

Plants unplugged

by Cardox International Ltd,
United Kingdom

Clearing blockages and build-ups in the cement processing line can be a time-consuming and costly affair but several cement plants have found a solution in using the Cardox system to significantly reduce both the time taken to clear build-ups and the associated costs.



Figure 1: Tabuk Cement Company

Kennedy, production manager at Tabuk Cement realised it could be an extremely difficult, time-consuming and costly operation.

"We had already installed the Cardox system on the cyclones to clear build-ups and in the cooler area to clear 'snowmen' and to break up large

boulders/coatings that block the cooler discharge, so we asked Cardox International Ltd to advise us on how we could use our Cardox system to clear our silos."

Normally Cardox tubes are introduced into the build-up in the silo through small sockets mounted onto the silo walls (see Figure 3).



Figure 3: Cardox tube in place

Tabuk Cement Company (TCC) – located south of Duba Port on the Red Sea coast of Saudi Arabia – recently undertook a number of development projects aimed at guaranteeing the efficiency and continuity of its production and increasing kiln capacity to reach 4000tpd of clinker. The strategic location of the plant enables it to cater to the demand for cement in the north regions of the kingdom and also for export to other countries like Egypt and Sudan.

One such development was the modernisation of its three cement silos, the first stage of which was to completely clear all three silos of their contents (approximately 10,000t) of cement from the lower areas of the silos.

Some of the product had been in the silo for over six years and Mr Xavier

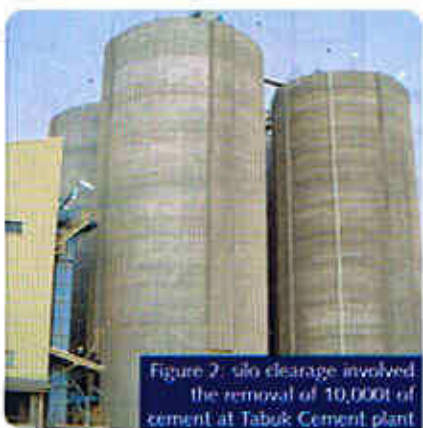


Figure 2: Silo clearance involved the removal of 10,000t of cement at Tabuk Cement plant



Figure 4: Cardox sockets installed onto cooler

On this occasion, it was decided to enter the silo and drill holes directly into the build-up to accommodate the Cardox tubes. Mr Kennedy reported "it usually takes over 40 days to clear this amount of build-up in one silo with traditional methods but using Cardox's system we managed to clear the build-up in seven days!"

Two engineers from Cardox International attended the plant to train and instruct a few of the local workforce in how to apply Cardox tubes in the silo application and to oversee the clearing of the first silo.

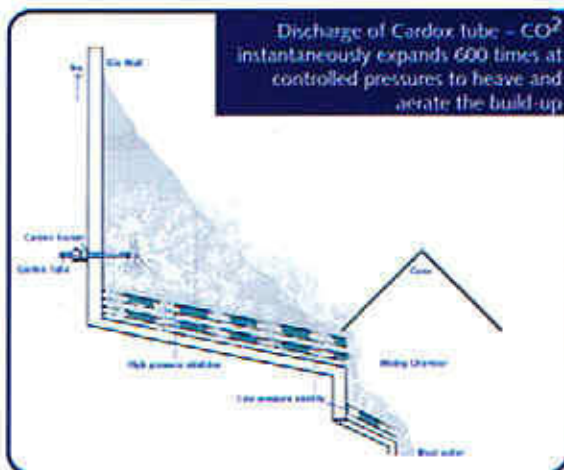
Using just 10 Cardox tubes and a total of 130 Tube Recharges (Heaters), over 3000t of cement was cleared from the first silo – averaging over 20t per tube use.

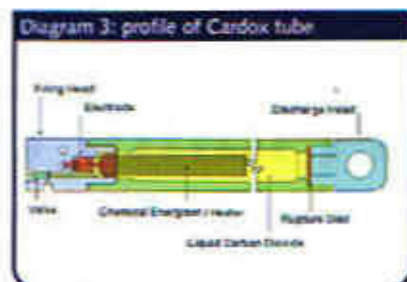
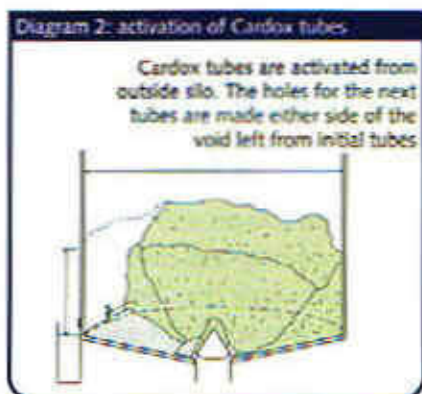
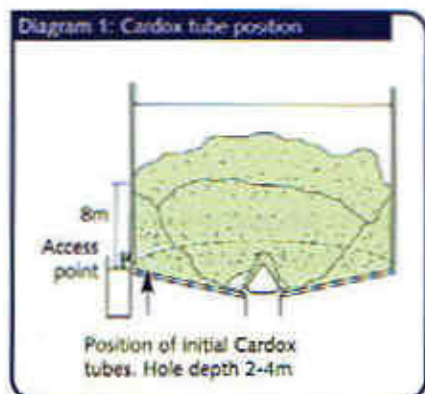
The remaining two silos are now being cleared by Cardox with the local workforce.

Cyclones and preheater

Tabuk Cement has been using Cardox for almost a year to successfully clear build-ups in the cyclones.

Mr Kennedy explains: "build-ups in cyclones are a common problem. Clearing the hot material is time-





consuming and can be a very dangerous operation.

We have tried various methods to clear these build-ups such as compressed air lancing and high pressure water jetting but by far the safest and most efficient method has been using the Cardox system.

We have found that inserting the Cardox tube into a socket located near the blockage point will clear any type of obstruction in the path and allow the hot material to enter safely into the system. It now takes a just a short time before the cyclone is back running at full capacity."

"Another common problem we have faced is heavy coating formation at riser ducts. These coatings not only affect the operation but also in some cases reduce

the kiln output. We would also recommend using Cardox system to clear these coatings too.

From a financial point of view Cardox is certainly proving its worth – a one time investment and negligible consumable costs in return for a steady kiln operation with constant increased output and definite "peace of mind" in knowing we have such a versatile system at hand.

We are now considering using our Cardox system for other build-up applications such as to break heavy ring formation inside the kiln and in our raw material hoppers for de-clogging the material."

How it works

The rechargeable Cardox tubes filled with "liquid carbon dioxide" (just like a

fire extinguisher) generate a "guaranteed" maximum pressure each and every time they are used and this can be regulated up to 3000bar (40,000psi). The tubes are inserted into the build-up through small sockets installed onto the preheater, cyclone, feed pipe, etc.

Within one second of sending a small electrical impulse to the Cardox tubes, the chemical safety heater pressurises the liquid CO₂ until it bursts the "rupture disc" and is released through special discharge nozzles into the build-up at 600 times the original volume creating a powerful "heaving" force. Carbon dioxide is an inert gas that is commonly used in fire extinguishers, so it is safe to use without fear of generating secondary reaction with gases in the silo.

The Cardox system is now recognised by all the major cement manufacturers as the most efficient, safe and cost-effective method of clearing build-ups and blockages. Cement plants that are turning to alternative fuels need a reliable method that they know can handle even the most difficult of build-ups and Cardox is certainly proving its worth in that area.

Cardox is also extremely versatile in that a small number of Cardox tubes can service the preheater, cyclones, feed pipes, cooler area, rotary kiln, raw feed mill and silos.

