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Troubleshooting Blow by Pressure High on the Komatsu Bulldozer Unit D375A-6R

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ABSTRACT

PT United Tractors Tbk Loajanan-sanga site backs up a large number of customers, one of which is PT. RCI (RPP Contractors Indonesia) which is engaged in coal mining with the Komatsu D375A-6R unit which is used for dozzing and ripping. From the D375A-6R unit at PT. RCI experienced Troubleshooting on engines which caused Blow by pressure high, which resulted in the engine low power and could not run because the oil engine continuously exited from the oil engine filling hole, if the engine is forced to operate it is feared that the engine oil will run out and the engine components it will experience excessive wear and can also experience jammed which results in the maximum performance of the D375A-6R komatsu unit.

INTRODUCTION

The bulldozer is seen as the most efficient heavy equipment unit for mining, especially dozing and ripping material. The bulldozer is used in almost all sand, coal and gold mining projects [1-6]. The process of pushing the material (sand and rock) in large volumes is done with a short working time and is more efficient by the bulldozer than other heavy equipment units, so do not be surprised if the bulldozer mining site works almost without stopping for the achievement of the production process charged by the company as well as market demand. One of the bulldozers that are often used in mining is D375A-6R [7-9].

Therefore, the authors make a troubleshooting analysis relating to one of the Komatsu products, the D375A-6R, which is caused by a lack of customer attention to maintenance on the unit.

In the D375A-6R unit of PT. RCI, often encountered repeated problems, namely blow by pressure high, which on average these problems occur because the engine combusts dust or dirt in the engine.

Referring to the problem above, the author decided to take the analysis of the trouble shooting Blow by high pressure on the D375A-6R unit, see Figure 1.

Fig. 1. D375A – 6R [10]

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EXPERIMENTAL METHOD

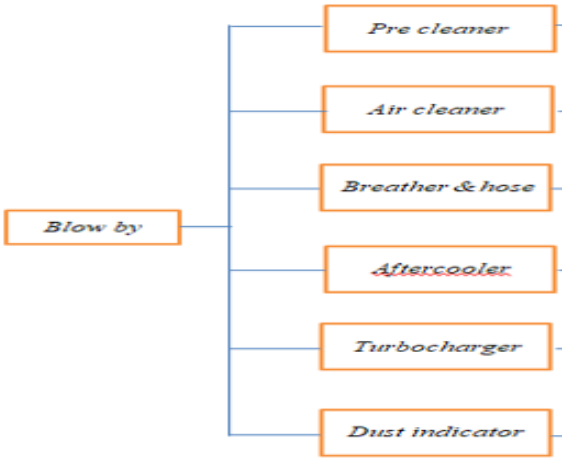

Fig. 2. Possible cause diagram

RESULTS AND DISCUSSION

Analysis is a comparison activity based on data obtained with standard data in the shop manual book. From the results of visual checking also testing compression and blow by which have been carried out during the observation and diagnostic stages. The following results are obtained, see Table 1.

Table 1. Analysis

Check item	standar	Aktual	Keterangan
Pre cleaner	Tidak ada kerusakan	Tidak ada kerusakan	OK
air cleaner	Tidak tersumbat & tidak rusak	Tidak tersumbat & tidak rusak	OK
Breather & hose breather	Tidak tersumbat & kerusakan	Tidak tersumbat & kerusakan	OK
Aftercooler	Tidak ada kerusakan	Ditemukannya *crack*	Not OK
Turbocharger	Tidak ada kerusakan & kebocoran	Tidak ada kerusakan & kebocoran	OK
Dust indicator	Tidak menunjuk ke warna merah	Tidak menunjuk ke warna merah	OK
Kompresi cyl.1	2,94 Mpa	2,4 Mpa	Not OK
Kompresi cyl.2	2,94 Mpa	2,6 Mpa	Not OK
Kompresi cyl.3	2,94 Mpa	2,4 Mpa	Not OK
Kompresi cyl.4	2,94 Mpa	2.4 Mpa	Not OK
Kompresi cyl.5	2,94 Mpa	2 Mpa	Not OK
Kompresi cyl.6	2,94 Mpa	0,8 Mpa	Not OK
Blow by pressure	3,43 Kpa	>5 Kpa	Not OK

