

Thermal Quenching of Hopper Tubes

Purpose

Provide information on potential causes for furnace hopper tube failures.

Problem

Tube failures have occurred on front and rear wall furnace tubes (below the hopper throat) on boilers with water impounded bottom ash systems, due to thermal cycling caused by external water quenching.

Causes

The bottom of the horizontal run of the hopper throat tubes should be inspected for metal loss, or signs of thermal fatigue or stress cracks (see Figure 1). The condition and operation of the ash hopper should be checked if any of these items are seen. Possible causes of tube water quenching are:

1. Splashing caused by falling ash.
2. Hand held water jets, used for breaking up clinkers, spraying water onto tubes.
3. Damaged nozzles on hopper jets allowing water to spray up onto tubes.
4. Hopper jets being operated while the hopper water level is drained.
5. Submerged observation or lance door aspirating air, bubbling or spraying water onto tubes.
6. Operating with plugged overflows, resulting in abnormally high hopper water levels.

Recommendations

Proper maintenance and operation with annual inspections of the ash hopper should prevent these

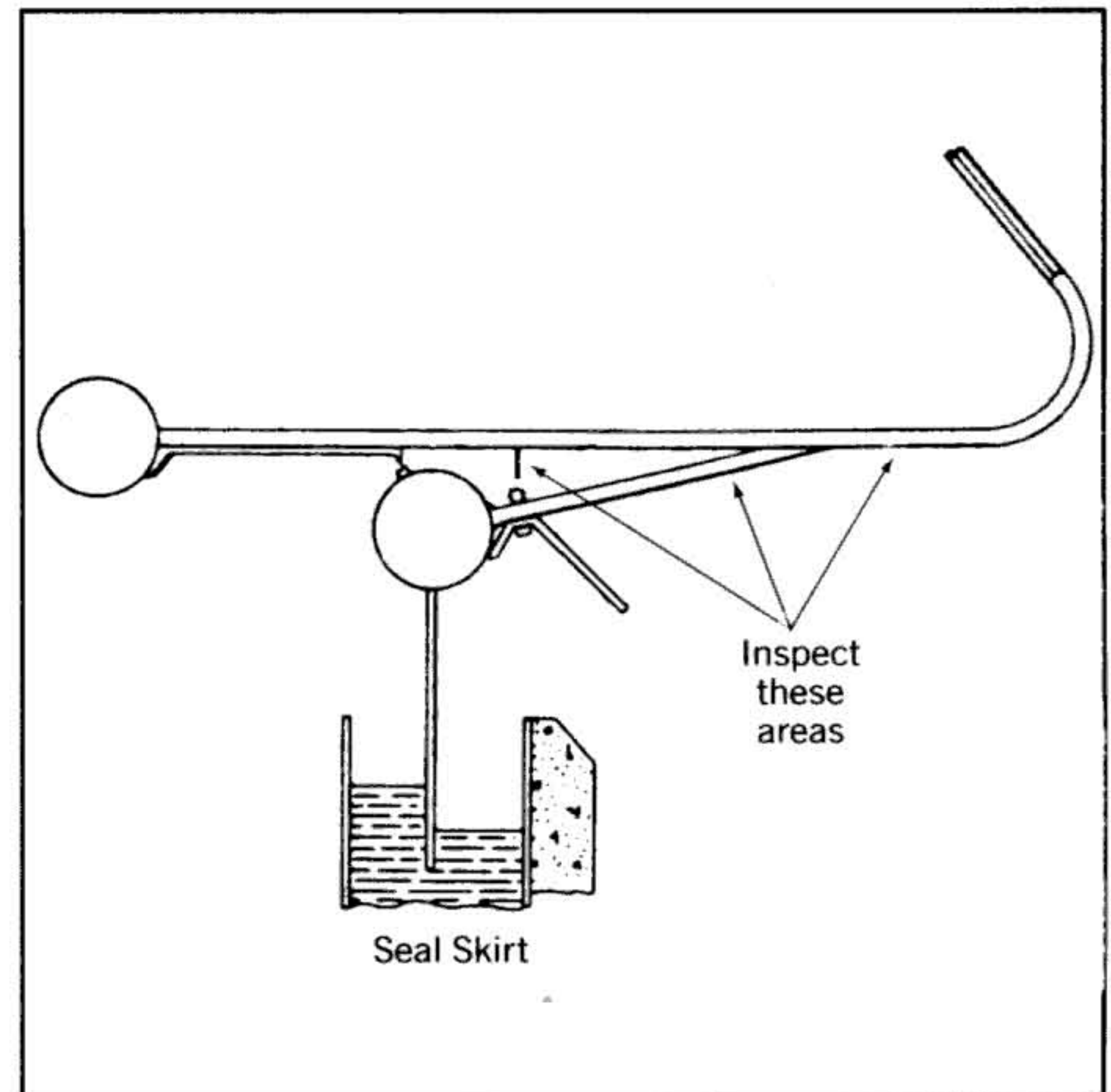


Figure 1 Hopper tube.

problems from developing or occurring.

The hopper system should be reviewed to insure that plugged overflows cannot go undetected.

Although these problems have mainly been found on supercritical Universal Pressure boilers, which have small diameter, thick walled and closely spaced membrane tube panels, they can also develop on any style boiler with a wet ash system.

Support

If any problems are encountered, contact Babcock & Wilcox Field Service Engineering for further information or assistance.

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