

Re-use of quarry wastes

Developing saleable by-products

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Modern society creates a considerable demand for industrial rocks and minerals, particularly crushed rock aggregates. During the aggregate production process, large volumes of mineral residues are generated, mainly as fine-grained materials, which in most quarries are either stockpiled on site or transferred away from the quarry for disposal at waste sites. If beneficial use could be found for these 'quarry dusts', which generally make up 10–25 per cent of total output, this would create added-value products and improve the profitability of the quarrying operations, at the same time as meeting sustainability criteria.

Some limited commercial use has been made of the fines, for example in the

separation of feldspar products from crushed granite fines, but little attention has been given to the use of the residues as mineral fillers.

The BGS is currently involved in an EC supported industrial research project which is aiming to develop low-cost by-product fillers as a replacement for high-cost primary fillers, using mineral wastes from crushed rock-aggregate quarrying. The project, entitled 'REFILL' is coordinated by MIRO (Mineral Industries Research Organisation) and involves a consortium of partners from Britain, Ireland and Greece. Tarmac Quarry Products Limited are actively involved, both as an aggregates producer and as an industrial end-user. Greek partners include a major limestone quarrying company, industrial end-users in paints and paper products,

The major benefits of developing saleable by-product fillers from quarry residues will be :

- reduced quarry wastes and optimised use of resources;
- reduced environmental impact caused by stockpiling and disposal of large quantities of quarry waste;
- reduced costs of waste disposal for the quarrying industry;
- generation of additional income for the producers by the sale of quarry residues.

and the geological survey of Greece (IGME). The project, which will be carried out over three years, commenced in July, 1998.

The first phase of the research involves an investigation of the properties of the aggregate wastes from quarries in Britain, Ireland and Greece. The extensive laboratory facilities of the research organisations will be used to determine the petrological, mineralogical, chemical, physical and engineering properties of the wastes and to assess their qualities as potential mineral fillers. The second phase of the research will be the development of mineral processing methodologies for the separation of selected minerals from the quarry residues. A broad range of established and novel techniques will be evaluated for their potential to produce value-added filler products. The third phase will be test work on products formulated with the by-product fillers, such as paints, papers, asphalt and lightweight concrete blocks. The final phase will involve an economic evaluation of results, assessments of the commercial viability of proposed processes and products and an evaluation of current quarrying practices to optimise resource utilisation.



Large stockpiles of quarry fines, Bantry Bay, Ireland.