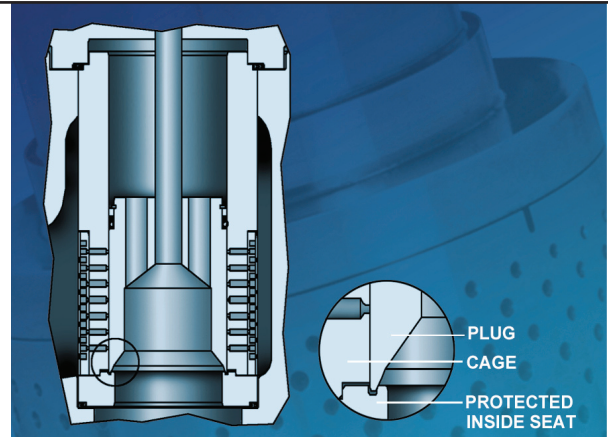


Maintenance Costs Reduced in Boiler Feedwater Valves Using Protected Inside Seat

RESULTS

- Leakage and plug and seat wear have been reduced significantly.
- Customer has experienced a significant reduction from the \$35,000 to \$45,000 they had been spending to replace the seat, plug, and cage prior to use of the protected inside seat.



APPLICATION

High pressure boiler feedwater valves.

CUSTOMER

Independent power producer.

CHALLENGE

The customer commissioned a 2X1 combined cycle merchant power plant in May of 2000 that produces approximately 540 megawatts of power at full load.

The original boiler design utilized a main feedwater valve and a start-up feedwater valve in a parallel configuration. The start-up valve was a Fisher® 2" HPT with Cavitrol® III three-stage trim. The main valve was a Fisher 6" HPT with Cavitrol III characterized trim. The valves were specified by the main contractor for the plant.

The valves were operating under very severe conditions. The original specification for the main feedwater valves indicated the highest operating pressure drop would be 664 psi at an inlet pressure of 2506 psi. In fact, the main feedwater valves were experiencing a pressure drop 2500 psi during start-up at an inlet pressure of nearly 3200 psi.

The plant does not shut down the boiler feed pumps overnight. Any excess valve leakage causes the drum level to rise to a point where the operators must open a drain valve to keep from flooding the system. This wastes a significant amount of treated water.

The main feedwater valves were opened for inspection in the spring of 2002 due to complaints of leakage, and the trim in each was found to be damaged or worn. New trim was installed in both valves.

The protected inside seat for control valves with Cavitrol® III Trim addresses seat leakage issues due to plug-tip erosion.

SOLUTION

In 2005, Emerson severe service engineers selected this plant to serve as a beta test site for a new protected inside seat design that it hoped would significantly improve valve performance and reduce maintenance cost in this kind of tough application.

For control valves with standard Cavitrol III trim designs, shutoff occurs when the radius tip of the plug, located on the lower outside edge of the plug, contacts the beveled seat ring. On the protected inside seat design, the plug seat consists of a bevel on the inside of the plug tip and enters a machined groove in the upper surface of the seat ring. Since surfaces for shutoff are inside the plug tip and the radius in the groove of the seat ring, the protected seat feature does not expose shutoff surfaces to potential erosion in the flow stream. The plug and seat are made of 440C to combat the high stress levels found in the plug tip.

The protected inside seat, consisting of a plug and seat ring, was installed in January 2006 in the main feedwater valve. It was decided that the existing cage could be re-used.

RESULT

The feedwater valves have been opened and inspected every six months since the beta test installation and plug and seat wear have been reduced significantly using the protected inside seat. Now, the customer has experienced a significant reduction from the \$35,000 to \$45,000 they had been spending to replace the seat, plug, and cage prior to use of the protected inside seat.

For more information on severe service solutions, see us at www.fishersevereservice.com.

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