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Sootblower Type Long Retractable Problem Analysis At PLTU Banten 2 Labuan PGU

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ABSTRACT

Sootblower is equipment used to clean *slagging* or *fouling* attached to the *boiler* wall or pipe pipes contained in the *boiler*. Slagging is coal ash attached to the furnace, on the furnace wall and on the superheater and *reheater* pipes. At PT. PLN Indonesia Power PLTU Banten 2 Labuan PGU has 4 types of Sootblowers, namely, Short Retractable Sootblower, Long Retractable Sootblower, Semi-Long Retractable Sootblower, Helical Retractable Sootblower. In the results of the analysis for maintenance on this sootblower, it routinely carries out *Preventive Maintenance* activities every week and also applies every day, then if the replacement *of spare parts* must use those that have SNI.

Keywords: PLTU Banten 2 Labuan, *Sootblower, and Preventive Maintenance*

1. INTRODUCTION

The rapid development of infrastructure and technology accompanied by the times requires everyone to find solutions in order to adapt to these changes. Along with existing developments, the need for electrical energy also increases where all activities always require electricity. Electrical energy has an important role in the development of the nation, this electrical energy as a support for production in all sectors from households to industry.

One of them is a steam power plant or PLTU with coal fuel, this type of plant is quite present in Indonesia, especially during the acceleration of 10,000 MW electricity development due to low prices and coal is one of the abundant natural resources in Indonesia so it is easier to obtain.

PLTU Banten 2 Labuan uses a control system in the form of PLC (*Programmable Logic Control*) and DCS (*Distributed Control System*). This system will keep the production of electrical energy maintained and will provide a signal if there is a disturbance in the system.

Sootblower is equipment used to clean *slagging* or *fouling* attached to the boiler wall or pipe pipes contained in the boiler. *Slagging* is coal ash attached to the *furnace,* on the furnace wall and on the pipes of *the superheater* and *reheater*. While *fouling* is coal ash attached to the walls and pipes of the *economizer.*

Electrical energy at the Labuan PLTU is transmitted through the nearest Substation, namely Menes Substation which is about 6 kilometers away and Saketi Substation. With the operation of the Labuan PGU PLTU, it is expected to be able to reduce the use of SSM for plant operations in a significant amount, so as to reduce SBM subsidies

2. GENERAL COMPANY DATA

2.1 Theoretical Basis

Coal power plant is a power plant that uses its main fuel coal. PLTU 2 Banten - Labuan is one of the plants that uses coal fuel with a generation capacity of 2 x 300MW.

2.2 Brief History of PT. Indonesia Power

1995

Establishment of PT PLN Pembangkitan Listrik Jawa-Bali I (PT PLN PJB I)

2004

Sharpening the Company's Mission Focuses on the Field of Power Generation

2015

Indonesia Power Top 100 WCS

2000

Change of Name of PT PLN PJB I to PT Indonesia Power and Declaration of Vision and Mission

2010

Target Setting World Class Services (WCS) 2015

2.3 Profile PLTU BANTEN 2 LABUAN PGU

Banten 2 Labuan PGU Steam Power Plant (PLTU) is located in Sukamaju Village, Labuan District, Pandeglang District, Banten Province. PLTU Labuan PGU has a capacity of 2 x 300 Mega Watt (MW). PLTU Labuan is operated by PLTU Banten 2 LABUAN PGU which is managed by PT. Indonesia Power after being handed over by chengda as the developer of the plant. President Susilo Bambang Yudhoyono inaugurated PLTU Labuan PGU Unit 1 on January 28, 2010.

Figure 1. UNIT PLTU Banten 2 LABUAN PGU

2.4 Company Vision and Mission

As a company in general, PT. Indonesia Power has the company's goals and vision and mission :

EVERYONE : "To be the Best Energy Company to Grow Sustainably“

MISSION : “Providing Energy Solutions that are Reliable, Innovative, Environmentally Friendly, and Exceed Customer Expectations”

3. THEORETICAL FOUNDATION

3.1 Comprehesion *Sootblower*

Sootblower is equipment used to clean *slagging* or *fouling* attached to the boiler wall or pipe pipes contained in the boiler. *Slagging* is coal ash attached to the *furnace,* on the furnace wall and on the pipes of *the superheater* and *reheater*.

