Shutdown PMR's

Purpose:	To assess the kiln condition by specific measurements. To ensure the compliance of the Planned Maintenance Routines with Holcim standards To correct all unacceptable conditions recorded of the kiln To reduce risk of sudden failure and ensure the needed maintenance activities are carried out
Description:	**Kiln seal** • **General** Inspect completely from inside and outside, partly dismantle is required Change wear parts according to the inspections results Adjust position of the main parts to center the seal to the kiln rotation axis. Check the scoop on the inlet seal, restore condition if required (see figure 1) **Kiln shell** • **Condition** Measure the shell thickness on 2 positions (angle) every meter along the kiln shell Make a UT testing of the weld seems which are badly deformed Analyze the corrosion below the bricks, ask for brick analysis if required. Measure the refractory thickness and record results **Kiln tires** • **Attachment** Check carefully all welds of the attachment. Carry out repair welding if required Check that pads are not broken Shim the tire according to the inspection results to maintain a relative movement in operation from 10 to 30mm (see specific training) • **Condition** Conduct a UT testing of all tires (every second year) make a MT testing every year in between (see specific training on Holspace) Measure the tire wear, foresee and carry out machining if unacceptable (machining is to be carried out in operation) **Kiln rollers** • **Condition** Conduct a UT testing of all roller shaft (see specific training on Holspace) For rollers of hollow design carry out a UT test of the roller body on visual indications Measure the rollers wear, foresee and carry out machining if unacceptable (machining is to be carried out in operation) Change lubricant according to analysis Remove water from cooler if temperature may go below 0°C **Kiln girth gear** • **Pinion** Check condition and proper fixation Check bearing clearance • **Condition** Inspect each tooth visually (running at low speed on the auxiliary drive) Check the axial and radial run out (see specific training on Holspace) Make a contact pattern on the teeth in three location of the girth gear and two of the pinion with Dykem red ink Conclude and carry out adjustments Grinding of steps or progressive pitting is recommended but to be assessed and carried out by specialists **Kiln drive** • **Gear Boxes** Inspect each tooth visually Check bearing clearance, conclude and carry out adjustments Change oil according to analysis

	• **Couplings and brakes** Open couplings, check for wear and replace lubricant if required Check misalignment and carry out adjustments Inspect overrunning clutch and over speed brake, carry out adjustment and replace worn parts **Kiln nozering** • **Condition** Change the nozering segments according to condition **Kiln bricks retaining rings** • **Condition** In the area where bricks are removed, check the condition of the brick retaining ring. Refurbish if required **Kiln inlet chute** • **Condition** Change the segments according to condition and refurbish refractory **Specific for wet kilns** • **Condition** Check the feed pipe thickness - replace if necessary Check the chains and change according to design requirements as required Change the temperature probes **A practical lesson were the participant has to carry out the shutdown inspections is part of this training unit !!!!**
Standards:	• Girth gear / Pinion alignment check • Wear limits for rollers and tire are 5mm conical, 2 mm convex or concave wear (see figure 2) • Complete inspection • Replacement of wear parts • NDT testing (VT, PT, MT and UT)
Impact if not applied:	• Stops due to sudden failure • Damage due to lack of maintenance during planned stops (correctives actions not carried out because of missing inspections) • High maintenance cost due to increased damages
Actions:	• Training and information • Severity of non conformance has to be assessed and processed to the shutdown work list
Unit Completion:	• Participants has checked the actual level of PMRs in the plant and recommend corrective actions • Participants has carried out a kiln shutdown inspection
See site specific unit for additional information, respective actions and applicable safety instructions.	

Shutdown kiln PMR

Figure 1
Scoop ring

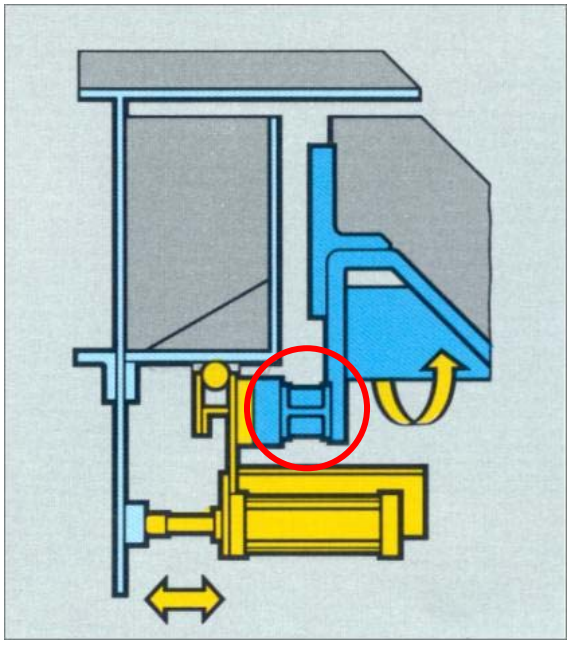
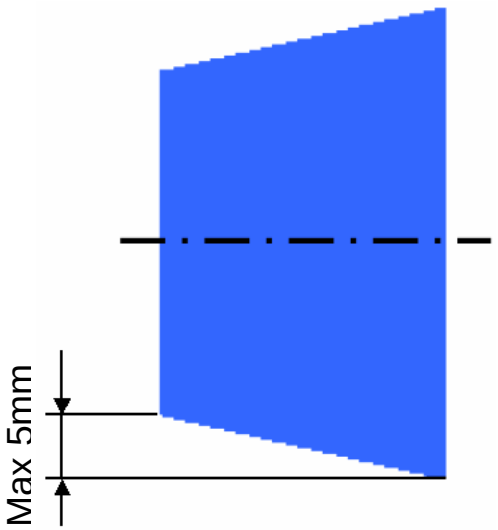
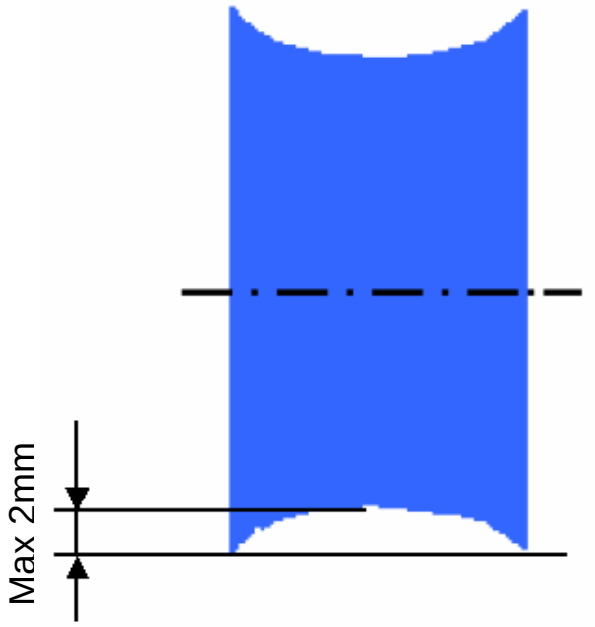


Figure 2

Consider for each roller the surface straightness to be measure with straight edge and filler gauge





Girth Gear

Contact pattern

Radial run-out