

# Fons Delta Cooler fitted in 15 days!

by **Fons Technology International, Turkey**

**H**igh demand and a booming local market meant that a stoppage of more than 15 days was unacceptable for the plant. In fact, Askale had not halted its kiln for a very long period due to this high demand.

In June 2011, Askale Cement had planned for a stoppage of the kiln for ordinary maintenance and for the connection of their new investment, a waste heat recovery project. A total of 15 days was scheduled, among other works, to connect the main ducts between new heat exchangers, preheater and cooler exhaust air.

Earlier, in March 2011, Fons Technology International (FTI) was erecting a Fons Delta Cooler at the Yurt Cement plant. This project was a replacement of a 2700tpd, 1.5 years-old, reciprocating cooler. Askale management visited Yurt Cement and viewed the Fons Delta Cooler during the kiln stoppage on the 12th day of erection. The cooler installation was completed with cold tests and released to the plant.

Askale management was really excited by the results and the successful completion and commissioning of the cooler after just 15 days of kiln stoppage. Askale Cement was now determined

*Askale Cement TAS, one of the biggest cement producers in Turkey, had some trouble with its previous reciprocating grate cooler due to inefficient heat recuperation, high clinker outlet temperature, expensive maintenance costs and breakdown stoppages. Askale Cement had already purchased a replacement cooler including new fans and crusher from a world well-renowned equipment supplier. All import and local parts were in the stockyard of Askale Cement. The producer had completed local manufacturing for the casing and kiln hood. However, the time period for the installation was estimated at more than 45 days - too long!*

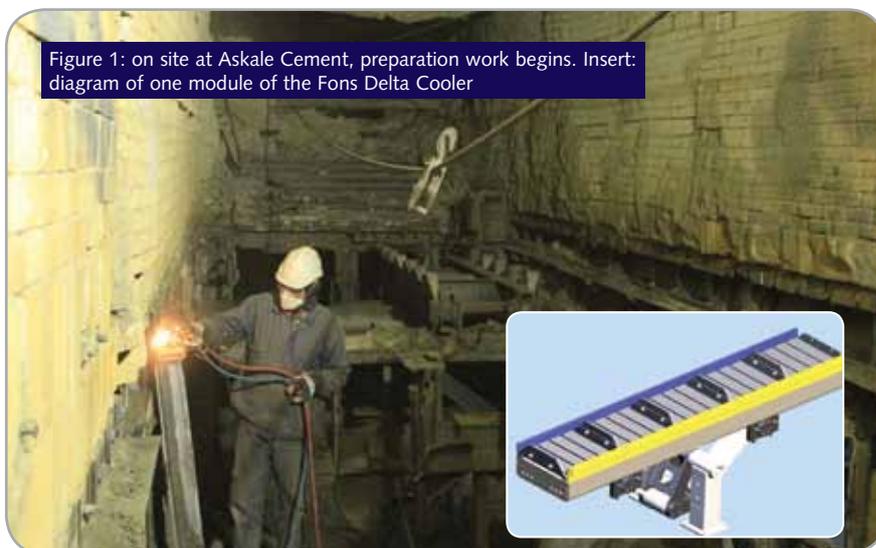


Figure 1: on site at Askale Cement, preparation work begins. Insert: diagram of one module of the Fons Delta Cooler

to buy a Fons Delta Cooler for its own production line, and placed the order.

## Planning for the Askale project

On the first site visit to Askale Cement, parallel to finalising the order, FTI's engineers carried out the sizing of cooler

and compartments, enabling the reuse of the already purchased fans. This is possible, because the Fons Delta Cooler has a flexible modular design which can be fitted into any casing. The new clinker cooler for Askale comprises the following: cooler width made up of six lanes each of 0.4m (total 2.4m width); moveable lane lengths comprise seven modules each measuring 2m (total 14m length); and fixed inlet with six rows of grate plates (see Figure 1 insert).

