Billerud-Korsnäs Frövi

Application: Black Liquor Recovery Boiler
Efficiency solution: Infrasound Cleaning
Cleaning area: Duct between Generating Bank and Economizer

General info

Mill: Billerud-Korsnäs, Frövi, Sweden.
Boiler manufacturer: Metso (Valmet)
Fuel: Black Liquor
Capacity: 1130 TS/day

Installation

Type: APX2000
Year of installation: 2007

Situation description (Page 1 of 2)

Dust accumulations and resultant plugging of the duct between the generating bank and the economizer constituted a bottleneck in the process and limited production rate of the boiler. The duct was kept clean by a combination of four steam soot blowers, online water washing with manually operated spray nozzles in the duct, and offline water washing using the soot blowers. The soot blowers were regularly operated as part of the overall boiler soot blowing program. In addition, every other day the duct was water washed while the boiler continued operating. During scheduled outages every sixth week, the ducts were water washed more thoroughly.

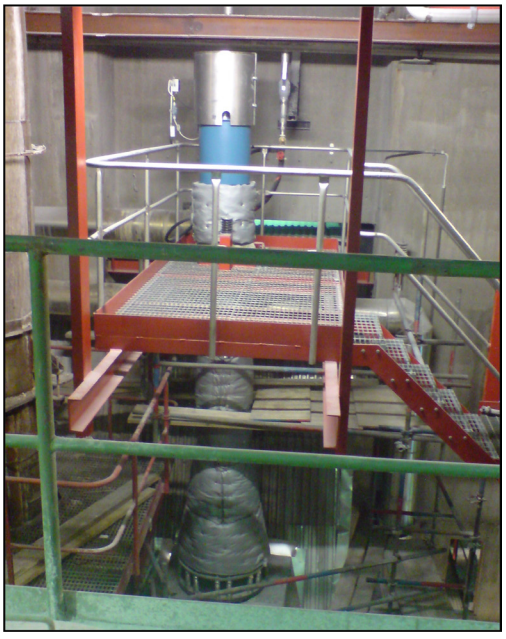


Figure 1. Photo of Infrasound Cleaner installed on the "gooseneck" duct.

Water washing corroded the duct, requiring replacement of damaged sections. A complete replacement of the duct was made in 2003. Despite the above-mentioned cleaning efforts, the differential pressure across the duct would increase uncontrollably. Water washing would only temporarily reduce the delta p. As a result, ID fans would typically operate at or near their maximum capacity.

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Situation description (Page 2 of 2)

The reason behind the project was to keep the duct clear and eliminate the frequent water washing with resultant corrosion. Other benefits, such as elimination of steam consumption of the soot blowers, would be a bonus.

An infrasound generator was installed to solve the problem. First step was to produce a complete acoustic model of the boiler flue system and determine optimum sonic cleaner location, frequency and power level to clean the desired areas.

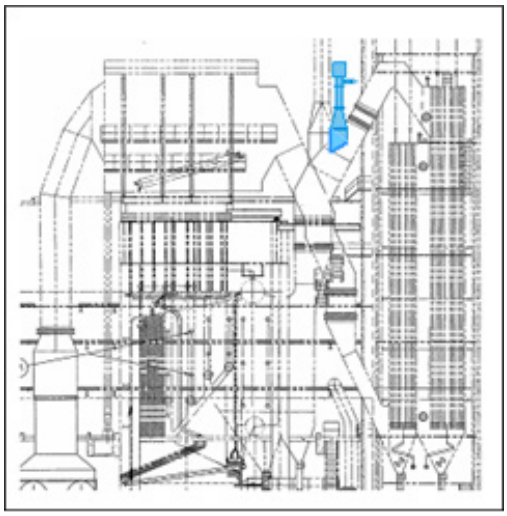


Figure 2. Drawing of Infrasound Cleaner installed on the "gooseneck" duct.

