Heat Management

Mölndal Energi

Application: Combined Heat and Power plant
Efficiency solution: HISS™
Cleaning area: Superheater (SH), Economizer (ECO), Air preheater (APH) and Convection area (CONV)

General info

Plant: Combined Heat and power plant
Boiler: Valmet (Metso)
Fuel: Biofuel (bark, wood residue)
Capacity: 80MW$_{th}$

Installation

Type: HISS™ Advanced
Year of installation: 2012
Number of sootblowers: 19

Situation description

The boiler was originally built for 70 MW$_{th}$ but Metso prepared it for additional power load, therefore, the load was increased to 80 MW$_{th}$. There are 8 retractable sootblowers in the superheaters (Clyde Bergemann, 6880 mm) and 11 sootblowers in CONV/ECO/APH.

Before HISS was installed, sootblowing was operated twice per day and each sootblowing cycle caused 1 MW decrease on turbine load for 2.5 h (duration of one sootblowing cycle).

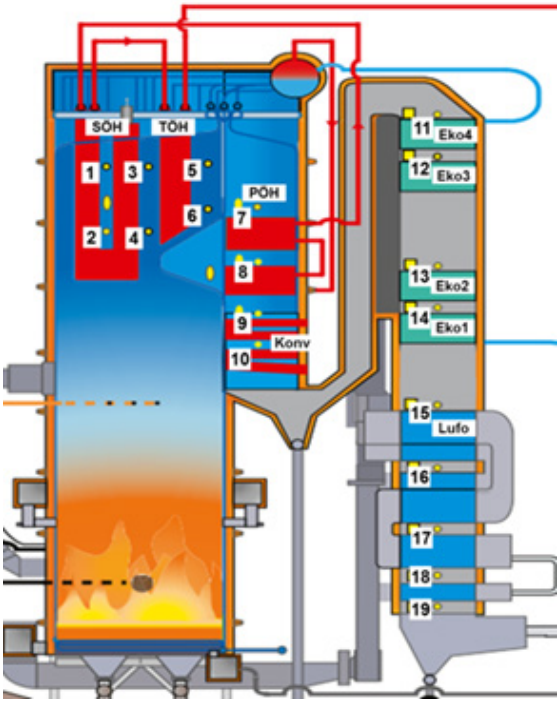


Figure 1 - Boiler design

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Results

After HISS was installed, sootblowing is still used twice per day (12:00 and 01:00). The main benefits with the installation are:

1. Reduced time for one sootblowing cycle by **60% or 1,5h**. This gives a saving of 3 MWh(el)/day. (During a sootblowing cycle, the boiler load must be decreased, hence a shorter sootblowing cycle will prolong the time the boiler runs at maximum load, which in turn saves electricity).
2. Steam consumption reduced by **45%**, used for power production instead.

However, operating the sootblowers overlapping has also eliminated the large pressure hammers, that are inevitable when switching between two sootblowers. By eliminating these, the steam pressure is kept stable. This results in less wear on equipment according to the client.

Since the installation 2012, the features Smart Heating[(1)] and Soot Blower Performance Panel[(2)] has been installed. Smart Heating has removed the condensate in the sootblower system and Soot Blower Performance Panel is used for monitoring the mechanical condition of the sootblowers. In total the client is very satisfied with the optimized system.

(1) Smart Heating reduces wear since no condensate reaches the heat transfer surfaces.

(2) Soot Blower Performance Panel continuously analyzes the operation and efficiency of each sootblower. A warning is triggered if outside set limits, thereby preventing unplanned outages.

On the next page, Figure 2 and 3 displays operational data trends provided by Mölndal Energi, showing how the sootblowing system behaves after installing HISS™. Heat Management experts always monitor operational data to maximise the benefits of HISS™ for each customer, this will result in maximised availability, efficiency and lifetime of the boiler.



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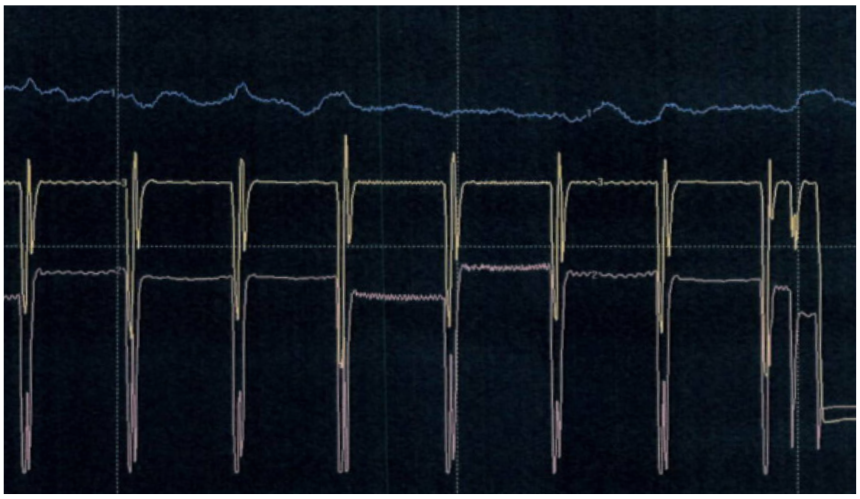


Figure 2. Data trends before installing HISS™

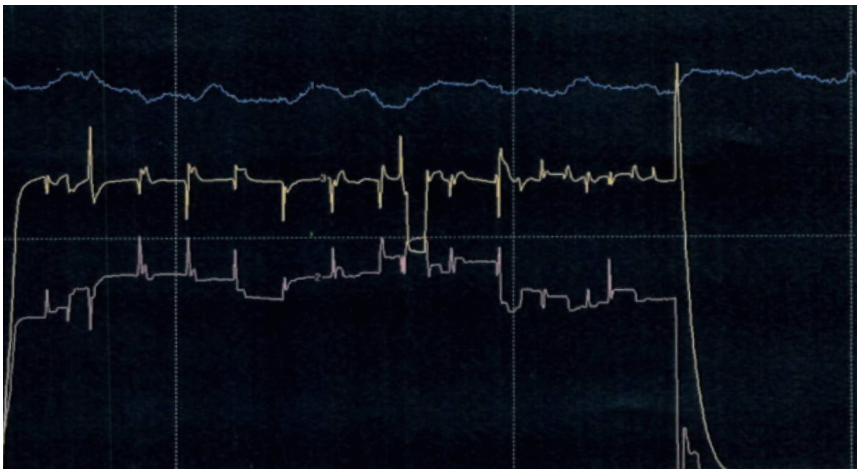


Figure 3. Data trends after installing HISS™

Data interpretation

The diagram in Figure 2 shows data measured before the HISS™ installation and Figure 3 is a post-installation graph. The line coloring is described below:

- *Main steam flow rate (kg/s)*
- *Pressure regulation, steam to sootblowers (bar)*
- *Flow, steam to sootblowing system (kg/s)*

The comparison shows that HISS™ stabilized the main steam flow rate and steam pressure (Blue and yellow lines), "pressure hammers" shown in Figure 2 are drastically reduced due to HISS™ Overlapping which results in a reduced wear on the sootblowers, extended life expectancy of the system, and reduced steam consumption, among many other benefits.

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