UP Boiler Mix Stud Plate Cracking

Purpose

Advise customers to inspect for cracks in wall tubes in the furnace enclosure mix areas of UP boilers that were designed prior to 1973. Several recent inspections have revealed stud plate deterioration and cracking, which has propagated into the tube wall, typically at the termination of the stud plate or membrane weld.

Problem

Figure 1 shows the "H" type stud plate design and the typical cracking, which can occur. This cracking can be quite advanced before tube leaks develop and extensive mix area tubing replacement may be required to avoid forced outages for repairs.

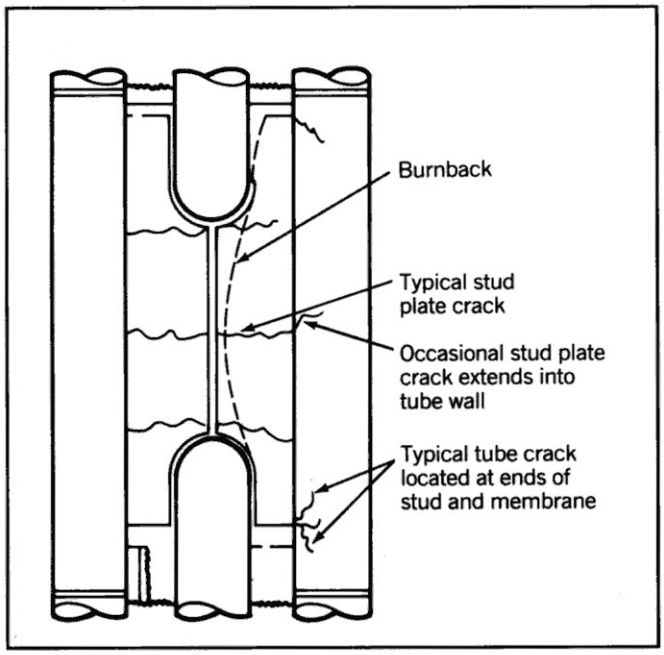

Figure 1 *Typical "H" type stud plate and cracking that could occur.*

Background

Mixes are required for B&W UP boilers, having up-up circuitry to eliminate fluid flow temperature unbalances and the potential for overheating tubes. To eliminate the cracking problem, B&W developed the all welded mix design in 1973. Figure 2 shows this construction. The all welded mix has proven to be a maintenance-free design, which has been demonstrated on many boilers, including both original and retrofitted equipment.

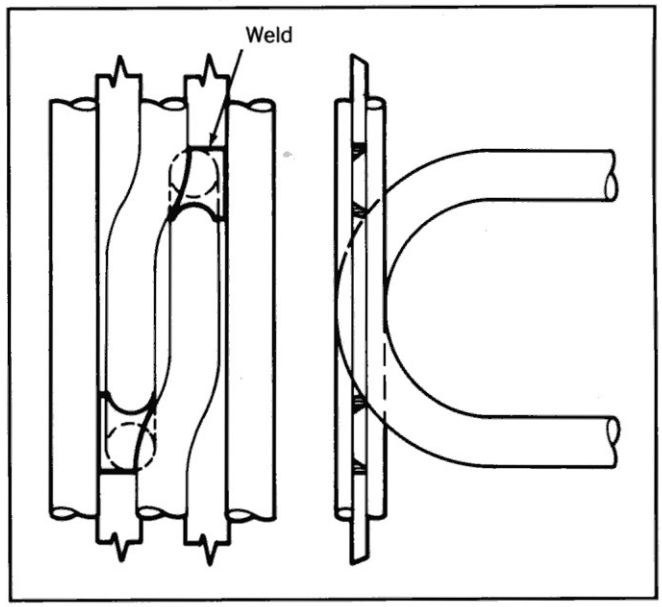

Figure 2 *New all welded mix area.*

Recommendations

Visual and dye penetrant inspections will determine the extent of damage and repairs required. The mix areas should be cleaned on the furnace side by sandblasting.

(continued on reverse side)

Two acceptable methods of repair exist.

1. Figure 3 shows a repair used for units with relatively minor cracking problems. The existing stud plates are not replaced but they are trimmed to within 1/4″ of the tube surface to prevent additional stud plate cracking. Some tube section replacement may be required in areas that exhibit minor cracking. The membrane bar terminations should be inspected and modified, if necessary, to make sure that the membrane-to-tube welds wrap around the ends of the membrane bars and that the weld terminates on the membrane bar. Refractory seals supported by stainless steel expanded metal lath are installed to close the openings in the existing burned back and slotted stud plate. This repair has proven to be effective, but refractory maintenance will be required.

2. Replace the existing mix tube bend area with the all welded construction as shown in Figure 2. This is the best positive step for completely eliminating the cracking problems as well as the annual refractory repairs necessary with the solution described in 1 above.

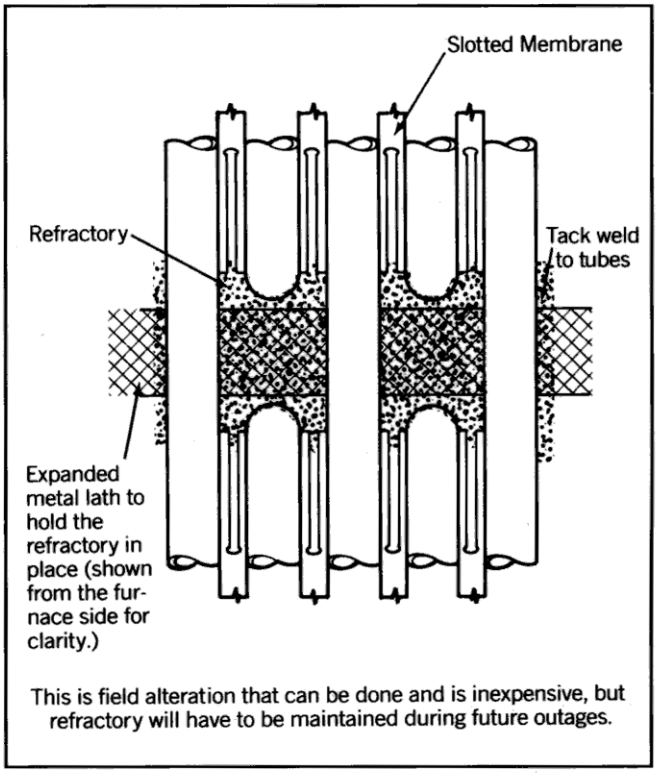

Figure 3 *Repair of old design viewed from furnace.*

Support

Contact B&W Field Service Engineering through your local District Service Office to coordinate your inspection and repair efforts.

For more information, contact your nearest B&W sales office or write: Dept. CIC, Power Generation Group, Babcock & Wilcox, Barberton, Ohio 44203, U.S.A.; or, in Canada, Manager, Marketing and Sales, B&W Canada, Cambridge, Ontario, N1R 5V3.

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