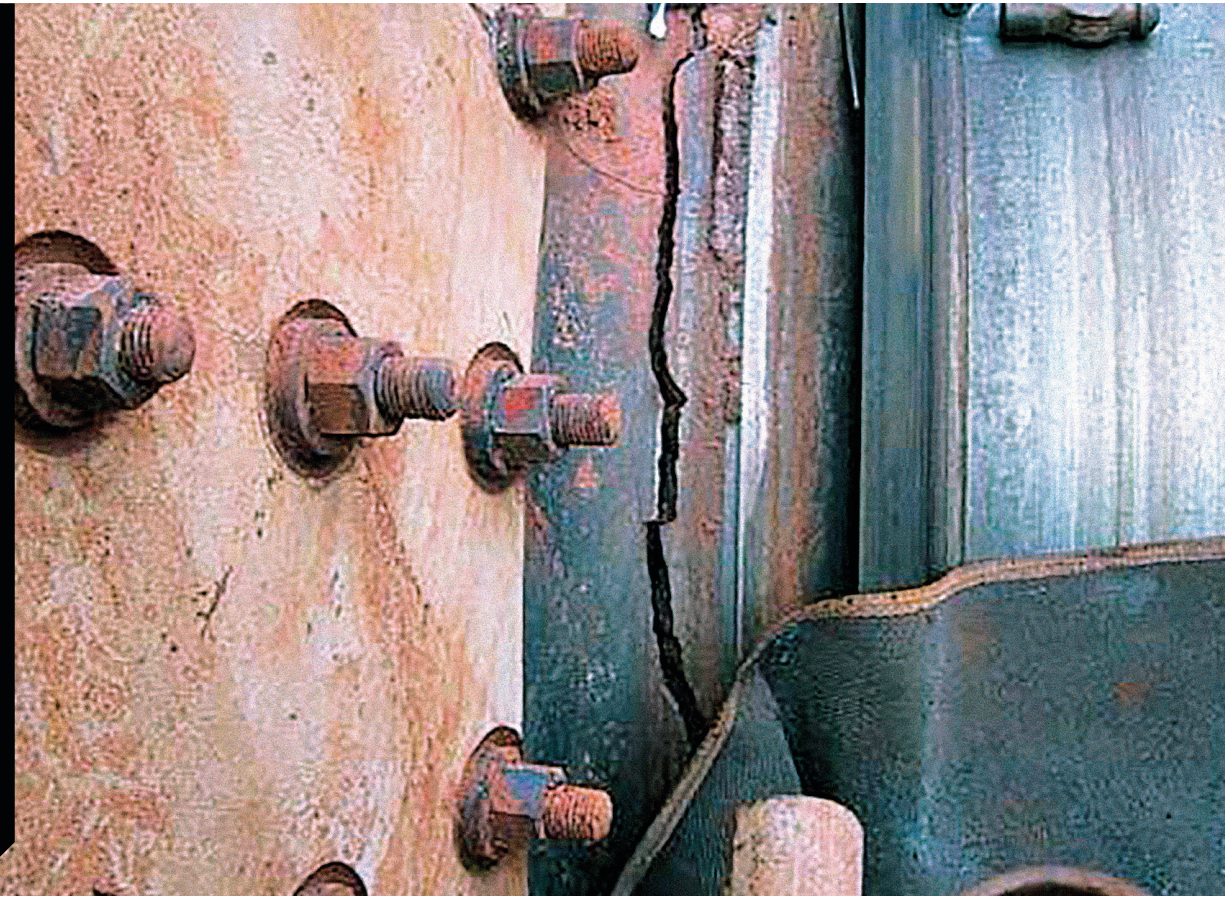
Metso:Outotec

3 inspection packages for your horizontal grinding mill

Avoid catastrophic failures
by finding problems early



Issues that are not caught early can lead to breakdowns and unplanned downtime, significantly increasing repair costs and production losses.

