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Corrugator bearing clearance checks and their impact

Scope

This TIP is a general guide for checking bearing wear on the corrugator. Bearing clearance can be simply defined as the distance between a roll journal and its supporting bearing or the amount of “free play” in a bearing. In many cases however, the total movement measured may include eccentric clearances and wear and also sideframe or housing wear, in addition to the actual bearing clearance. This is often called “total movement” or “lift” in order to make the distinction. Determining the amount of movement in each of these components goes beyond the scope of this TIP and may involve removing end caps, bearing retainers, etc. To measure bearing clearances on a machine requires a dial indicator or gage and holder with magnetic base and a pry or lift bar. Bearing clearances are typically measured in 0.001 in. (0.0254 mm) increments. Note that the bearing clearances on heated rolls should be checked while the machine is hot!

Safety precautions

Ensure that the machine is “de-energized” in accordance with “Lock Out and Tag Out (LOTO)” procedures. LOTO procedures require that potential energy from air, steam, and hydraulic pressure also be eliminated. Simply turning the power off may not be adequate. The steam system will still be under pressure since checking the bearings when the machine is hot is the most accurate method. When working on hot machines, care must be taken to avoid burns. Follow your plants OSHA compliant safety program requirements. Long sleeves and protective gloves are recommended. Place “heat protective blankets” around hot rolls and other hot machine components in the immediate work area.

Procedure

There are many types of dial gage or dial indicator holders available for various uses. The ones commonly used in box plant maintenance often consist of a magnetic base that will adhere to steel plate and machine frame castings and either a fixed or flexible post. The type shown in Figs. 1-5 has the flexible post. A fixed post type is shown in TIP 0304-56 “Total indicated run-out and its impact on combined board quality.” Older machine sideframes often have many coats of paint and perhaps even oil or grease on them. For this reason a 150 lb. (68.04kg) “pull” magnetic base often comes in handy. The 150-lb. “(68.04-kg) pull” base with flexible post and rod allows more base mounting options with its long reach. See Fig. 1-dial indicator and holder.

Dial indicators are available in a variety of different ranges and graduations. The dial indicator shown in Figs. 1 and 2 is a versatile “back-plunger” style that accommodates use in tight spaces. A preferred type of dial indicator to be used for bearing checks should have a range of 0.000 in. to 0.200 in. (0.0 mm to 5.08 mm) and be graduated every 0.001 in. (0.0254 mm). Figure 2 shows a close up of a dial indicator. Note that the plunger accommodates a range of 0.200 in or 5.08 mm but the dial face only has 0.100 in or 2.54 mm, so the dial hand will move around the dial at least twice when the plunger is fully depressed.



Fig. 1. Dial indicator and holder with magnetic base.



Fig. 2. Back-plunger style dial gage or indicator with "button" tip attached.

The dial indicator holder's magnetic base should always be placed on the frame which houses the bearing and the dial indicator contact tip on the roll surface or its journal. Figs. 3 and 4 depict a bearing check being conducted on the bearing of a wrap idler roll on a liner preheater drum. Note that Fig. 3 shows improper placement of the dial indicator and its base. The wrap idler roll is mounted on movable support arms which often have play or movement in them due to gear backlash or wear, worn key or keyway, etc. This additional play or movement will