3.2 Sections *Sootblower*

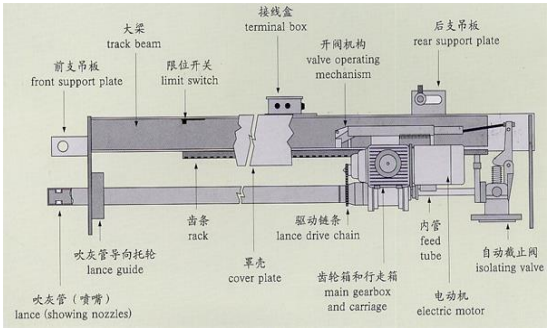

Figure 2. Sections *Sootblower*

a. *Drive Motor*
Drive motor serves to drive the gear transmission circuit on the *carriage*, so that it can rotate

b. *Carriage*
In this case the carriage is assembled to be used as a guide or carrier of the lance tube soot blower so that it can move in and out *Air Heater, Economizer, Superheater.*

c. *Poppet Valve*
Poppet valve Its operation is carried out by mechanical processes. *The poppet valve* is at the very back of the *sootblower*. *Poppet valve* is used to close and open the steam flow that will be used for the *blowing process*, and this *valve* has a pressure control controller that can be set

d. *Beam*
Beam made of *canopy type* is used as support and protection as much as possible from all component parts of the *blower.*

e. *Limit Switch*
Limit Switch is a device that functions to connect or disconnect circuits that are driven by a mechanical limit.

f. *WallBox*
Each *wallbox* has two holes placed on a horizontal line. Support bolts from the front support go into the hole and transfer the load to the *wallbox*.

g. *Power Supply*
Power supply For the electric motor drive of the *sootblower* system obtained from a voltage of 230/460 volts supplied from the cable, where the cable is placed at the top of the *baem blower.*

h. *Front Support Bracket* (Special *Long Flexible Sootblower*)
This type of support is at the front of the beam blower and is placed on the casting wallbox.

i. *Feed Tube*
The feed tube is a stainless steel material that supplies medium blowing to the lance *tube.*

j. *Lance Tube*
Lance tubes are made of different types of steel, depending on where the sootblower is placed. There is more than one type of lance tube placed and this is very important for the best placement so that it will be in accordance with the location and conditions in the place.

k. *Nozzle*
The lance tube has a closed *nozzle* block that rotates with the opening positioned upright.

3.4. Types *Sootblower*

a. *Short Retractable Sootblower*
Short retractable sootblower is a type of *sootblower* that has a short *lance tube*. This *sootblower* is used to clean the furnace walls .

b. *Long Retractable Sootblower*
A long retractable soot blower is a type of soot blower that has a long *lance tube*. This *sootblower* is used to clean the pipes of *super heaters* and *reheaters*.

c. *Semi-Long Retractable Sootblower*
A semi-long retractable soot blower is a type of soot blower that has a relatively long lance tube but is not as long as a long retractable soot blower. This sootblower is used to clean *economizer pipes.*

d. *Helical Retractable Sootblower*
Helical retractable sootblower is a *sootblower* used to clean *water preheater* (APH) plates.

4. RESULTS OF PROBLEM ANALYSIS

4.1 Damage *Sootblower Type Long Retractable*

The problem *of Sootblower Type Long Retractable* can be seen in the following points :

a. *Sootblower* PS-SB *economizer area* not *centre line* due to *boiler expansion.*
The installation of *the sootblower* on the *boiler* is in accordance with the capacity and movement of *the boiler* expansion when the *boiler is running*. Therefore, the *sootblower unit* has been designed to follow the direction of boiler movement. But there **is** a problem with the whole *helical sootblower* PS-SB installed in the *economizer boiler area* of unit #1 and unit #2. PS-SB is not in its centre. So that the *lance tube* touches the inner side of the *wallbox* cavity and separates from the *support roller track*.

Figure 3. Lance *tube sootblower* PS-SB that is not centered

In this troubleshooting, efforts continue to be made to get a solution, but until now there are 3 options that are still being analyzed to be able to answer this problem, namely :

1. Readjusting boiler position
2. Adjusting *the steam sootblower piping line* (because there is an indication of restraint with the H *beam structure*
3. Replaced *the PS-SB* helical blower model into the *D92* rotary blower.

b. Damage to *vent valve*
Almost all vent valves long retractable sootblowers do not work when assessment is done in the boiler unit 1.

Figure 4. The physical appearance *of the vent valve* on one of *the PS-SL* sootblowers

Such conditions require immediate preventive and corrective maintenance. The *vent valve* area needs to be cleaned of dirt inside. However, if after cleaning it still does not work, it must be repaired immediately, including replacing the ventilation valve with a new one.

c. Leaks in *stuffing box packings*
There are many leaks that have been identified and found in the *stuffing box packing area.* The leak can be caused by several factors, including tightness in the packing tightener, damage to stuffing box packing, stuffing box packing wear, errors in the use of stuffing box packing, and human error when installing *stuffing box packing*. Gambar berikut adalah kebocoran yang terjadi pada *area stuffing box packing* disebabkan pada saat pemasangan tidak kencang di *packing tightener*.

