Measurement Of Hydraulic Pressure Fan Motor In Engine D1551a-6 With Modification Tool Adapter

Hasan Basri, Anwar Ilmar Ramadhan

Abstract: In the world of heavy equipment has been achieved with the development of various methods used to improve product quality. Over time, many problems are experienced in the unit, one of which is the problem experienced by unit D155A-6 engine overheat caused by abnormal fan motor. The purpose of this research is to make adapter tool for measuring fan motor hydraulic pressure in troubleshooting engine overheat on unit D155A-6. The measurement results indicate that the Fan Motor is in abnormal condition and must be replaced. To determine the Preassure Oil Hydraulic Fan Motor and not to repeat the same thing when the same problem occurs, it should be made adapter tools with the results can save expenses with price comparison (before and after) the availability of tools for: ($3.888 - $486) = $3.402.

Keywords: engine overheat, fan motor, internal leakage, Preassure Oil Hydraulic Fan Motor.

INTRODUCTION

Buldozzer is a chain tractor (clarwler tractror) that is useful for the work of digging, displacing, pushing soil or materials and pulling logs or portable camps that can be operated in rocky, hilly and muddy terrain on various jobs such as mining, construction), logging, industrial timber estates (forestry) and plantations. Bulldozer can make the land move effectively as far as 100 meters by way of relay (Basri, 2017, Rasma, 2013). The development of the heavy equipment industry has given a little nuance to all the people, due to the opening of jobs. This country of Indonesia has abundant natural wealth, so the heavy equipment industry in Indonesia developed rapidly. Such rapid technological advances have brought us to the effectiveness of time, energy, and cost (Diniardi, 2013, Kamsar, 2016). In the world of heavy equipment, this development has been achieved with the development of various methods used to improve the quality of products you have used to be better by modifying the tools to be more efficient (Mulyanto, 2018). Over time, many problems experienced experienced in the unit, one of which is the problem experienced by unit D155A-6 that is troubleshooting overheat caused by abnormal fan motor. Engine overheat occurs because the fan rotation is not maximal / standard which caused by not reaching pressure on motor fan component (Purwono, 2017, Nugrahanto, 2016, Diniardi, 2015). In handling the trouble is having difficulty in determining data from the motor fan.

- *Hasan Basri, Anwar Ilmar Ramadhan*
- *Department of Automotive and Heavy Equipment, Faculty of Engineering, Universitas Muhammadiyah Jakarta*
- *Department of Mechanical Engineering, Faculty of Engineering, Universitas Muhammadiyah Jakarta*
- *Email : anwar.ilmar@ftumj.ac.id*

the adapter tool in the measurement of the fan pump.

Figure 1. *Unit D155A-6 (Purwono, 2017)*

RESEARCH METHOD

The following is a flow of research conducted in accordance with Figure 2.

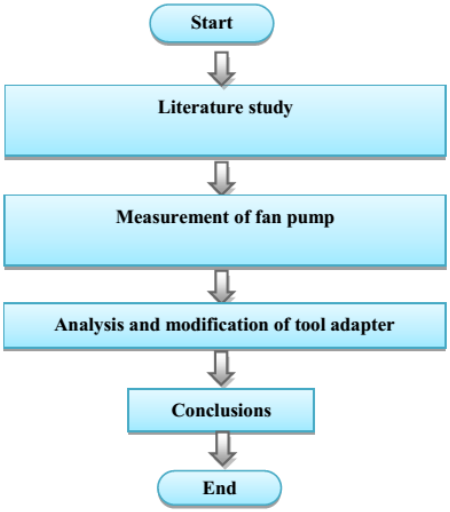

Figure 2. *Flowchart of this research*

RESULTS AND DISSCUSSION

Measurement of the fan pump

The first step of this research is to make measurements to the fan pump for approximately two days constrained to determine the preassure oil hydraulic Fan Motor, so to

shorten the work done modification piping on Fan Motor, can be seen in Figure 3.

Figure 3. *Component of piping modification*

The next step is the modification done on the piping with the addition of nipple mounted on the piping by way of fabrication, as in Figure 4.

Figure 4. *Fan Motor components after fabrication*

After the modification on the Fan Motor then can continue the measurement to determine the Fan Motor is still normal / not, can be seen in Figures 5 and 6.

Figure 5. *Measurement of Low Idle Motor Fan*

Figure 6. *Measurement of High Idle Motor Fan*

From the result of measurement result above Fan Motor condition at Low Idle 4 kg and High Idle condition equal to 8,5 kg at 100% Fan motor mode. The measurement results indicate that the Fan Motor is in abnormal condition and must be replaced. From the results of the above analysis to determine the duration of the measurement results so that the unit breakdown time is too long and by modifying the Fan Motor if lack of safety that can cause leaks in the fabrication results due to material differences. To not repeat the same thing when there is the same problem then the author took the initiative to create tools to determine the Preassure Oil Hydraulic Fan Motor.

Tool Adapter Modification Scheme

Below is a schematic drawing of the modification of the adapter tool, shown in Figure 7-9.

