There are many methods used for optimization of wall blower operation in boiler furnace, like the manual method, heat flux measurement method, and the automated method. The manual method is discussed as this will bring out the philosophy involved in optimizing wall blower operation.

Wall blowers are provided in boilers to clean the furnace wall deposits. They seldom finds use in oil and gas fired boilers. The deposition and slagging in boiler furnace is required to be removed from the furnace walls at regular intervals. The interval period will depend on the area of deposition and the severity of deposition. Steam wall blowers are found to be very efficient in removing the furnace wall deposits. However, the steam wall blowers are not at all effective in the case of molten slag removal from the furnace walls. Water lancers, instead, are used for molten slag removal.

In a large boiler of around 1500t/hr capacity, the total number of soot blowers can be around 120. In this, around 90 numbers will be wall blowers. The frequency of soot blowing will depend on the type of coal being fired. However the operating group must remember that the initial suggested sequence and frequency is more general and has to be adapted to each boiler. The purpose of these soot blowers is to keep the heat transfer surface clean so as to contribute towards optimal performance of the boiler.

Effect of the wall blower on boiler performance
- Removes the deposits on the furnace wall and ensures good heat transfer in the furnace region
- The furnace outlet temperature slowly ramps up after wall blowing as time lapses
- Superheater spray quantity is seen to increase with time lapse after wall blowing
- Increases the bottom ash quantity depending upon the deposition on furnace walls
- Increases furnace tube material loss if blowing is done too frequently without any deposits. This leads to boiler outage or increased maintenance.
- In the case of water lancers for removing molten slag, while operating there will be a large dip in generation for the same heat input. This is mainly due to the increased boiler losses.

Optimisation of wall blowers
Before taking up wall blower optimization, the following will have to be ensured.
- All wall blowers are set to the right steam pressure recommended by the designer
- Check the alignment of the wall blower with respect to the furnace walls
- Ensure at least 50 degree centigrade of super heat in the steam being used. This is to prevent damage of the furnace walls due to wet team impingement.
- All wall blowers are operational
- It will be of great help if the boiler furnace walls are photographed just after a planned shutdown. Before shutting down the boiler, do not wall blow the furnace for one full sequence. This will ensure deposit collection on the walls between the adopted frequency. While shutting down the boiler ensure minimal thermal shock, by slowly lowering the load. This will ensure deposits stay on the walls. Take the photograph from a convenient man hole. But take all safety precautions as anytime the deposit can fall down due to cooling or thermal gradient.
There are many methods used for optimization of wall blower operation, like the manual method, heat flux measurement method, and the automated method. The manual method is discussed as this will bring out the philosophy involved in optimizing wall blower operation.

**Need for wall blower optimization**
- To improve consistency in efficient operation of boiler
- To reduce steam wastage by identifying those areas of low or no deposits
- To reduce damage on furnace wall tubes due to excessive blowing

The change in SH spray without change in other parameters indicates that the furnace deposits are increasing. If the superheater spray increases above a particular level (to be determined for each boiler) operate wall blowers. These are two basic things to adhere to while optimising wall blowers.

**Steps in wall blower optimisation**
Assuming there are 88 wall blowers in a boiler furnace wall, the steps for optimisation is listed.

- Operate all 88 blowers
- See the effect on superheater spray and note all operating parameters of boiler
- Wait for the superheater spray to ramp up to the initial level and stay almost steady
- Wall blow each row - study effect
- Watch superheater spray drop and regain time
- The interval between blowers is to be maintained constant
- Repeat if required each row independently, waiting each time for the spray to reach the original level with other parameters of boiler remaining constant
- Repeat the study for two adjacent rows
- Repeat the study for two alternate rows
- Repeat the study for blowers in front, rear, left and right sides of furnace walls separately and study the effect on superheater spray flow.
- The blowing having the least effect on the superheater spray indicates low or no deposit on the walls.
- A plot of superheater spray drop when each blower is operated will give a good idea of deposition in that area
- Use the photograph of the furnace wall to validate the effectiveness of blowers
- Decide which blowers can be skipped during blowing as well as the effectiveness of the row

The procedure for wall blower operation can be evolved after the study and data analysis for the most effective way of wall blowing.

The use of heat flux meter by embedding thermopiles at appropriate location in the furnace walls to understand whether the tube in the region is clean or with deposition the operation of the wall blower requirement can be decided.

In the case of fully automated intelligent wall blower system, the need to wall blow each blower is understood from the effective heat flux falling on the tubes. Designers use different methods to establish this.

**Source:**