

PREVENTIVE MAINTENANCE OF AIR HEATER ON BOILER UNITS 1- 4 AT PT. PLN INDONESIA POWER SURALAYA PGU

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Graphical abstract

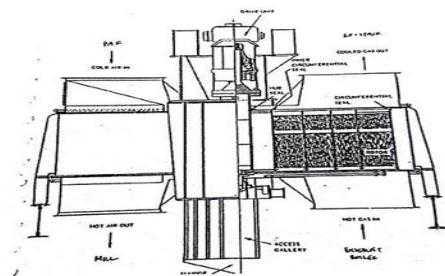


Figure 1. Air Heater Structure

Abstract

One of the components used in power plants in boilers is the water heater. Of course, it has a very important role in the power plant. Its function is that it is very tight in the steam power plant, making the air heater work 24 hours, so its use is quite important. Knowing the function and usefulness of the Air Heater is important enough to require proper preventive. PT. Indonesia Power Suralaya PGU applies very strict Maintenance because of the losses experienced if the plant has damage which causes the unit to be forced to stop then the loss experienced is also very large. Preventive Maintenance performed on the Air Heater is done by looking at the condition visually and sound as the cornerstone of the repair analysis so that the treatment effort can be done well in terms of tightening, lubricating, and cleaning 32 minutes is the effective time an inspection is carried out whether there is significant damage or not. At the PM in the Air Heater found the effective run time every day is 2 hours 59 minutes when no indication of damage is found.

Keywords: Preventive Maintenance, Time Maintenance, Air Heater

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Abstrak

Salah satu komponen yang digunakan di pembangkit listrik di boiler adalah pemanas air. Tentu saja, ia memiliki peran yang sangat penting dalam pembangkit listrik. Fungsinya adalah bahwa sangat ketat di pembangkit listrik uap membuat pemanas udara bekerja 24 jam sehingga penggunaan sangat penting. Mengetahui fungsi dan kegunaan Pemanas Udara cukup penting untuk memerlukan pencegahan yang tepat. PT. Indonesia Power Suralaya PGU menerapkan pemeliharaan yang sangat ketat karena kerugian yang dialami jika pabrik mengalami kerusakan yang menyebabkan unit dipaksa berhenti maka kerugiannya juga sangat besar. Pemeliharaan Pencegahan yang dilakukan pada Air Heater dilakukan dengan melihat kondisi secara visual dan suara sebagai batu penjur analisis perbaikan sehingga upaya perawatan dapat dilakukan dengan baik dalam hal pengencangan, pelumasan dan pembersihan 32 menit adalah waktu efektif pemeriksaan dilakukan apakah ada kerusakan yang signifikan atau tidak. Pada PM di Air Heater ditemukan waktu berjalan efektif setiap hari adalah 2 jam 59 menit ketika tidak ada indikasi kerusakan ditemukan

Kata kunci: Preventif Maintenance, Waktu Maintenance, Air Heater

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1.0 INTRODUCTION

Indonesia is becoming one of the countries with the highest levels of electricity consumption, where electricity provides the necessary and sufficient supplies for society. One of the companies moving into the electricity field is INDONESIA POWER. This company is moving directly under the shadow of PLN (Perusahaan listrik Negara). One of the kinds of power plants developed by INDONESIA POWER is the Suralaya Steam Power Plant, which uses a type of power plant on steam fluid to generate electricity. The most frequently used fuel in this plant is the Barrel Stone where the barrel stone will be burned on incineration.[1]

In the Power Plant Section there are certain components that play an important role in the Suralaya Steam Power Plant. One of the components used in power plants in boilers is the water heater. Of course, it has a very important role in the power plant. Its function is that it is very tight in the steam power plant makes the air heater work 24 hours so its use is quite important. Knowing the function and usefulness of the Air Heater is important enough to require proper preventive. Based on the above description, the author would like to know more about Maintenance on Air Heater preventively.[2]

2.0 METHODOLOGY

In the testing process carried out in PT. Indonesia Power Suralaya PGU is by performing treatment preventively. This study is conducted more directing to how to perform treatment preventively on Air Heater Unit 1 and 3. In the process of checking on the Air Heater will first perform Visualization on the condition of the oil on the Gear Drive as the main driver gear of the air Heater. Then after performing the checking of the lubricant on Gear Drive performed also tightening on binder - binder on the gear Drive to reduce the Vibration that occurs on Gear drive. Finally performed Cleaning and Regreasing on gear drive to remove the dirt that can cause the inhibition that happens on the engine Gear Drive.[3]

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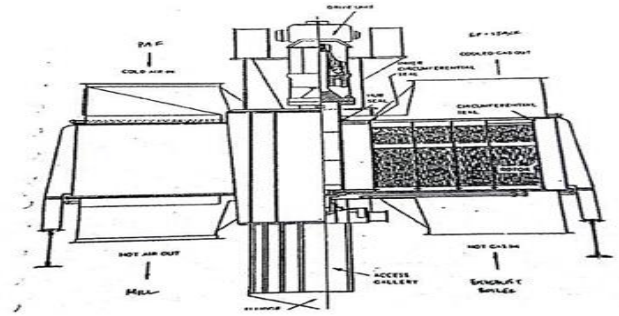


