

CASE STUDY:
**MATRA
 POWER
 STATION**
 HUNGARY



MODIFICATIONS TO THE AIR PREHEATERS INCREASED THE BOILER EFFICIENCY BY OVER 1.9%



DETERIORATION OF THE SEALING SYSTEM ON THE AIR PREHEATERS HAD RESULTED IN VERY HIGH LEVELS OF AIR LEAKAGE INTO THE FLUE GAS. MODIFYING THE EXISTING SEALING SYSTEM TO THE HOWDEN VN CONCEPT HAS REDUCED LEAKAGE FROM 24% TO 4.7% WITH A CONSEQUENT IMPROVEMENT IN BOILER EFFICIENCY OF 1.9%. THIS HAS PERMITTED THE STATION TO REDUCE FUEL CONSUMPTION AND TO REDUCE THE LOAD ON THE ID FANS.

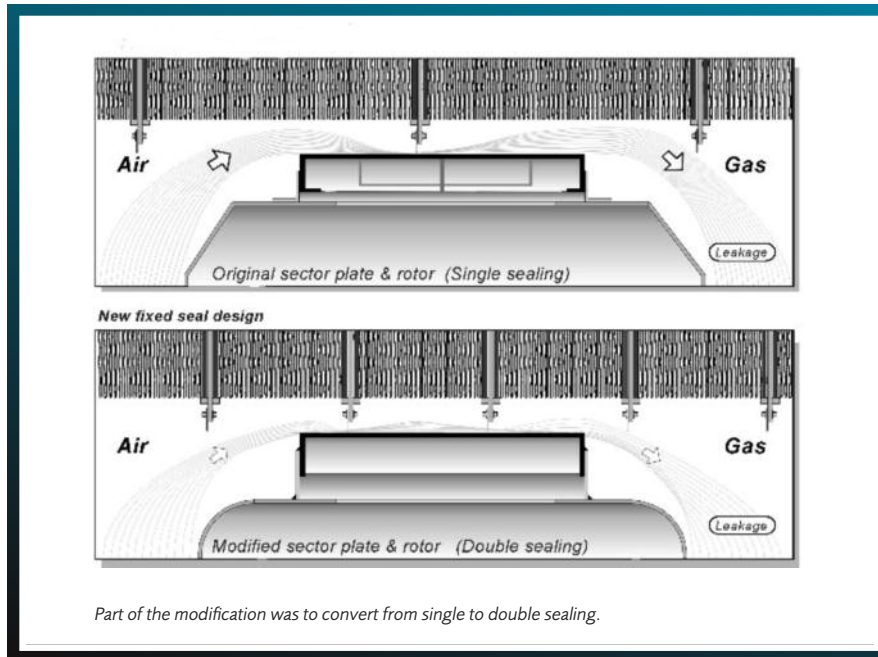
MATRA UNIT 3 IS A 200MW LIGNITE FIRED POWER STATION IN HUNGARY WHICH WAS BUILT BY GANZ ROCK IN 1970. THE AIR PREHEATERS (2 PER BOILER), WHICH WERE ALSO SUPPLIED BY GANZ ARE OF THE LJUNGSTROM TYPE, APPROXIMATELY 9.5M IN DIAMETER. THESE WERE FITTED WITH MOVING RADIAL AND AXIAL SECTOR PLATES THAT WERE INTENDED TO REDUCE GAPS BETWEEN THE ROTOR AND THE HOUSING IN AN ATTEMPT TO CUT DOWN AIR LEAKAGE.

The sealing had deteriorated to such an extent that a large amount of air was short-circuiting the system through the air preheater and thus bypassing the furnace. In addition, a proportion of the air and gas was found to be flowing through gaps between the element baskets and the rotor walls and was therefore not contributing to the heat exchange process. The net effect was a high flow of high temperature flue gas to the chimney, resulting in a reduction in boiler efficiency.

Investigations by Howden Sirocco revealed that there was considerable erosive damage to the sector sealing plate, and to the seals between it and the casing. The station therefore decided to modify the sealing on the air preheater to the advanced Howden VN system. Work commenced in July 1995 during the annual maintenance outage, and by the end of August the sector plates had been replaced and the rotor had been modified by doubling the number of radial and axial seals.

Basic Data	Before	After
Air Leakage	24%	4.7%
Gas Out	205°C	164°C
Air Out	285°C	287°C
Boiler efficiency	Datum	+1.9%

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At the same time, new element baskets were fitted and bypass seals were replaced, which reduced the bypassing of air and gas through the rotor, in order to improve heat recovery. The station came back into service in September that year. The upgraded air preheater sealing considerably reduced the mass flow of gas flowing to the chimney, which, combined with the improved heat exchange, resulted in a significant reduction in the dry stack loss with consequent improvement in boiler efficiency.

Tests carried out by the power station before and after the modification showed that the air leakage reduced from 24% to 4.7% and the mass flow of flue gas dropped by a corresponding amount. Flue gas leaving the air preheater fell in temperature from 205°C to 164°C (undiluted), and the boiler efficiency increased by 1.9%. An additional benefit was that the considerable reduction in flow through the FD and ID fans resulted in a significant saving in auxiliary power. The elimination of moving sector plates means that annual maintenance hours are reduced.

The life of the radial and axial seals is increased because there is no possibility of mal-operation of the sector plates causing seal wear.

Operational experience since the modification has been good and no increase in air leakage has been detected by the station. As a result of the successful performance, the station carried out the same work on Unit 5 in 1996 and similar benefits have been obtained.

OPERATIONAL EXPERIENCE SINCE THE MODIFICATION HAS BEEN GOOD AND NO INCREASE IN AIR LEAKAGE HAS BEEN DETECTED BY THE STATION.

AS A RESULT OF THE SUCCESSFUL PERFORMANCE, THE STATION CARRIED OUT THE SAME WORK ON UNIT 5 IN 1996 AND SIMILAR BENEFITS HAVE BEEN OBTAINED.

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