1. Mill Visuals and Vitals

Quickly catch visual failures, oil contamination and slurry leaks

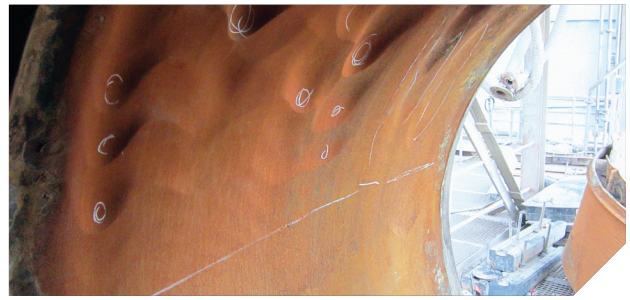
2. Mill Mechanical Verification

Next level inspection with specific adjustments and fixes

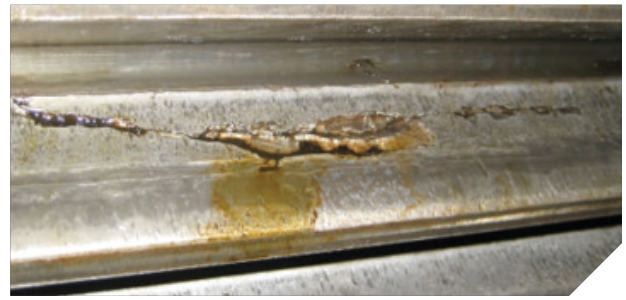
3. Mill Comprehensive/Customized

Complete, in-depth package with gear and pinion inspection

1. Mill Visuals and Vitals:
An external crack discovered on a mill shell while performing a visual inspection.



2. Mill Mechanical Verification:
Wash pockets discovered inside the mill trunnions. These can be detected from the outside through UT.



3. Mill Comprehensive/Customized:
A crack and severe damage found on a gear tooth while performing a pinion and gear MPI.

	1. Mill Visuals and Vitals	2. Mill Mechanical Verification	3. Mill Comprehensive/Customized
Core benefit - improved	Mill reliability	Mill integrity	Mill longevity
Downtime required*	1 shift	4 shifts	6 to 8 shifts
Inspection frequency	2 per year	Yearly	Every 1-3 years
Inspection offering	• OEM visual inspection of the mill with temperature, pressure, and flow readings. • Historical data helps predict mill component performance over time. • Detailed future inspections are recommended if needed. • Specific adjustments if required and requested by the customer	• Visuals and Vitals, plus OEM inspection with guards and covers removed. • Mechanical adjustments and critical torque verifi cations. • Ultrasonic thickness verifi cation of the trunnion journals to detect wash under the trunnion liners. • Specific adjustments if required and requested by the customer	• Complete OEM mill inspection. Additional inspections and measurements performed. This includes gear and pinion. • Metso Engineers present retrofit designs and procedures if required. • Recommendations to use as is, monitor or repair. • Customizable on demand.
Inspection code	FSE5032000517	FSE5432000517	FSE5532000517

*Number of shifts mill needs to be stopped to complete each inspection whit optimum number of millwrights (in addition to inspection while mill in operation).

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Horizontal grinding mills - Inspection packages

Component	Task	Mill status	Package 1 Mill Visuals and Vitals (1 shift)*	Package 2 Mill Mechanical Verification(4 shifts)*	Customized Mill Comprehensive (6 to 8 shifts)*
Control room data	Collect basic operating data (tonnage, power draw, speed, etc.)	Operating	●	●	●
Coupling	Visual inspection	Stopped	●	●	●
Gear and pinion	Check temperatures, pinion teeth visual	Operating	●	●	●
Gear guard	Check for lube spills, leaks, and grease accumulations	Operating	●	●	●
	Check mud guard installation, pinion seal	Stopped	●	●	●
Gear spray	Visually inspect components, check quantity, sequence, and interlocks, verify type of lubricant	Operating	●	●	●
	Spray pattern check	Stopped	●	●	●
Head	Visual inspection	Stopped	●	●	●
Inching drive	Interlock check to ensure presence of Trapped keys or Kirk keys	Operating	●	●	●
Infrared system	Visual inspection of components, verify reading accuracy of infrared probes	Operating	●	●	●
Jacking cradle	Visual inspection (presence, damage, rust) if applicable	Operating	●	●	●
Lube units including brakes for gearless mills	Visual inspection of components (gauges, leaks), oil condition (color, air bubbles), check for noise and vibration, check oil levels (sight glass), pressure differential at filters, pressures and flows (main and pinion bearings), relief valves (closed), temperatures, valves for proper position (open or closed), verify type of lubricant	Operating	●	●	●
Main bearing	Check pressures and flows, seals	Operating	●	●	●
	Visual inspection, check main bearing clearances	Stopped	●	●	●
Pinion bearings	Check flows, temperature, vibration	Operating	●	●	●
Reducer	Check temperature, verify type of lubricant	Operating	●	●	●
	Visual inspection, inspection of oil condition (color, air bubbles)	Stopped	●	●	●
Shell	Visual inspection	Stopped	●	●	●
Soleplates and grout	Visual inspection	Stopped	●	●	●
Trommel	Visual inspection (frame wear, panel wear, drip ring)	Stopped	●	●	●
Trunnion	Check temperature	Operating	●	●	●
	Visual inspection	Stopped	●	●	●
Trunnion liners	Check weep holes for plugging (leaks, racing), inspect trunnions with camera through the weep holes, visual inspection for wear and cracks	Stopped	●	●	●
Brakes	Check brake pads, accumulators, filters for gearless mills	Stopped		●	●
Coupling	Alignment check, mechanical adjustment	Stopped		●	●
Feed chute and spout	Visual inspection (wear pattern), make necessary adjustments, inspect hydraulic unit (lateral wheels)	Stopped		●	●
Gear and pinion	Visual inspection of teeth, contact, backlash, and gear root check	Stopped		●	●
Gear guard	Check lube packing at pinion	Stopped		●	●
Motor	Hold down bolts torque check, internal clearance check, magnetic center check	Stopped		●	●
Pillow blocks	Cap and hold down bolts torque check	Stopped		●	●
Pinion bearings	Internal clearance check	Stopped		●	●
Reducer	Hold down bolts torque check as required	Stopped		●	●
Trunnion	Trunnion runout, UT inspection of journals	Stopped		●	●
Anchor bolts	UT inspection	Stopped			●
Concrete piers	Core sampling survey	Stopped			●
Gear and pinion	Gear wash	Operating			●
	MPI inspection teeth**, axial and radial runouts, gear mounting bolt torque check, gear split bolt torque check	Stopped			●
Head	Circumferential and radial bolts torque check, UT inspection of wall thickness	Stopped			●
Mill positioning	Mill survey	Stopped			●
Shell	Longitudinal bolts torque check, MPI of welds, UT inspection of shell plate	Stopped			●
Trommel	Bolt torque check	Stopped			●
Trunnion	Bolt torque check, UT inspection of wall thickness	Stopped			●