FTI engineers, in cooperation with the customer, decided to use the fans and hammer crusher purchased for the stockyard cooler to lower the investment cost.

## Delivery schedule

It is a great advantage that the Fons Delta Cooler has a modular design, with each module measuring L2.0m x W0.4m x H0.6m.

As mentioned, the equipment delivery

Figure 2: Askale Cement, stripping down the old cooler in readiness for the new Fons Delta Cooler



time was two months from end of March to beginning of June. Such short delivery times are relatively easy for FTI to achieve, given that the Fons Delta Cooler modular design enables stocking. Indeed, FTI stocks 10,000tpd clinker coolers to meet future orders.

After receiving the order, FTI began to assemble the cooler at the workshop, and the hydraulic unit was manufactured within weeks, using FTI's stock delivered pumps and proportional valves. After 1.5 months the cooler was fully assembled in the workshop for hydraulic tests. After testing and disassembling for transportation, the Fons Delta Cooler was delivered to Askale Cement.

Figure 3: workshop Aasembling of one unit



Figure 4: pushing the Fons Delta Cooler into place along the rails



### Installation begins at Askale Cement

On 15 June the kiln was stopped, and the cooler erection time began with well-prepared teams and time schedules.

FTI, within the first four days, fully dismantled the existing internals, mechanical drives, drag chains, crusher and crusher chutes. Concrete jobs under the grate line were executed, and kiln hood support casing and crusher casing were dismantled (see Figures 1 and 2).

After the fifth and sixth day, the new cooler was ready to be railed into the casing. FTI engineers designed a rolling unit concept for the Fons Delta Cooler main units. The rollers mounted under the new cooler had been assembled in FTI workshops. At site, one forklift could carry the new cooler units and put them on the rails which had been specially designed. The forklift carried the units to the rails and from there, two workmen pushed the Fons Delta Cooler units from the one end of the casing to the other (see Figure 3 and 4).

In 24 hours, the main components of the Fons Delta Cooler were mounted into the casing and aligned. At the end of day six, the cooler was ready to mount sealing and grate plates (see Figures 5).

The next two days of erection were spent on the mounting of seals, grate plates and compartments. Hereafter, the

Fons Delta Cooler was ready for hydraulic and central greasing tests (see Figures 6 and 7).

On the ninth day, FTI executed the cold test of the cooler within two hours and hereafter released the cooler for remaining refractory work (see Figures 8 and 9). Installation of the new cooler was completed in 15 days – a new world record for this scope!

### Engineer evaluations

In every project, FTI engineers evaluate the existing casing, under hoppers, spillage conveyors, existing casing surroundings, etc and therefore separately choose individual methods for layout and erection of the Fons Delta Cooler.

FTI ensures the erection time for main internals of the Fons Delta Cooler in 24 hours. With the cooler's simple, smart design, FTI decreases the modification

