A Case study from Heat Management

BillerudKorsnäs Gruvön, Sweden

Application: Recovery boiler, T5

Product: High Impact Sootblowing System (HISS™)

Cleaning area: Superheater, Boiler Bank, Economizer

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General info

Plant: Integrated Board Mill
Boiler: Kvaerner (Valmet)
Operation time: 8,500 hours per year
Fuel: Black liquor
Capacity: 2700 tDS/day

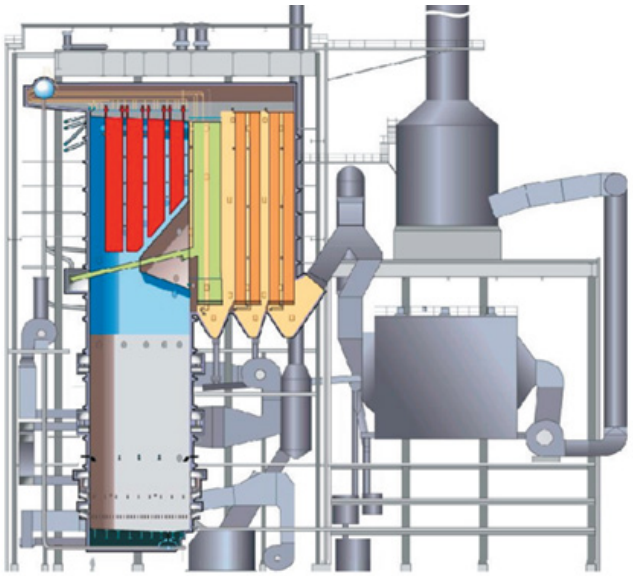
Installation Information

Type: HISS™ Advanced
Number of sootblowers: 80
Cleaning area: Superheater, Boiler Bank, Economizer

Situation description

After performing a boiler operation study, it was obvious that substantial savings could be obtained from reducing sootblower steam consumption and at the same time operating the steam sootblower more often for handling fouling at the heat transfer surfaces of the boiler. After a few weeks of operation, a water wash was needed, due to high sulfidity.

The mill could operate normally as long as the sulfidity did not increase. When this happened, the mill got aggressive fouling in the boiler and had to stop for a water wash in a matter of weeks. With HISS™ the boiler could stay operational for months, even with higher sulfidity but the mill had to sootblow more often.



Installation

All 80 steam soot blowers were rebuilt in 2016 with Heat Management's patented solution using local actuators controlling the steam poppet valves on the sootblowers, together with upgraded software for monitoring/controlling the sootblowers. The chosen settings focus both on increasing the number of soot blower starts and reducing steam consumption. The number of starts has for most of the operating time been increased by 25 % for all steam soot blowers, which has resulted in cleaner heat transfer surfaces and has enabled operation on higher load. A substantial amount of steam is at the same time saved (see Figure 2).

Results

- The black liquor throughput (load) was increased by 7.8 % compared to the previous season.
- One water-wash was avoided during periods with high sulfidity, by increasing the sootblowing to maximum (8 sootblowers operating at the same time).
- Stable flue gas temperature and differential pressure with "normal ash" (see Figure 3-5)
- During the period with normal ash the differential pressures were lower compared to the reference period RS15-RS16, despite higher DS flow
- At normal load and load controlled sootblowing - Period C in Figure 2, the optimization resulted in a reduction of steam consumption of 8.54 tons/h (25.92 → 17.38), which is a 33% reduction.
- During the period with normal load (Period A in fig 2), the savings of sootblowing steam were 8.04 tons/h (25.92 →17.88), which is a 31% reduction.
- If the savings of sootblowing steam is put in relation to boiler load, the steam consumption is reduced from 0.255 to 0.159 [tons steam per TDS], which corresponds to a 38% reduction.
- When in an operating period with very difficult/sticky ash the ability of increasing sootblowing capacity, thanks to the optimization of the system, helps in limiting fouling of the heat transfer surfaces.

The above dynamic between saving steam, increasing load and avoiding water-washes is what makes HISS™ unique.