Results

The installation was immediately successful. Water washing for duct cleaning is a thing of the past. The differential pressure across the duct is lower than ever and stable with time, indicating that the duct is kept clean. As a bonus, duct soot blowing has been reduced.

- Plugging and fouling issues have been eliminated.
- Water washing has been completely eliminated with attendant elimination of water consumption, man-hours for cleaning, and corrosion of ductwork.
- Two steam soot blowers have been shut down. The other two are at reduced operating levels.
- Duct delta p is low and stable.
- ID fan speed is low and stable.
- Pulp production records have been achieved.
- The consensus of operating personnel is that the overall boiler operation has significantly improved.
- Return of investment has shown to be less than six months.
- In 2014 an attempt was made to rebuild the duct for eliminating the need for using soot cleaning systems like the infrasound cleaner. This didn't solve the issue and the infrasound cleaner remains necessary for stable boiler operation.

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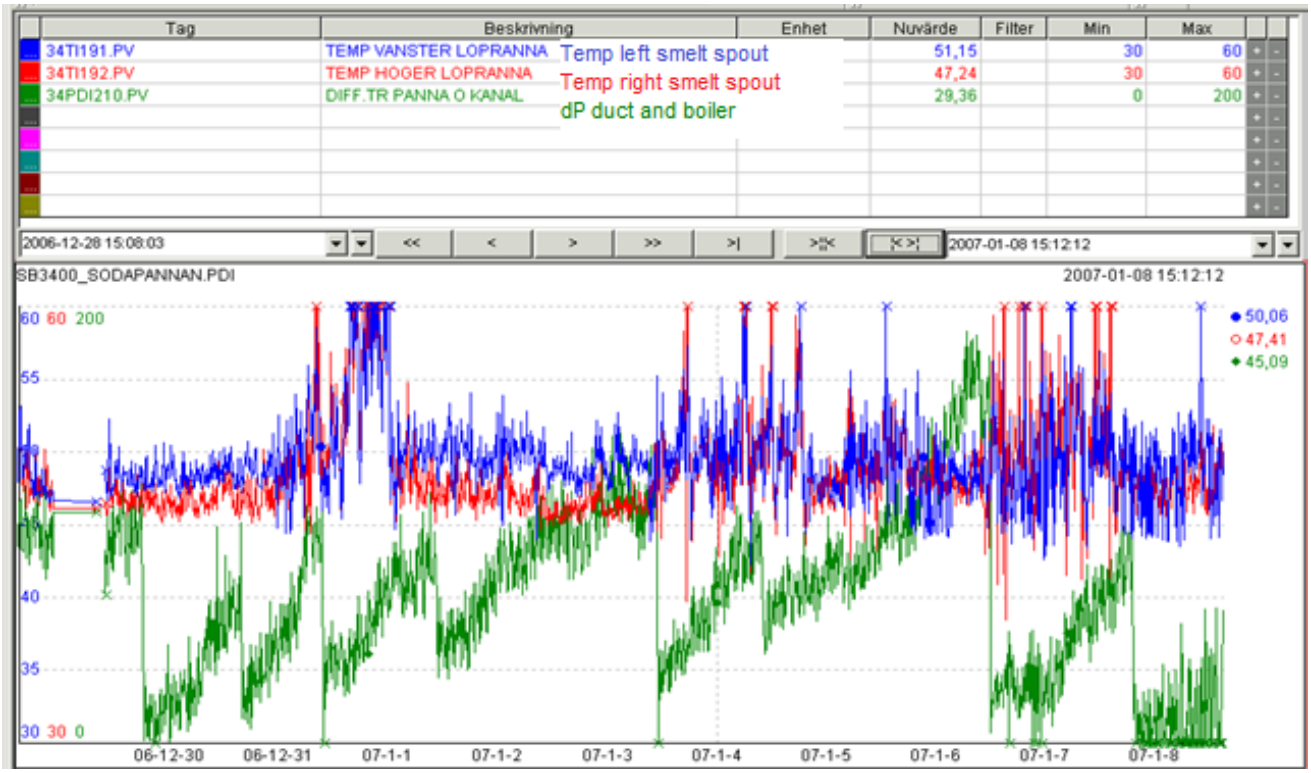