Figure 5. The remaining use of non-OEM packing with wire fibers

4.2 Standard Operating Procedure *Sootblower*

Operation of *the sootblower* in the SH, RH and wall tube areas should be at BMCR > 70%. As for the economizer and *air preheater* can be operated at any boiler rate

- Conditioner base where the sootbloer is carried out based on the temperature parameters of the boiler pipes :
  - 1*st superheater temperature* : > 450° C
- Time base where the sootblower is performed based on operating time
  - *Sootblower* AT (APH) : 1 x Pershift
  - *All sootblower* : *Start up* unit
    : 1 x 24 jam

4.3 Sootblower *Maintenance*

The maintenance of the *long retractable type sootblower* can be seen in the following points :

1. *Main Body*
   Overall from the *sootblower* consisting of supporting components. The main *body* of the *sootblower* is located outside the furnace where the end is attached to the *furnace wall*.

Figure 6. *Main Body*

How to care :

- Clean *the case* or *body* once a week.
- Clean it with majun so that the casing is clean from coal dust.

2. *Main Gearbox*
   Main Gerabox serves to drive a series of gear transmissions in the *traverse gearbox*, so that it can rotate.

Figure 7. *Main Gearbox*

How to care :

- Check the condition of the main gear box every 2 weeks.
- Check oil condition.
- Looking at the oil volume reduced or not.

3. *Poppet valve*
   Poppet valve operation is carried out by mechanical process. *The poppet valve is at the very back of the sootblower*.

Figure 8. *Poppet Valve*

How to care :

- Check the *valve* for leakage.

4. *Feed Tube*
   This part is located inside the *lance tube*, but does not enter the *furnace*. *Feed tube* is a stainless steel used to supply *blowing* medium to *lance tube*.

Figure 9. *Feed Tube*

How to care :

- Check the *feed tube* connection so that there are no leaks during the *run test*

5. *Power supply*
   The power supply for the driving electric motor of the *sootblower* of the system is obtained from a voltage of 230/460 volts.

Figure 10. *Power Supply*

How to care :

- Cleaning the case from dust using majun

6. *Lance tube*
   The lance tube is located outside the feed tube whose end is connected to the nozzle which is a place to spray steam into the furnace.

Figure 11. *Lance Tube*

How to care :

- Checking roller condition

- View lubrication conditions on rollers

7. Chain

Chain (chain) is an engine component that is used to forward power (power) from the engine through the rotation of the *sprocket* / the chain functions as a *transverse gearbox* to move forward and backward.

Figure 12. Chain

How to care :

- Checking the lubrication condition of the ranti.
- Check the condition of the chain state of the chain whether loosening occurs in the chain.
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4.4 Routine Replacement of Inner Part on Long Retractable Sootblower

The Routine Replacement of Inner Parts on *Long Retractable Sootblowers* on *Sootblowers* can be seen at the following points :

a. Replacement of gland packing on stuffing box leaks
The leak can be caused by factors, including; tightness in packing tightener, damage to stuffing box packing, stuffing box packing wear, error in the use of stuffing box packing and human – error when installing stuffing box packing.

Figure 13. Replacement *Gland Packing*

b. Damage to the *vent valve*
This problem is caused by the internal *vent valve* that has corroded due to *life time*, causing the cooling process by the *vent valve* not to run properly.

Figure 14. The Physical condition of vent valve on one of *PS-SL* sootblowers

5. CONCLUSION AND ADVICE

The conclusions obtained from the results of the implementation of Field Work Practices at PT PLN Indonesia Power PLTU Banten 2 Labuan PGU are as follows :

5.1 Conclusion

1. *A sootblower* is equipment used to clean *slagging* or *fouling* attached to the *boiler* wall or pipe pipes contained in the *boiler*. Slagging is coal ash attached to the furnace, on the furnace wall and on the superheater and *reheater* pipes. Fouling is coal ash attached to the walls and pipes of the *economizer.*
2. At PT. PLN Indonesia Power PLTU Banten 2 Labuan PGU there are 4 types of *Sootblower* , namely, *Short Retractable Sootblower, Long Retractable Sootblower, Semi-Long Retractable Sootblower, Helical Retractable Sootblower*
3. For maintenance on this sootblower, routinely carry out Preventive Maintenance activities every week and also apply to every day.

5.2 Advice

The suggestions included in this report can be seen in the following points:

1. Preventive Maintenance *is carried out* regularly and according to guidelines in order to minimize damage to every *part* of the *Sootblower area.*
2. Cleaning areas that are sensitive to breathing so that when Preventive *Maintenance* runs according to SOP.

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