

Improve steam system performance

The auxiliary steam system on board can be a significant consumer of fuel. Low running costs are dependent on regular maintenance.

A 1500kg/h boiler operating at 7.0bar can be consuming around 100kg of fuel per hour. At a fuel price of \$700 per tonne, the boiler is costing over \$500,000 a year to run or nearly \$0.05 per kg of steam produced.

A 10% improvement in the performance of such a system can deliver an additional \$50,000 per year to the vessel's bottom line.

A steam system health check can determine whether your system is operating as efficiently as it could be

There are three areas that a health check should focus on:

- Steam generation side
- Distribution system
- Condensate recovery

There are multiple ways in which the performance of these three areas can be improved upon. Some proven methods are given opposite.

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Improvements on the steam generation side are:

- Minimise the excess air at the burner. This improves the amount of fuel energy transferred to the steam and reduces the wasted heat in the exhaust gas. The rule of thumb is that 2% reduction in excess air is a 1% reduction in fuel consumption.
- Ensure that the boiler heat transfer surfaces are kept clean, improving heat transfer between the hot combustion gases and the steam. Fouling of the heat transfer surfaces can increase fuel consumption by up to 5%.
- Check the blow down level, which should be between 4% and 8%. Close monitoring of feed water quality reduces the quantity for blow down and consequent energy loss.

Distribution system efficiency improvements:

- Ensure insulation is effective on pipes, valves and vessels. Effective insulation can reduce losses by up to 90% compared to un-insulated pipe.
- Survey the system for leaks and repair them. Wet or damp insulation is sign of leaks and the cost of losses can be vast in proportion to the size of hole.
- Isolate unused lines and turn off consumers that are not required.
- Minimise vented steam from the system.

Condensate recovery system improvements:

- Maintain the hotwell temperature above 80°C.
- Use the high-pressure condensate as flash steam in the low pressure parts of the system.
- Optimise the level of condensate recovery. In steam system where the maintenance has been less than rigorous over the medium term, up to 10% of the traps may have failed each year. A 3mm orifice in a stuck trap operating at 7-bar can cost over \$9000 per year.

For further information contact

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