

EQUIPMENT RESTORATION REPORT · CEMEX DOMINICANA

MAAG WPU-242B cement mill gearbox: bearing back to normal without replacement

CEMEX Dominicana, S.A., San Pedro de Macorís cement plant, reliability department · signed by:
Operation Director and Maintenance manager of the plant, Supervising Engineer XADO Chemical Group
San Pedro de Macorís, Dominican Republic · defect since June 2014 · sensors back to normal —
December 2015 · report dated 09.10.2018

PRODUCT

XADO gel-revitalizant
XADO gel-REVITALIZANT® for
hydraulic systems, industrial ·
9,000 ml for the full cycle

TREATED UNIT

MAAG WPU-242B gearbox
bevel-planetary, FLSmidth
MAAG Gear AG · cement
grinding mill No. 3

DOCUMENT TYPE

Equipment restoration
report,
signatures and stamps of
the parties

EQUIPMENT**CONDITION AT THE START OF WORK****WHAT WAS MONITORED**

MAAG WPU-242B gearbox

Mill No. 3 in operation, **1,000 rpm** at the
input shaft, dimensions **3900 × 3000**
mm

Overall vibration level (OVL)

Drive pinion bearing (No. 9 in
the monitoring system)

Increased clearance since June 2014,
position sensors No. 32 and No. 33 in
ALERT state

Vibration acceleration at two
points

Gearbox lubrication system

1,000 l of oil, filtration fineness **15-25**
µm

Oil temperature and pressure

Treatment: 6 stages of {{1,500 ml}} at intervals of 24-30 h of gearbox operation, {{9,000 ml}} in total for a {{1,000 l}} system; the full cycle takes at least {{650 h}} of running time.

Key result

↓ **2.6×**

overall vibration level of the gearbox, 1.7 → 0.65 G

Gearbox diagnostics by the permanent vibration monitoring system

MONITORING POINT	BEFORE TREATMENT	AFTER TREATMENT
Overall vibration level (OVL)	1.7 G	0.65 G
Sensor 6 — vibration acceleration, bearing pos. No. 32	ALERT	OK
Sensor 7 — vibration acceleration, bearing pos. No. 33	ALERT	OK
Sensor 8 — vibration acceleration, planetary stage	OK	OK
Sensors 9 and 10 — vibration velocity, grinding table X and Y	OK	OK

Sensors 6 and 7 had been indicating increased clearance in the drive pinion bearing since June 2014; in December 2015 both returned to normal operating mode.

Repair avoided: bearing replacement calculation as given in the report

ITEM	VALUE
Bearing replacement time — mill downtime	5 days
Cost of the bearing	\$3,914
Downtime costs	\$2,827,723
Cost of labour	\$5,000
Total for bearing replacement	\$2,836,637
Cost of the XADO gel-revitalizant applied	\$13,589.04
Calculated benefit	\$2,823,047.96

The calculation is given in the report: the bearing was not replaced, the amounts are the plant's avoided costs of a five-day shutdown of the grinding mill.

Conclusion of the report

Conclusion of the report signed by CEMEX Dominicana, S.A. and XADO Chemical Group: a new metal-ceramic coating formed on the friction pairs, as a result the accuracy of the gearbox operation increased, vibration decreased by **62%**, the bearing temperature decreased to nominal values; the calculated benefit from the use of the gel-revitalizant is estimated at approximately **\$2,823,047.96**. The increased clearance in the drive pinion bearing had persisted since June 2014: position sensors No. 32 and No. 33 of the mill's vibration monitoring system were in ALERT state. By December 2015 both sensors had returned to normal operating mode. The gearbox was not disassembled and the bearing was not replaced — the compound was introduced into the standard lubrication system in six doses, between which the mill kept running.



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The results refer to the MAAG WPU-242B gearbox of the cement grinding mill at the San Pedro de Macorís plant; with other units and operating modes the figures may differ. The economic calculation is given in the report itself and refers to the avoided bearing replacement on this mill. The original report with signatures and stamps is published in full and available for download.