Figure 5: one unit is in its place

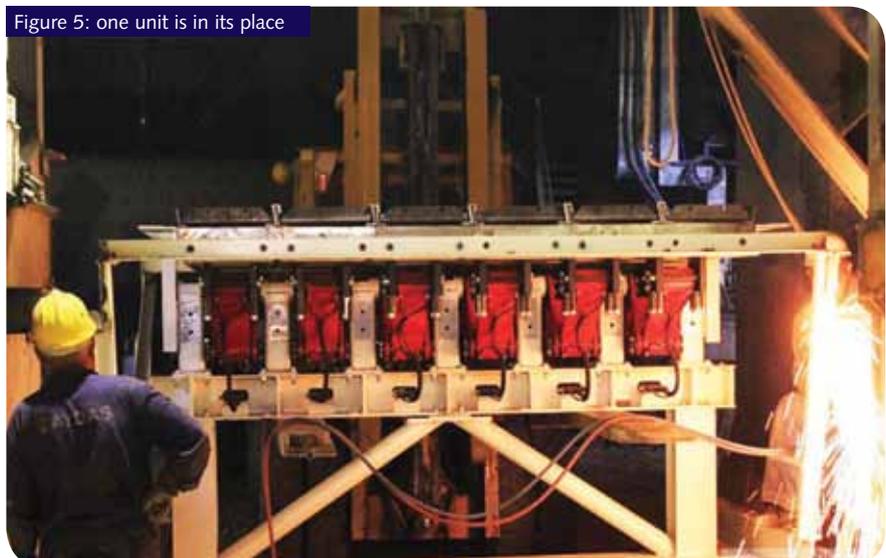
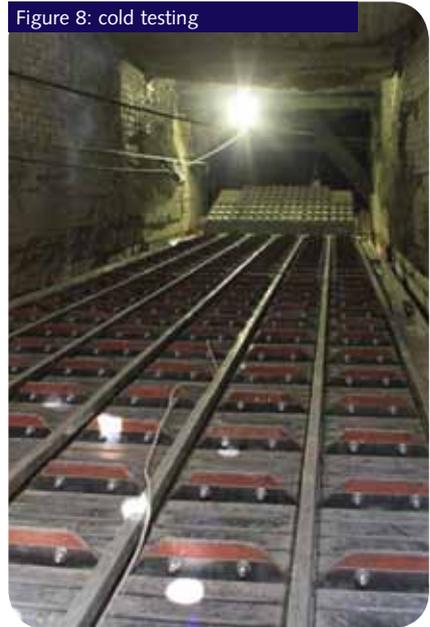


Figure 6: seal and grate plate Installation



Figure 8: cold testing



time to almost equal the time of an ordinary maintenance shutdown of a cement plant/cooler.

Another advantage of the Fons Delta Cooler is the FTI assembly of the whole cooler at FTI's workshops and testing of hydraulic systems, so that only fine-tuning is left for site erection.

### Stepped Air Flow Function regulator (STAFF)

For hot tests, FTI commissioned only positions of the STEpped Air Flow Function (STAFF) regulator (see Figure 10). STAFF is FTI's latest patent pending solution. It sets new standards for the efficiency of the heat exchange possible to achieve in a clinker cooler. With a reduction of electrical power for the fans, the STAFF optimises the aeration for

every grate plate separately. STAFF is a self-regulating mechanism which generates a 'stiff' and at the same time regulates the distribution of air adjusted to the clinker layer above.

Any grate plate area (0.4m X 0.4m) of the cold clinker or any other situation generating unwanted high distribution of cold air through the clinker layer, will activate the STAFF function. This again will cause an increased correction immediately, counteracting the unwanted high passage of air, hereby achieving optimal heat exchange and heat recuperation in the kiln system.

Figure 9: refractory work complete

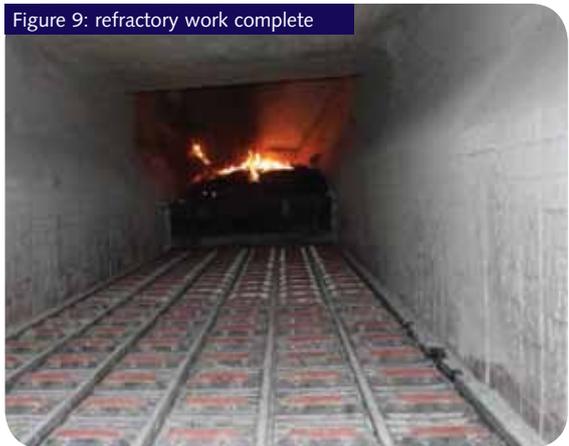


Figure 10: STEpped Air Flow Function Regulator



During commissioning (or for long-term production capacity change), the air flow through each STAFF can be adjusted without any spare parts by only side-sliding the flap and hereby changing the orifice area.

The patent pending STAFF system has not only transformed understanding of clinker cooling using less fuel and electricity – it has also minimised energy consumption.

Figure 7: crusher outlet Installation