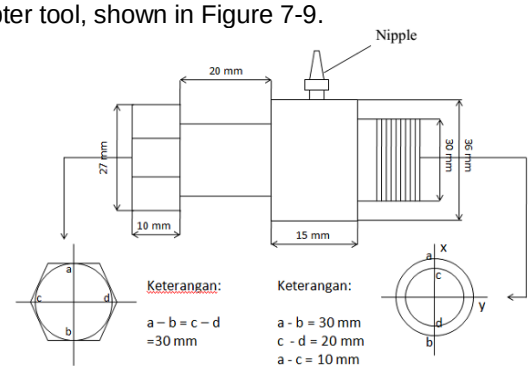

Figure 7. *Adapter Tools schema*

Figure 8. *Tools Adapter*

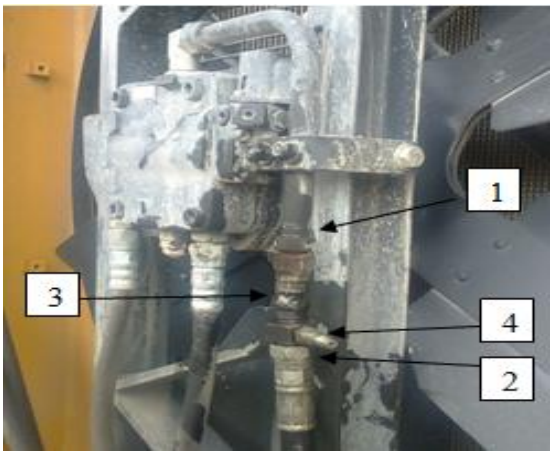

Figure 9. *Fan Motor Components when installed Tools adapter*

Furthermore can be calculated cost of labor cost when doing service when happened over heating at engine. Can be seen in Tables 1 and 2.

Table 1. *Labor mechanics before the availability of tools*

No	Goods / Services	Price x Qty	Total
1	Analysis trouble	$27 x 2 (man) x 48 (hour)	$2.592
2	Component replacement	$27 x 2(man) x 24 (hour)	$1.296
Total			$3.888

Table 2. *Labor mechanics after the availability of tools*

No	Goods / Services	Price x Qty	Total
1	Analysis trouble	$27 x 2 (man) x 1 (hour)	$54
2	Component replacement	$27 x 2 (man) x 8 (hour)	$432
Total			$486

From the above table it can be concluded that customer can save expenses by price comparison (before and after) available tools: ($ 3.888 - $ 486) = $ 3.402 or if calculated with Rupiah ($ 3.402 x Rp 13,000) = Rp. 44.226.000 (Forty Four Million Two Hundred Twenty Six Thousand Rupiah).

CONCLUSIONS

Based on the above study obtained conclusion that is:

1. Quality, if the previous process of troubleshooting slow and potentially mistakenly analyze the cause of the damage because of the unavailability of tools to be reduced.
2. Cost, if previously in troubleshooting the customer must pay Rp.50.544.000, when the availability of customer tools only cost Rp.6.318.000, if the total cost comparison can save the cost of Rp.44.226.000.
3. Delivery, if previous workmanship for trouble analysis and execution process of component turnover spent 72 hours, to 9 hours.
4. Safety, before the tools can cause potential leakage on the components due to modification of components that are less precise, after the availability of tools can reduce the potential danger.
5. Productivity, if previously more unit productivity disrupted due to long breakdown time, become reduced due to breakdown time that can be reduced.

ACKNOWLEDGEMENT

The authors express their gratitude to the Institute for Research and Community Service (LPPM) of Universitas Muhammadiyah Jakarta, which has funded this research through the UMJ Internal Grant.

REFERENCES

[1] Basri, H., Rasma, Ramadhan, A.I., Diniardi, E., 2017, Analisa Kerusakan Alternator Semi Konduktor Regulator Pada Charging System Pada Unit Dump Truck 465-5, Prosiding Semnastek

[2] Diniardi, E., Ramadhan, A. I., Basri, H., 2014, Analisis Kekuatan Mekanik Dan Struktur Mikro Pada Material Polimer Penyusun Kipas Radiator, Jurnal Teknologi, Vol 6 No 1

[3] Diniardi, E., Syawaluddin, Ramadhan, A. I., Mubarok, R., Basri, H., 2015, Analysis of Mechanical Properties Connecting Rod Bolts Outboard Motor FT50CEHD, International Journal of Applied Science and Engineering Research, Vol 4 No 5.

[4] Kamsar. Hasbi, Muhammad. Rachman, Aditya, 2016. Analisis Sistem Hidrolik Pengangkat Pada Alat Berat Jenis Wheel Loader Studi Kasus Dinas Pekerjaan Umum Kab. Bombana, DINAMIKA – Jurnal Ilmiah Teknik Mesin, Vol. 1 No. 1.

[5] Mulyanto, S., 2018, Analisa Fan Control Declinepada Unit Alat Berat Bulldozer Komatsu D375-6, DINAMIKA – Jurnal Ilmiah Teknik Mesin, Vol 9 No 2

[6] Nugrahanto, I., 2016, Analisis Monitoring Pelumas Hidrolik Wheel Loader, Jurnal Ilmiah - VIDYA, Vol. 24 No. 2

[7] Purwono, H, Rasma, 2017, Analisa Engine Overheat Pada Unit Komatsu Bulldozer D155A-6, Prosiding Semnastek

[8] Rasma, Basri, H., Ramadhan, A. I., 2013, Analisa Pengaruh Tekanan Terhadap Steering Control Valve Alat Berat Pada Unit Grader (GD) Tipe 621R-1, Prosiding Seminar Inovasi Teknologi dan Rekayasa Industri 2013