

Castle's Chromium reduction

by Fairport Engineering Ltd,
UK

During the clinker manufacturing process and later, during the milling process, particles of Chromium VI are produced. Chromium VI, is soluble in water, and in wet cement becomes a sensitising agent for allergic dermatitis if there is direct and prolonged contact with the skin. The most effective way of decreasing Chromium VI is to add reducing agents, among them ferrous sulphate. With this addition, Chromium VI is converted to Chromium III, which is not soluble and so does not cause allergic reactions. This being the case, as most readers will be well aware, all European cement suppliers needed to conform to the EU directive regarding the 2ppm maximum level of Chromium VI in their cements, as from January 2005.

In light of this situation Castle instructed Fairport, in mid-September 2004, to proceed with the design and build of four ferrous sulphate reception, storage and addition systems. Two of these were to be at the Ketton works, and one each at Padeswood and Ribblesdale. The total contract value was some UK£1.5m and the plants were all to be operational in 18 weeks.

Broadly speaking, all four plants are generically identical in that they include facilities to pneumatically unload ferrous



Padeswood plant



Ketton works

sulphate from road vehicles into storage silos ranging from 100 to 150t capacity. Screw feeders then extract the stored ferrous sulphate and a pneumatic conveying system transports the material to day bins prior to addition, via loss-in-weight feeders, to the mill discharge bins.

In view of the hygroscopic nature of ferrous sulphate, chiller and dehumidifier units were supplied for both the tanker unloading and pneumatic conveying packages.

The projects were full turnkey assignments, designed and engineered closely in co-operation with Castle's engineers and included the civil, electrical and control works.

The design and build of all four projects was on time, allowing Castle to continue to supply its clients with a

high quality and user acceptable product.

These projects continue the long and successful association between Castle Cement and Fairport. Extending back to the mid-1990s with work at Ribblesdale, constructing a new bag handling system and warehouse, and more recently assisting with enhancing the materials handling systems required for the new kiln and ancillary facilities at Padeswood.

Fairport has worked at Ketton since 1990 when a new 3200 bag/h bagging and palletising plant was constructed. This facility was upgraded in 1996 to handle 4000 bags/h. More recently, in 2003, Fairport installed a new clinker handling system.

Currently, Fairport is working with Castle Cement and ATEC (Advanced Process Technologies GmbH) at Ketton to design, construct and install a chlorine by-pass system.

This system, to be complete in 2006, is intended to reduce the amount of chlorine re-circulating through the clinker making process and so minimise the deposition of volatile substances in the cooler areas of the kiln and preheater, which lead to poor performance and potentially leave coating and deposits which ultimately may halt the cement making process.



Padeswood installation