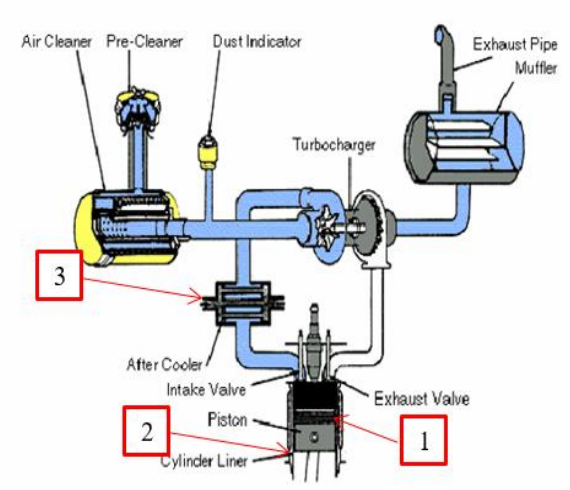

Fig. 3. Air intake system

In this troubleshooting the main cause of blow by high pressure is the occurrence of wear on the piston ring (1) and cylinder liner (2) which causes compression on each cylinder to be low compression, which should have a standard compression of 2.94 kPa. The most severe low compression occurs in cylinders no. 5 and 6 have been seen when doing compression testing using a compression tester when in the field, the cause of rising blow by pressure and the occurrence of low compression is because the air during the compression process carried out by the piston was leaking into the crankcase room. What causes wear and tear on the piston ring and cylinder liner is the occurrence of cracks which cause leakage in the after cooler (3) which causes dust & dirt to enter the air intake system circulation. The entry of dust and other impurities is caused by air pressure & the rate in the after cooler (3) is high so that the dust gets sucked into the after cooler.

Suspected Cause

Allegedly the oil that gushes out through the engine oil fill hole due to increased blow by pressure due to cracks in the after cooler which causes dust and dirt into the air intake system and causes the piston, piston ring and cylinder liner to wear excessively so from the results of previous analyzes need to do repairs on the cracked after cooler housing to prevent dust from entering the circulation air intake system due to a leak in the after cooler.

Fig. 4. Aftercooler crack

Action For Improvement

After knowing what causes trouble, the handling steps are by overhauling the engine, removing all cylinder liners, and measuring / measuring the cylinder liner and piston.

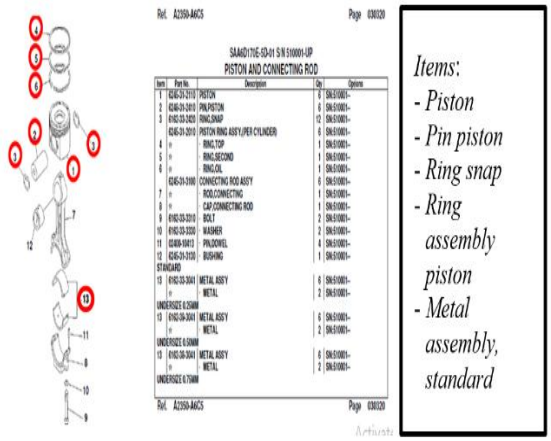

Fig. 5. Standard part overhoul

Measuring cylinder liner

Fig. 6. Measuring cylinder liner

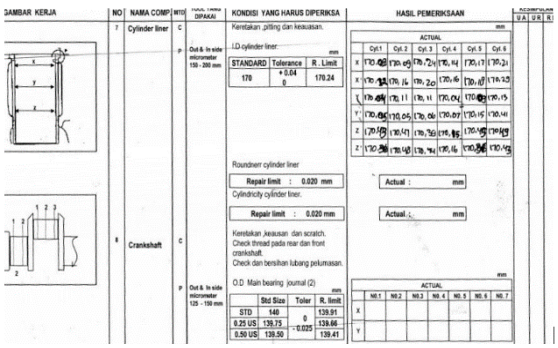

Fig. 7. The results of measuring the cylinder liner

CONCLUSION

Based on the results of the analysis, checking and data collection, the writer can get a conclusion about the damage due to:

1. The existence of a crack on the after cooler that causes dust & dirt into the air intake system that causes the piston, piston ring, and cylinder liner to wear excessively.
2. The piston, piston ring and cylinder liner have excessive scratching and wear, so the compression pressure that should be compressed in the combustion chamber experiences a leak where the air enters the crankcase chamber.
3. Pressure blow by rise is caused by a leak in the combustion chamber during the compression process due to wear and tear on the piston and piston rings.

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