Howden

Performance Enhancement

Howden Power

Howden

Outstanding improvements to existing plant **performance** from the world's leading air and gas handling equipment supplier

Optimising Performance

As today's primary industries know only too well, the performance requirements of main plant are seldom constant. Different fuels and new operating cycles may have to be accommodated. The performance of other aspects of the process may need to be compensated for. New technologies may offer benefits that cannot be ignored.

Throughout the world there is one company that customers turn to for the highest standards of performance enhancement to fans and heat exchangers – Howden Power. With over a century of experience of air and gas handling technology, no one understands the changing needs of the market better.

In power and petro-chemicals, cement, mining and steel, Howden has helped customers to achieve economic and environmental gains from existing plant, ranging from lower dust emissions to greater efficiency, reduced fuel consumption to increased output.

Impeller being prepared for blade tail extensions to increase performance

Installation of a different impeller design can match substantially changed performance requirements

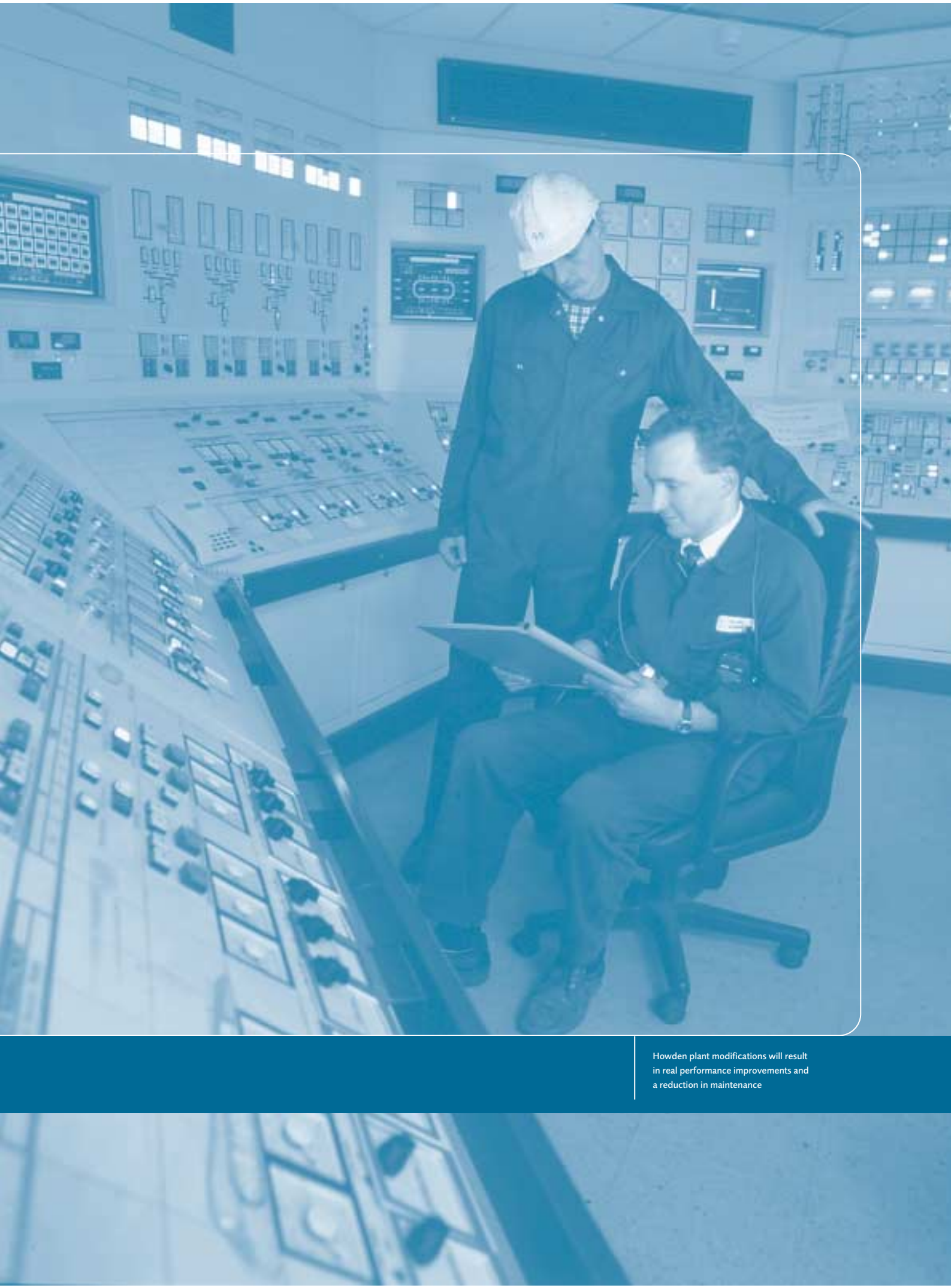
Replacing elements with a modern high-efficiency design to increase heat recovery

