

Boiler Efficiency Improvement through Air Preheater Renovation and Modernization at Hindalco Industries (Renusagar Power)



With increasing power demand and with the deterioration of the existing plants, ways and means are to be found out to improve the performance and availability of the existing plants. Normally the rotary air preheater typically accounts for approximately 10% to 12% of a unit's overall thermal efficiency.

The reported problem with rotary air preheaters is mostly on the deterioration of thermal performance and the higher air leakage. Mere availability of the air preheater in service mislead that the air preheater is performing good. By retrofitting the state of art through Renovation and Modernization (R&M), the performance of the air preheater can either be brought to the original condition or with an improvement. Upgrading or enhancing an air preheater is usually one of the most cost effective ways of improving boiler performance.

Renusagar Power Plant in India is having 8 boilers. Out of which 5 boilers are having rotary air preheaters and the balance 3 boilers are having tubular air preheaters. In these boilers, the air preheater high gas inlet temperature resulted in high gas outlet temperature and also the air preheater leakage was on the high side. The Customer desired to recover this excess heat from the flue gas and also to bring down the leakage.

GEECO engineers did the assessment of the air preheaters, identified the problems and submitted the report with recommendations. Convinced by the recommendations, to start with, the Customer placed an order on GEECO for air preheater R&M of Spare boiler.

Based on the long experience in air preheaters, GEECO did the following major changes in the air preheater by incorporating the advanced technology.

- ♦ The height of heating elements was increased to increase the heat recovery. To accommodate this increase in element height, new rotor was supplied. Accordingly housing height was also increased.
- ♦ Supplied all new elements
- ♦ Used more efficient profiles
- ♦ Provided a small depth sacrificing basket at the hot end to reduce the replacement cost in future
- ♦ Double sealing technology to reduce the leakage
- ♦ Upgraded the sealing system to reduce the leakage
- ♦ Machined 'T' bars
- ♦ Diaphragm Protection seal

This air preheater R&M job on Spare boiler resulted in the boiler efficiency improvement of 1.5% and the air preheater leakage is reduced from 19.83% to 9.29%. The payback calculated is as low as 9 months.

Realizing the benefits derived by this R&M job, the Customer placed repeat order on GEECO for the balance 4 boilers to carry out the same modifications.

After the execution of R&M in all the air preheaters, the Customer worked out the efficiency improvement and the leakage reduction. The results are tabulated below:

Unit No.	Efficiency Improvement	Air Preheater Leakage		Payback
		Before R&M	After R&M	
# Spare	1.50%	19.83%	9.29%	9 Months
# 5	1.24%	17.41%	4.51%	10 Months
# 6	1.40%	9.69%	6.34%	13 Months
# 7	0.69%	7.65%	4.20%	12 Months
# 8	1.52%	6.80%	2.70%	13 Months

GEECO confirms to the air preheater users that it is possible to improve the efficiency and reduce the leakage in most of the air preheaters by implementing the R&M.



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