete fines from construction and demolition waste (C&DW) are usually down-cycled for low quality purposes. Therefore, companies have few incentives to improve the demolition process separating the coarse aggregates, sand and the hardened cement matrix. The use of concrete fines from demolition waste, however, could increase value added for companies if properly used in the cement and concrete production. These could be used either to replace part of the raw materials in clinker production or as supplementary cementitious materials (SCM's) reducing the clinker content in cement. Furthermore, they can also be used to replace virgin sand in the concrete production. All these alternative uses of concrete fines will effect CO2-emissions in the Life-Cycle of concrete as well as resource consumption and production costs.

In the ongoing research project "CLOSE", we investigate alternative uses of fines from construction and demolition waste and evaluate their benefits from an environmental and an economic perspective. We also assess possible effects on the quality of concrete produced with these secondary materials, also considering the carbonation of the concrete fines. We work in close collaboration with industry partners using simulation methods as well as comprehensive material testing according the Swiss standards for cement and concrete.material testing. For the evaluation of environmental and economic impacts, we use Life-Cycle-Assessment focussing on GWP (including the effect of carbon uptake by carbonisation of crushed concrete) as well as cost calculation methods. It is a feasibility study to identify the most promising use of recycled concrete fines and show requirements for appropriate demolition processes and preparation process as well.

The authors aim for a power point presentation