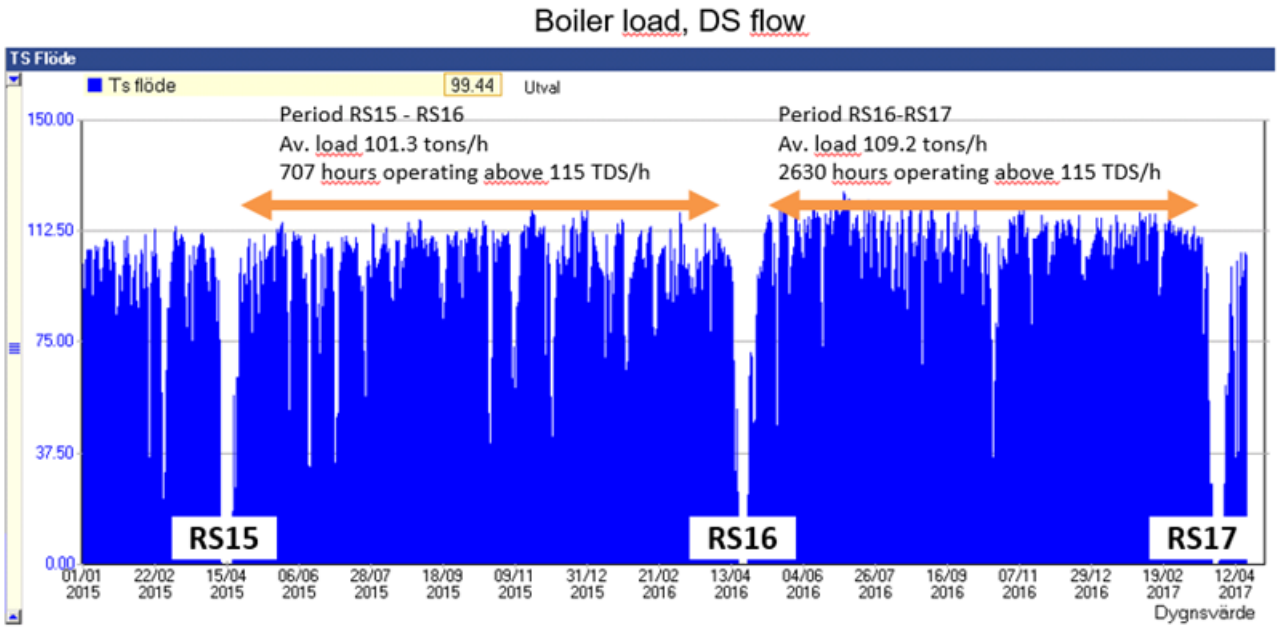


Figure 1 - Boiler load, DS flow

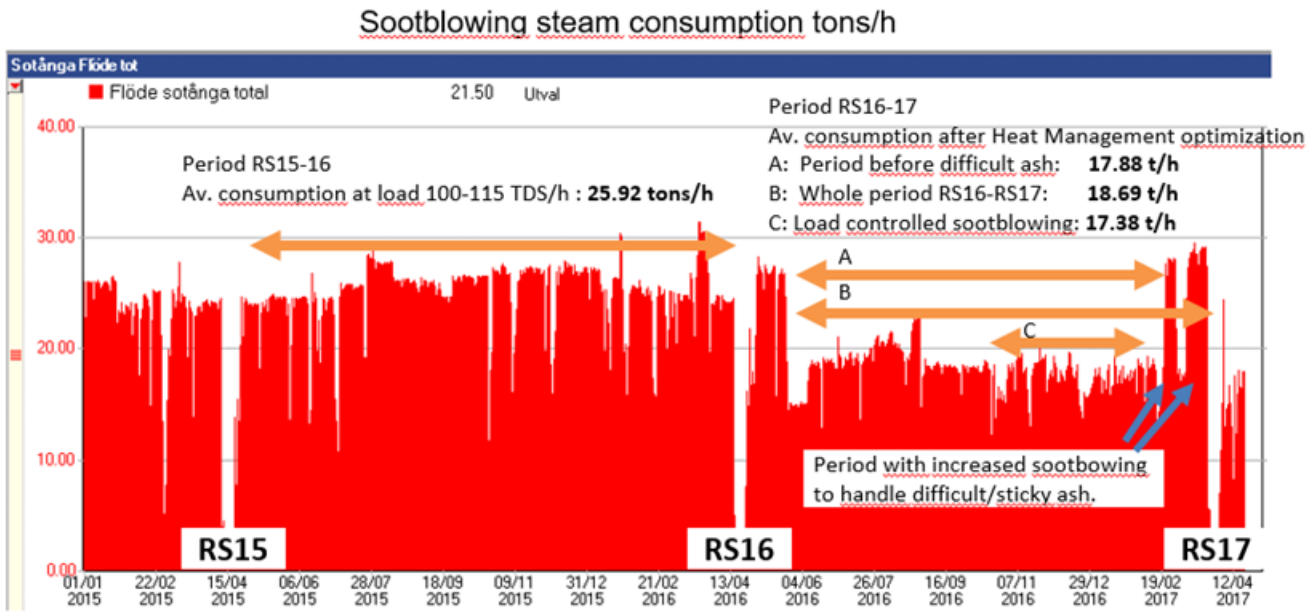


Figure 2 - Sootblowing steam consumption (tons/h)

