Metalock Engineering UK

Press Information

METALOCK REPAIR GIVES KILN MAIN DRIVE GIRTH GEAR NEW LEASE OF LIFE

Problems with a series of cracks emanating from oval windows between the spokes of a giant 6.5metre diameter cast steel main girth drive gear on one of Elementis Chromium's kilns have been overcome by Metalock Engineering using its metal stitching process to secure infill plates into the windows.

The 5 metre diameter 90 metre long kiln is used for chromium calcining and when cracks were first noticed in four of the windows a specialist welding team was used to weld steel plates into the ovals. Two of the windows were filled in and the cracks welded but unfortunately, they cracked again. Rather than fix plates into the remaining two windows, Elementis consulted with Metalock to see if they could suggest a solution. An alternative was to replace the gear but as well as the high cost, delivery would not be for 9 months. Add to this the downtime to fit a new gear and the cost was estimated to be about £¼ million.

After examining the gear, Metalock engineers decided that a possible solution would be to remove the welded inserts and fit new ones with tails top, bottom, left and right and secure them with metal stitching.

The Metalock process is the accepted repair technique for all cracked, broken and damaged castings in cast iron, aluminium and steel for a wide range of industries in a multitude of applications. The repair consists of peening layers of Metalock special nickel alloy multi-dumbbell shaped keys into prepared apertures. These keys are highly ductile and can be peened into a metal-to-metal condition to become almost integral with the component's parent metal. Metalock keys are manufactured in a variety of sizes to suit each individual job. Their high strength ensures the return of a high percentage of the original strength. The essential advantages of the Metalock repair are that no heat stresses are introduced, no distortion occurs and, in many instances, machining is unnecessary. The process is invaluable in emergency situations and in many cases where the component is accessible, it can be done in-situ to avoid costly dismantling and re-assembly.

To repair all four windows in one session would have taken 20 days and as Elementis could not allow the kiln to be out of operation for that length of time, it was agreed that the operation be staggered with one window being repaired a month. In the event it took four men on 12-hour shifts 4 days to effect a repair.

As well as the window stitching operation Metalock devised a system to stitch a tie plate located in cut-outs in the ribs either side of the repaired window to provide some additional strength. A tie plate was also applied across the remaining welded insert to provide support while Metalock were off site between stitching repairs. Over 12 months has passed since the last repair and the gear has shown no further signs of cracking which is evidence that the Metalock process is suitable for repairing cast steel as well as cast iron components.

The 6.5 metre diameter cast steel gear developed cracks emanating from four of the oval windows between spokes. As well as metal stitching plates into the windows, Metalock stitched tie plates across the ovals to provide extra strength

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