A comprehensive inspection report outlining the data taken and assesment of the condition of the components is provided with each package.
The above represent standard recommended packages from Metso. Within each package, customization is possible, allowing you to add or subtract services to meet your specific needs.
***Number of shifts mill needs to be stopped to complete each inspection with optimum number of millwrights.**
****Eddy current testing available upon request.**

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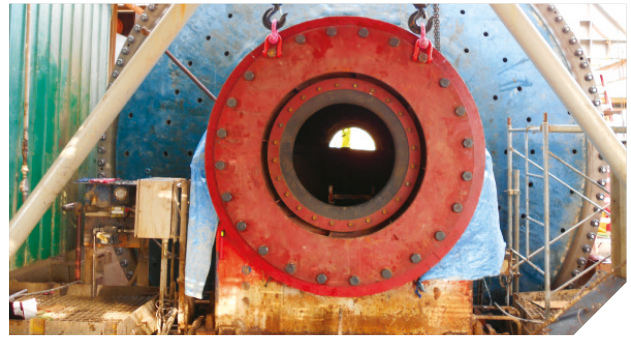
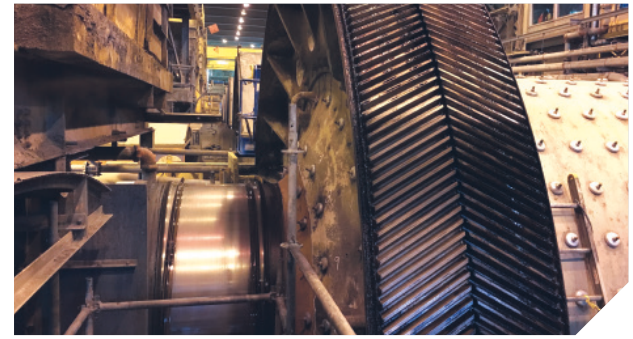
Metso:Outotec Horizontal grinding mill inspections

Case examples





A gold mine in the Philippines - Masbate Gold Project

Challenge: The mine was experiencing issues with bolt breakage on one of their ball mill heads. The breakage originated from the trunnion to head connection and worsened with time. Metso Outotec conducted an inspection of the mill and recommended replacing the mill head rather than continue to suffer downtime and lost production.

Results: Metso Outotec manufactured the replacement head, with an integral trunnion to replace the bolted joint. Metso Outotec teams installed and supervised alongside the mine's engineers. Since the installation, the mine has not had any issues with the newly installed head, allowing them to improve the mill's availability by reducing unplanned service stoppages. Metso Outotec has now been awarded a second identical mill head order at the mine site.

Metso Outotec solution

Designing the head with an integral trunnion required considerable reverse engineering of the existing parts while adhering to the strict tolerances needed to replace the existing third-party head. Metso Outotec Surabaya sent two crews to work in conjunction with Masbate's own mechanical fitters, for the installation and commissioning of the new mill head.

A North American iron ore mine

Challenge: The mine's operations were expected to cease within a decade due to declining resources in the nearby ore bed. With new findings at a second ore bed, the plant suddenly needed to increase production. However, the existing grinding mills required an assessment to determine their actual condition. Metso Outotec was mandated to conduct a visual and non-destructive inspection of the mill.

Results: Through the inspections, the mine could better understand the current condition of their equipment and determine what actions were required to ensure the integrity of their assets. The mine is using the information to map out their options for refurbishments and upgrades.

Metso Outotec solution

Metso Outotec conducted a complete inspection including verification of the condition of major components. This included the drive train, wear parts progression, instrumentation. Further tests were performed to spot cracks and defects. Metso Outotec supplied costing for supply and installation of parts as well as the estimated downtime to calculate production losses.

Read more at mogroup.com/showroom

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