Retrofitting the Howden sealing system can substantially reduce air preheater leakage

The Howden Pedigree

Howden Power is part of the Howden Group of companies, the world's largest and longest-established fan manufacturer. James Howden, a pioneering Scots engineer, founded the company in Glasgow in 1854. Today the Group has subsidiaries in six continents and more than 15 countries worldwide.

Howden Power is based in the United Kingdom and employs several hundred people, from design engineers and project managers to installation and maintenance technicians. Our state-of-the-art manufacturing unit are equipped with the most modern available technology.



Howden plant modifications will result in real performance improvements and a reduction in maintenance

Engineering excellence

In line with our philosophy of engineering excellence, Howden engineers are constantly developing and refining products to obtain better performance. The same experienced engineers are available to carry out performance tests and solve operational problems on fans, air preheaters, FGD gas reheaters, mechanical dust collectors and electrostatic precipitators - whether of our own or of other companies' manufacture.

Our plant enhancement service extends to the full turnkey package if required. In accordance with an agreed programme, our engineers will conduct a site survey which includes performance measurements and identification of the potential improvements to the plant and associated equipment. We will then manufacture the necessary parts, install them in the plant, and conduct subsequent performance tests.

A full performance test can be carried out to verify the effectiveness of a performance enhancement

Leakage modification to an air preheater can permit the installation of a smaller gas reheater on down-stream FGD Plant

Product development demands a constant search for new heat exchanger element profiles

Air Preheaters

Amongst the many modifications we have carried out on air preheaters for customers around the world, the two most common are to increase thermal performance and to reduce leakage.

Leakage

Many designs of air preheater suffer from leakage drift (the significant increase in leakage over a period of time). This can affect boiler operation in a number of ways, such as increasing fan power, increasing velocities in the precipitators, reducing the flow of hot air to the mills, or shrinking the draught fan margins. By fitting the advanced Howden VN sealing system, these problems can be reduced or eliminated.

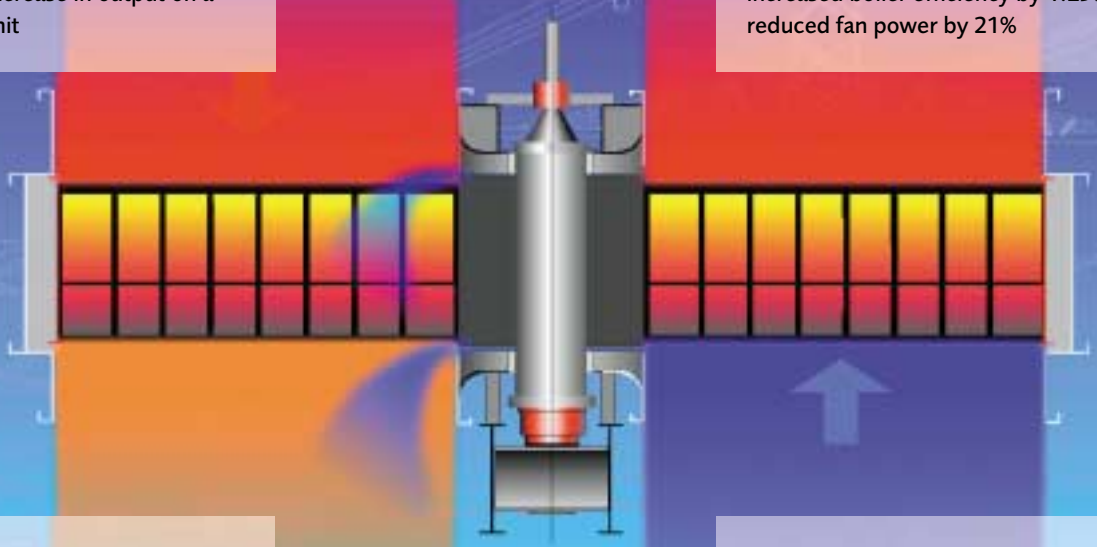
Thermal Performance

In many cases we are able to increase the heat recovery in a rotary heat exchanger by installing higher performance elements and/or by increasing the overall depth by better use of space within the rotor. This will improve the overall efficiency of a boiler.