Figure 2. Air Heater Structure

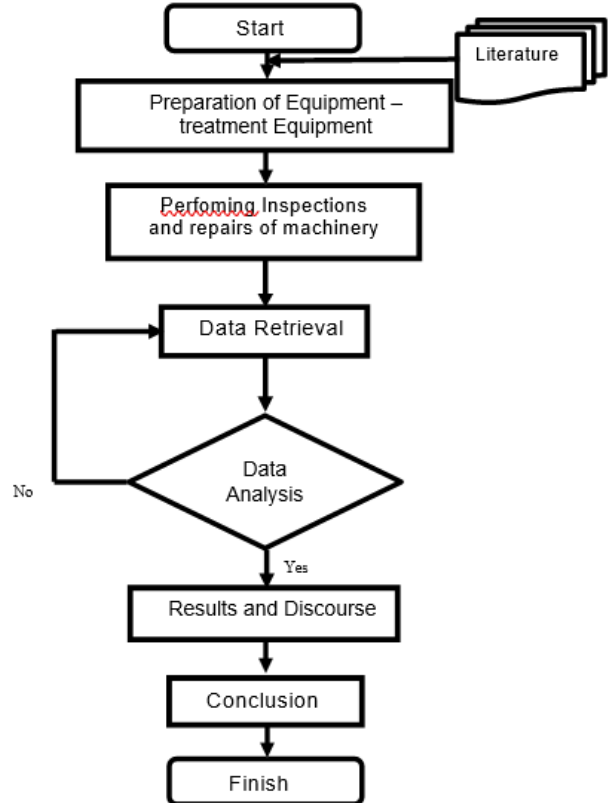


Figure 3. Experimental Flow Diagram

Table 1. Self Protection Device

No	Self Protection Device
1.	Safety Helmet
2.	Safety Protective Mask
3.	Safety Glove
4.	Safety Shoes
5.	Air Plug
6.	Wearpack

Table 2. Set of Preventive Equipment

No	Self Protection Device
1.	Screw Thread Pitch Gauge Mal
2.	Allen Wrench
3.	Wrench

Table 3. Set of Preventive Equipment

No	Self Protection Device
1.	WD-40
2.	Nuts and Bolts

3.0 RESULTS AND DISCUSSION

3.1 Maintenance Sheet

Maintenance is one of the efforts to avoid damage to the part of the machine as a result of continuous use, so it is necessary to do some ways to restore the machine to function as it works.[5] Treatments are also used as a means of saving money on the machine damage by performing repairs on a regular basis and keeping the spare parts to be used as they should. In most factories or fields of engineering related to machinery must have several divisions that are actually related to maintenance, one of them is PT. Indonesia Power Suralaya PGU that moves on the largest electricity producer company in the country.

PT. Indonesia Power Suralaya PGU applies very strict Maintenance because of the losses experienced if the plant has damage which causes the unit to be forced to stop then the loss experienced is also very large. So the care must be done well and structured with quality care staff anyway.[12] One type of care used in PGU is Preventive Maintenance which is the treatment used as an attempt to avoid and maintain damage by doing small repairs to the machine as a prevention of increasing damage on the work sheet can be seen there are several stages to perform care thoroughly from the beginning to the end.

of boilers and reducing the temperature of exhaustive gases before being discharged into the environment. Treatment of the Air Heater is routine and very on point in view of damage as well as minor repair efforts[6]. Visual and sound verification is the main point why Preventive Maintenance can be done well, according to the field inspection technicians using sound on the Air Heater is the most important point, when there is a noise deviation on the air heater both on the Gear Drive and inside the Air heater can be recognized by voice so that some validation efforts will be made between the noise variation with the operator's data about the air Heater.[11]



Figure 5. Checking in Gear Drive

In addition, a visual oil check is also vital to detect damage to both the Guide Bearing and Support Bearing as well as the Gear Drive as a rotating component. The damage that can be seen through the oil is like leakage and overheating on the Air Heater.[7] This can be dealt with in advance with the data from the operator's analysis.[13] The indicator instrument on the pump also has its own data so that the mechanic can check on the indicator in particular is the pump indicator where the pump is circulating properly or not.

