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## Mobile processing and use of short-transported aggregates

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Aggregates are major constituents in construction, the global request for which approaches some 22 billion tonnes per year. Some major challenges follow; first of all the dependency on geological conditions and the availability of resources; secondly the traffic, emissions and energy use connected with transportation; thirdly the technology of utilising resources with a variety of properties to meet user requirements; and finally – getting more awareness – the land use conflicts and environmental impact of the aggregate and quarrying industry, and the need for making these activities sustainable.

Geological resources are non-renewable, which e.g. can be seen in the rapid depletion of natural sand/gravel deposits: Most development in the aggregate sector is now focusing on crushed/manufactured materials. This causes increasing awareness along with environmental impact; conflicts of interest concerning land-use; sustainability in mass balance; and not least – increasing transport distances required to get the materials to the places of use.

The principle of a Best Available Concept (BAC) for aggregate production and use was introduced by Danielsen and Kuznetsova (2016 Geological Society Special Publication 416, pp 50-70), working with four essential phases: Inventory and planning, Quarrying and production, Use of aggregates, and Reclamation of mined-out areas. Important in such a concept is the use of novel LCC and LCA tools to enable the calculation of environmental and economic consequences of decisions.

The development of concepts and technologies to utilise local aggregates on a short-travel basis, is

an important part of this. A major Norwegian research project Local Use of Rock Materials, lead by SINTEF and sponsored by industry and the Research Council, has just been concluded. One aim of such a development was to obtain production processes on mobile platforms to offer on-the-run solutions that can greatly reduce the need for transport to and from site, make more tolerant user techniques of excavated or secondary rock materials, and not least, contribute to a significant improvement of mass balance. A comprehensive report on this theme has been prepared by the present authors.

Aggregates should be prioritized based on geological conditions in a bottom-up concept. This means that when considering local and/or short-travelled alternatives, the design and engineering solution should be based on the aggregates available – not the other way around. The geological differences and the often unpredictable variations are clearly among the major challenges for a short-travelled solution. The report highlights the aggregate technology triangle in order to see the geology – production – application interconnection, for the creation of good solutions

The set of novel processing technologies available, present the opportunities to transform theoretical knowledge into practical aggregate production. Especially, the portable processing equipment and the novel technology for crushing and sorting opens for solutions to produce purpose adapted, local/short-travelled aggregates. The report suggests processing examples for different user-purpose. Several flow-sheets for mobile processing of different kinds of product are presented and discussed.