Key Benefits

Installing VN sealing resulted in a 20MW increase in output on a 500MW unit

Modifications on a 210MW lignite fired unit increased boiler efficiency by 1.25% and reduced fan power by 21%



A VN retrofit reduced seal wear & permitted the adoption of a 4 year maintenance cycle

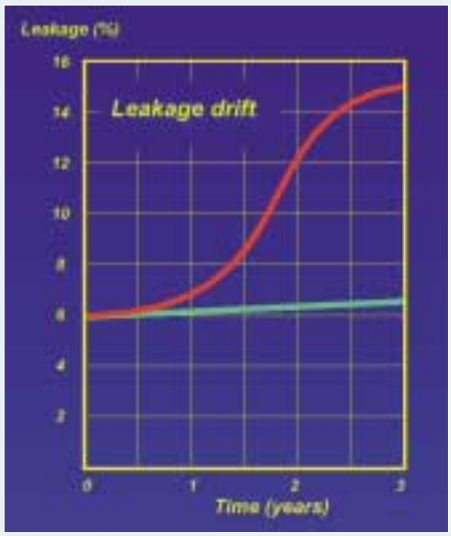
A 16% reduction in gas flow resulting from an air preheater modification will enable a smaller FGD plant to be retrofitted

The benefits of upgrading air preheaters to modern Howden technology include:

- Reduced draught fan power and consequent increase in saleable power output.
- Lower gas velocities permitting increased precipitator efficiency and reduced dust emission from the stack.
- Reduction of the temperature dilution effect of air leakage, reducing corrosion attack downstream of the air preheater.
- Reduction of leakage, making more air available at the coal mills to ensure that sufficient pulverised fuel can be transported to the burners (particularly when firing wet coals), and thus any shortfall in station MW output is recovered.
- Reduction of leakage which in turn lessens flow through the FD and ID fans, and which can eliminate MW output shortfall caused by overloading of the fans.
- Elimination of components such as adjustable sector plates and their associated seals, actuators and sensors. This significantly reduces planned and unplanned maintenance. In particular, the life of rotor sealing strips will be extended and theywill not require to be changed at every major outage.
- Increase in boiler efficiency with corresponding reduction in fuel consumption for a given MW output.

Retrofitting FGD plant

Our experience has shown that before retrofitting FGD plant downstream of the boiler, it is worth remembering that excess air preheater leakage can lead to an unnecessary increase in plant size. Improving the sealing system can therefore result in a reduction in the size of FGD plant required, with consequent cost savings.



Typical leakage drift on an older design of air preheater

Other designs

Howden VN

Engineering excellence

Fans

From time to time, changes in the performance requirements of certain plant may result in a fan being to large or too small for its new task. In other cases, the impeller may not be of the best design to meet the new requirements. Our engineers will examine the existing fan and system, and determine how best to provide the desired improvements in output, efficiency and lifespan.

For an axial fan, such a refurbishment may consist of new blades, new rotors or a change of some of the static parts as determined by the new performance requirements. Centrifugal fans may have the blade profile changed, wear protection added (or removed), or a new design of impeller fitted in the casing. These modifications are not confined to equipment supplied by a Howden company, but can be applied to any fan.

Our aerodynamic laboratory in Denmark, one of the largest of its kind in Europe can carry out model tests in accordance with AMCA standards.

Implementation

In accordance with ISO 9001, we impose rigorous quality control at all stages from initial design through to installation and commissioning. We also operate a safety policy with a dedicated safety officer controlling the activities on each site. We offer expert project management along with the highest standards of installation and commissioning and subsequent maintenance and repair.

Economic Benefits

Howden customers around the world agree that modifying air preheaters or fans can be an extremely cost effective way of increasing plant output or efficiency. Many have seen payback periods of a year or less. Where enhancement leads directly to an increase in power station MW output, new capacity can effectively be added at a fraction of the cost/MW of a new power station.

Replacing blades or the complete rotating assembly can significantly increase output or reduce power consumption

In some instances the installation of a new fan can be economically justified

the next step

For further information on any of the subjects covered in this brochure, or for any advice regarding fans and heat exchangers please contact us at the address overleaf.

Air preheater sealing
enhancement
nearing completion

As todays primary industries know only too well, the performance requirements of main plant are seldom constant. In power and petro-chemicals, cement, mining and steel, Howden has helped customers to achieve economic and environmental gains from existing plant.

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