Aggregates Industry Washes Cleaner

Aggregate washing traditionally uses considerable quantities of water, which is conventionally treated by discharge into settling ponds, where the suspended clay fraction slowly settles under gravity. The land used for these temporary ponds can readily be restored to agricultural use and the clean water recovered from them may safely be returned to local watercourses. However, there are numerous examples of aggregate deposits where abstraction of local groundwater is not permitted. In these locations, the material cannot be recovered economically as it cannot be washed clean. In some cases, the material is moved at considerable expense, allowing quarry operators to recover the underlying rock, only to move back again during restoration of completed quarry workings.

An off-the-cuff observation by Adrian Wilkinson, Senior Geologist at Tarmac, sparked a chain of events, which may well revolutionise the aggregates industry. Adrian suggested *that "what we really need is a machine which will wash aggregates without using water !"*. Whilst that wish is unlikely to be realised, development of new technology is on the near horizon. Les Balmer, ultrasonics expert with NRS technologies in Bristol and Mark Tyrer, Geochemist at Imperial College, London, are working closely with Tarmac to develop novel aggregate cleaning techniques. The research is a new MIRO project, supported under the MIST programme and relies on ultrasonic agitation of an aggregate slurry. The idea relies on ultrasonic pulses to selectively maintain fine clay particles in suspension, whilst allowing larger sand particles to fall. Through careful design of the chamber geometry and sequential processing of the material, the size fractions are separated very efficiently. The suspended clay particles form a fairly concentrated slurry, which greatly reduces the need for process water.

One unforeseen benefit of the research is the potentially rapid and very efficient cleaning of the sand grain surfaces. Fine aggregates for high strength concrete production must have a low clay mineral content, both to ensure a good bond between the cement paste and aggregate and also to prevent chemical reaction between the clays and cement. Ultrasonic cleaning of sands containing clay minerals will make them suitable for such applications and may have implications for the aggregates market. Production of clean sand in regions to which it is normally transported, limits haulage costs and ensures the most efficient use of this natural resource.

The work is ongoing and site trials of the demonstration plant are scheduled for the autumn.

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