

Beneficial Reuse of Steel Making Residues in Cement Manufacture

Entech was engaged by a steel maker to source and develop a reliable beneficial reuse market for 20,000 tonnes per annum of iron rich material. The material was analysed and found to be rich in the elements iron, calcium and aluminium but also contained a range of contaminants. A review of potential reuse applications was then undertaken which found that the cement manufacturing process could offer suitable reuse initiatives. However, it was found that the level of contamination of each by-product stream in isolation prohibited it from being used directly in the cement manufacture process. In order to address this issue a blending and quality control process was developed, that allowed several of the by-products to be mixed together to produce a valuable feedstock.

The Problem

Waste and by-product management has become a major issue for organisations globally. This is focused in the areas of cost minimisation, regulatory compliance and environmental performance. One of Australia's largest steel producers generates a significant quantity of iron rich by-products. Historically, it has been difficult for the steel maker to establish reliable reuse markets for the products.

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Our Solution
Entech initially characterized a series of iron rich residues to determine the value of the chemical attributes and also identify and contaminants. The evaluation found that a number of the by-products were rich in the elements iron, calcium and aluminium but also contained a range of contaminants.

A review of potential reuse applications was then undertaken which found that the cement manufacturing process was the most likely industry to be able to beneficially reuse the by-products. However, it was found that the level of contamination of each by-product stream in isolation prohibited it from being used directly in the cement manufacture process. In order to address this issue a blending and quality control process was developed allowed several of the by-products to be mixed together to produce a valuable feedstock.

Once the product was developed the commercial, regulatory and logistical aspects of the reuse application was addressed.

The Outcome
The development of reuse application resulted in approximately 20,000 tonnes per annum of an industrial by-product being diverted from landfill for beneficial reuse. This resulted in a cost saving of ~ \$2 million per annum as well as improved the environmental performance of the steelmaking facility.

The consumption of by-products in reuse applications also diverts significant raw materials from the manufacturing process. This reduces energy consumption and provides a low cost source of feedstock which assists in the

sustainability of the cement manufacturing process.