Cardox clears silo build-up

by Cardox International Ltd, UK

Castle Cement's Padeswood plant had endured a build-up of cement in one of its large cement silos for 12 years. The blockage caused by a bridge in the 2200t capacity silo needed to be cleared safely via four discharge valves. Cardox International Ltd was approached to see if a concentrated charge of CO_2 from the Cardox system would be successful in removing the blockage.

Figure 1: Padeswood silo complex

Figure 2: extraction gate door has been removed

Figure 3: extraction gates at base of silo where blockage has occurred

The new cement kiln at Castle Cement's Padeswood plant had installed the Cardox System to clear build-ups in the preheater tower where it was proving to be a reliable and effective method.

Chris Donald, Packing Bay Supervisor quoted, "Silo No 3 has been blocked for just over 11 years, using Cardox easily enabled us to reinstate three out of the four extraction boxes and almost certainly saved us many man hours of manual work. Safety is also a big consideration for us here at Castle Cement. Using Cardox we were able to carry out the procedure remotely, minimising risk of exposure to operative".

The Cardox System comprises of a special high strength reusable steel tube 50mm in diameter and approximately 1m in length that is filled with liquid carbon dioxide more or less the same is a fire extinguisher but with a Chemical Energiser (Safety Heater) that converts instantaneously the carbon dioxide from 50 bar pressure to nearly 2000 bar whereby a rupture disc shears and omits the carbon dioxide high pressure into the build-up or blockage.

During a visit by Cardox personnel, Castle Cements Clinker Manager Terry Pritchard enquired whether the system

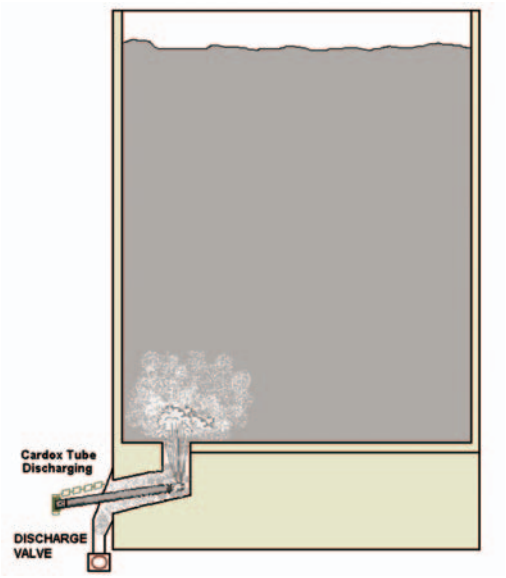

Figure 4: 21cm high x 10m diameter capacity 2200t, 1800t of cement inside silo

would be effective in clearing a cement silo that had been blocked for approximately 12 years!

The silo in question was silo 3 in a bank of five silos 21m high by 10m diameter which holds 2200t and had 1800t of cement inside which appeared to be bridged above the Discharge Valves.

Silo manager Chris Donald informed that the only access to the build-up was via four discharge valves at the base of the silo.

Each Cardox tube was fitted with a Discharge Head that omitted the carbon dioxide in an 'upwards direction' so that all the CO_2 charge could be concentrated on the bridge of the build-up.

The tubes were secured in position by a 'cap & chain' and activated individually the CO_2 charge instantaneously expanding 500 times the original volume at controlled pressures to heave and aerate the build-up.

Within seconds after activation the bridge of the build-up had been penetrating and the cement was flowing freely down the discharge valve.

As well as clearing cement silos, the Cardox system is used in many other industries such as power plants, steel plants, aluminium plants, zinc plants, oil and petrochemical plants, fertiliser plants, food industries where it is used to clear build-ups of many different types of products.

As carbon dioxide is an inert gas, it is safe to use without fear of generating secondary reaction with other gases that may be in a vessel/silo. In addition the quick release of the CO_2 refrigerates the discharge areas thus reducing the temperature low enough to avoid any ignition of any air – gas mixtures inside the blocked silo.

Access to the build-up is of course critical and the Cardox system is versatile in that it can be applied either through special 'Sockets' that are installed on the silo wall, through existing 'inspection doors' or from the silo roof.

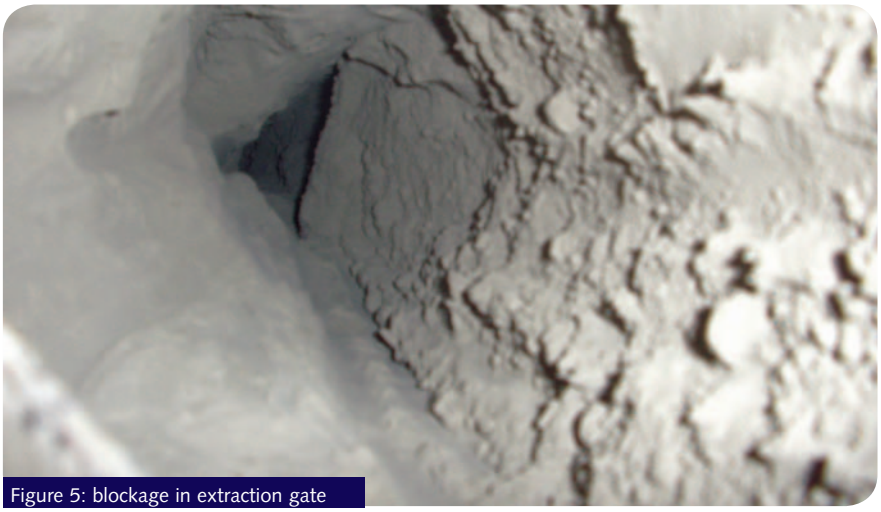

Figure 5: blockage in extraction gate

Figure 6: Cardox tube in position and secured with cap and chain

Figure 7: Cardoix engineer inserting tube into the extraction chute where build-up is located