Asset / Location		Location	Access
Asset	Asset Description	Location	Location Description
SUD1HN-001	Flue Gas Exhaust System Unit 1	SUD1HN-EP1	EP Area, Unit 1
Route: ROUTE-PMRSUHR14006			
Asset		Description	
SUD1HLD04H01-001	Main Air Heater A Unit 1		
SUD1HLD04H01-001	Main Air Heater B Unit 1		
SUD1HLD04H01-001	MS Air Heater A Unit 1		
SUD1HLD04H01-001	MS Air Heater B Unit 1		
Task IDs			
Task ID	Description	Estimated Duration	Actual Duration
10	W/ Operator (Menggunkan Loto Jika Diperlukan)	00:02	
20	Periksa Secara Visual Kondisi Pelumas Gear Drive	00:32	
30	Periksa Kelengkapan Suara Gear Drive	00:32	
40	Cleaning & Re-greasing Gear Drive Air Heater	00:32	
50	Periksa Secara Visual Kondisi Support Bearing	00:32	
60	Periksa Secara Visual Kondisi Lubri Oil Pump Support Bearing	00:32	
70	Periksa Kelengkapan Suara Support Bearing	00:32	
80	Periksa Kebocoran Ducting dan Expansion joint	00:32	
90	Periksa Secara Visual Kondisi Guide Bearing	00:32	
100	Periksa Kondisi Air Pendingin	00:32	
110	Periksa Kelengkapan Suara Guide Bearing	00:32	
120	Periksa Kondisi Air Pendingin	00:32	
130	Lapor Operator Bersama Petarajan Selsind Dan Buat Laporannya	00:32	
140	Kancangkan Baut Pengikat Gear Drive	00:32	
150	Buat Laporan	00:02	

Figure 4. Preventive Maintenance Sheet

3.2 Maintenance Component

Air Heater is one of the parts of a boiler that functions as a heat exchanger for exhaust gases and incoming air with the aim of improving the efficiency

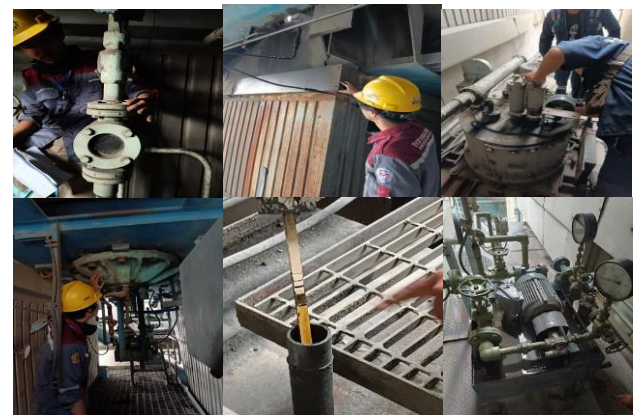


Figure 6. Checking in Guide Bearing and Support Bearing

The Preventive Maintenance performed on the Air Heater is done by looking at the condition visually and sound as the cornerstone of the repair analysis so that the treatment effort can be done well in terms of tightening, lubricating and cleaning. Field data such as damage must also be validated with the operator whether action needs to be taken or not.[8] A mechanic needs to perform repairs with the

right action in these conditions, the correct action can be done by performing Preventive Maintenance correctly and accurately so that small damage does not cause greater damage. The Domino effect produced by a small crowd will cause a huge damage that causes losses of this is of course very avoided for PT. Indonesia Power Suralaya PGU.[14]

3.3 Maintenance Time

The maintenance time given on the work order sheet usually covers a certain amount of time. On the Air Heater treatment sheet it can be seen that the time spent on the water heater ranges from 32 minutes. This time is the actual time required in the actual inspection.[9] At the maintenance time, the actual and ideal comparison time can be found to be less than the real time. The common reason why this happens can be because of the actual time used when an inspection finds a damage so the actual amount used is 32 minutes.

According to the technicians at PT. PLN INDONESIA POWER, the amount of time used is overstated so that the engineers have enough time to perform certain actions. Besides, time is relative to each examination. So the comparison of time cannot be compared but can be called the time of effectiveness of a test. If the time used is less than 32 minutes then it is assured that there is no significant damage. 32 minutes is the effective time an inspection is carried out whether there is a significant damage or not. A total of eight hours is preventive maintenance time, but the time it takes every day is two hours and 59 minutes, so technicians only do PMs at the beginning of the day and tend to merge with other divisions when conducting inspections after a preventative maintenance inspection.[15] It can be concluded that the effective time used is still less than 8 hours because there is no damage and it does not take too long, as well as the time spent too much so that the technicians are more focused on repairs to other component sectors



Figure 7. Maintenance time comparison

4.0 CONCLUSION

One of its kinds is Preventive Maintenance where according to the work order the care is carried out from the beginning and end according to

applicable rules and SOP. As to the treatment will be documented and online through the Whatsapp Group and Upload Work Order on Data Base. The components of the treatment is done in the Air Heater sector very thoroughly starting with the inspection of the visual and noise anomalies on the rotating components Gear Drive and Bearing both Guide and Support.[10] Not only the oil inspection is also done on a routine basis to avoid friction on the rotary components. As well as the testing of the oil cooling component of the pump as well as Expansion Joint as a component that is sufficiently susceptible to heat changes as the effect of the crop which should remain wellined.

The timing of care plays a very important role in the treatment of the differences between the actual and ideal timing as determined as the urgency of care. At the PM in the Air Heater found the effective run time every day is 2 hours 59 minutes when no indication of damage is found. However, at the ideal time is 8 hours when certain indications are found. The innovation that can be done is on the Preventive Maintenance process on the Air heater is to add a checking aids on the engine Gear Drive and Oil Pump namely Vibration Meter besides being able to detect the noise anomalies Vibrations Meter makes it easier for mechanics to know the damage on noise abnormalities more accurately on the oil pump and Motor Gear Drive.

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