Figure 3. Before infrasound cleaning: Very unstable differential pressure (green). Clogging of the duct also was related to unstable temperature in the smelt spouts (red, blue)

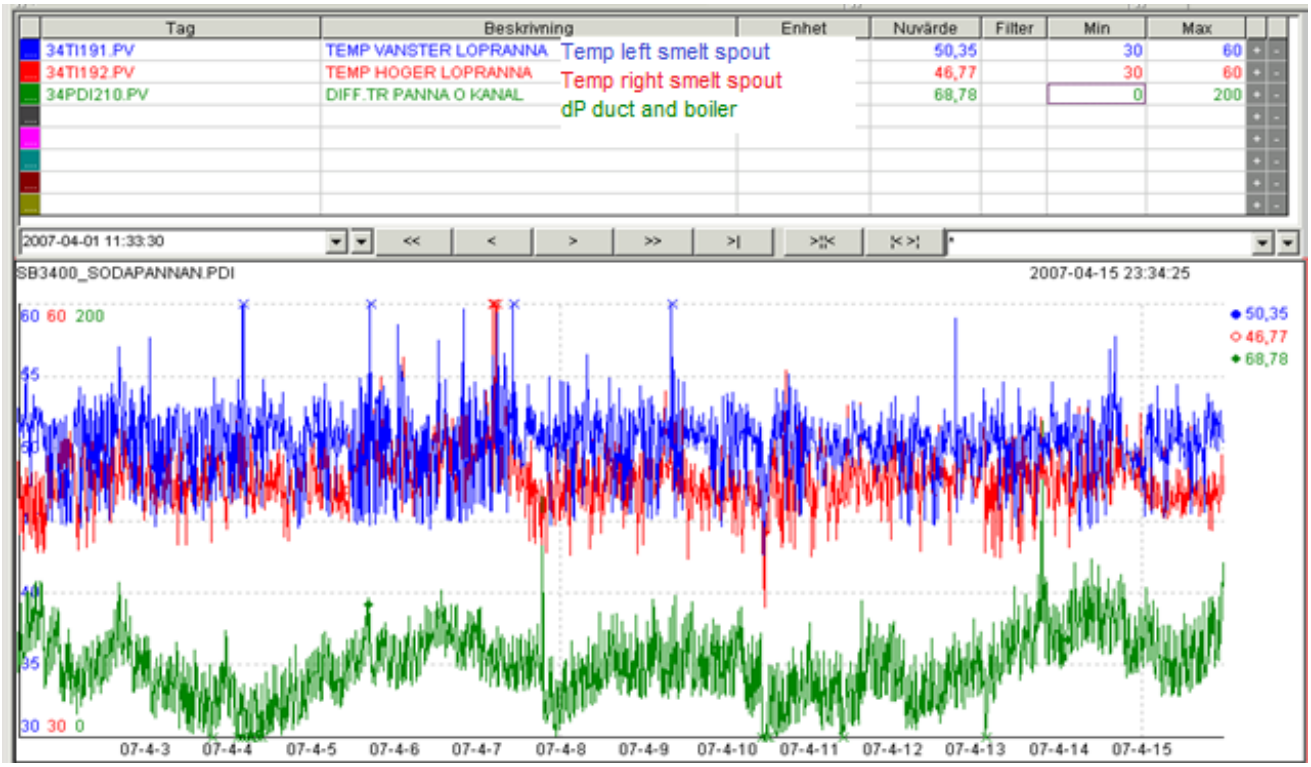


Figure 4. With infrasound cleaning: Stabilized differential pressure (green) and smelt spouts temperatures (red, blue).

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