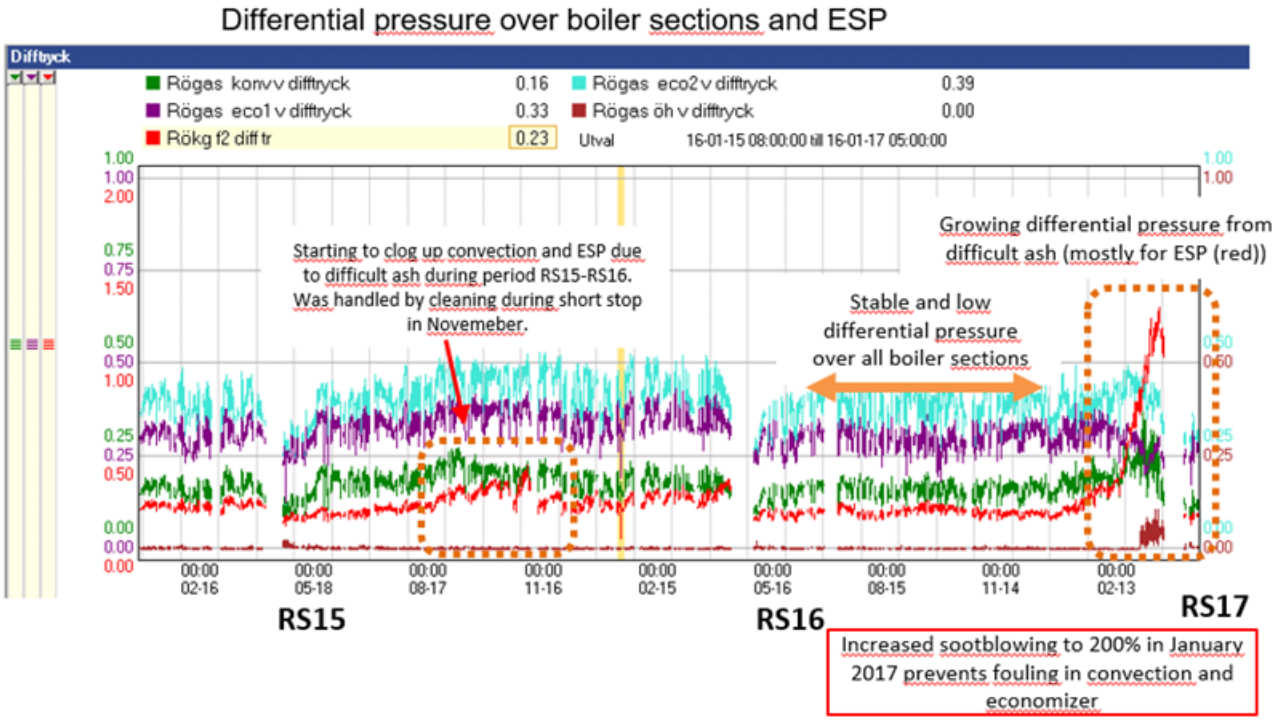


Figure 3 - Differential pressure over bioler sections and ESP

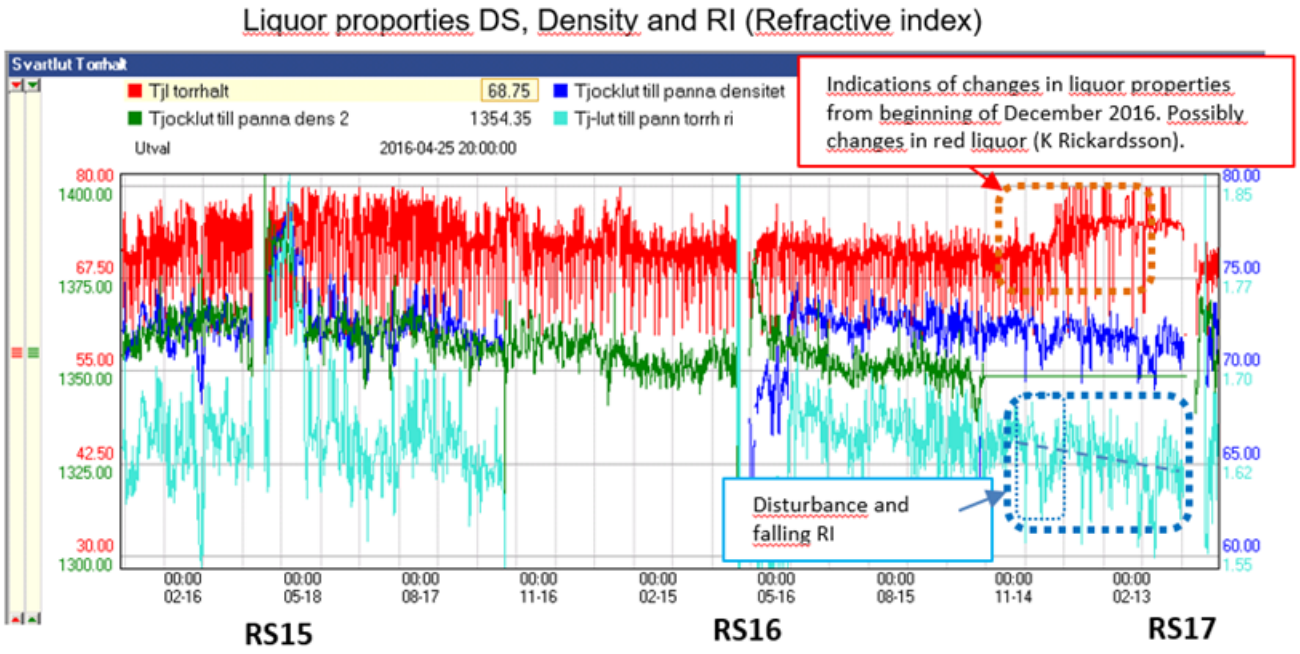


Figure 4 - Liquor properties DS, Density and Refractive Index (RI)

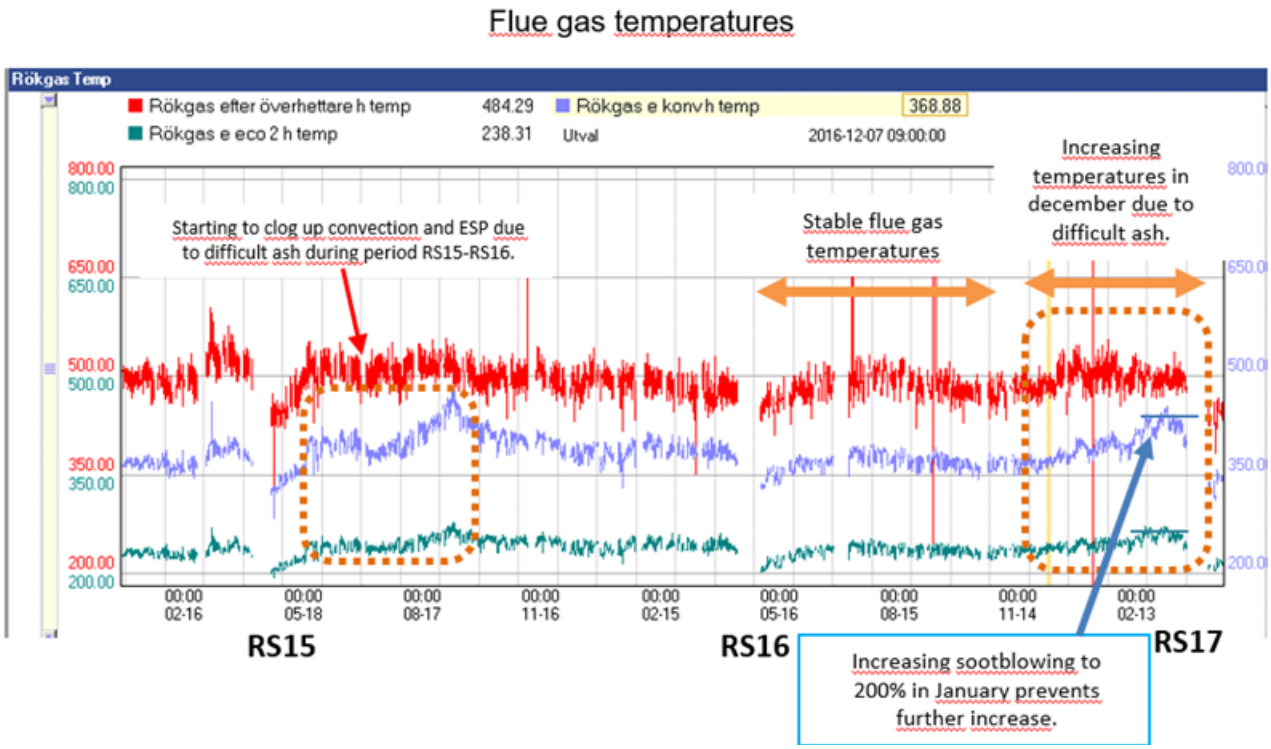


Figure 5 - Flue gas temperatures

Heat Management

Heat Management was founded in 2016 following a merger between Infrafone AB and Soottech AB. The purpose of the merger was to create a world-leading cleantech company with a superior product portfolio in energy conversion adapted for industrial boilers and incinerators.

Heat Management's primary customers include power and heat plants as well as pulp mills and marine companies. Today, Heat Management has patented solutions installed in a large number of applications around the world.

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Wave Impact Heat Management AB
Landsvägen 50A
172 63 Sundbyberg, Sweden

E-mail: info@heatmanage.com
Phone: +46 8-661 33 10
Fax: +46 8-661 33 60