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Overhauling a Perkins Engine {400 Series} To Increase Engine Performance to Attain Perfect Combustion

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ABSTRACT

Overhauling comes about troubleshooting, finding faults, dismantle and reassemble of engines, this paper talks about the corrective maintenance done on a Perkins engine to increase performance during operation. The engine is been dismantled and the following damage parts are changed pistons, rings, top gasket, main and con bearing. The front and back oil seal, and which the injector pumps and nozzle are been set to gauge to meet up engine requirement. The engine is reassembled and continues to run with high performance.

Keywords: Troubleshooting, Maintenance, Increasing Engine Performance.

1. INTRODUCTION

In our part of country today due to lack of constant electricity the usage of alternative means of generating electricity is the best options to meet the required standards which include the use of gasoline generators, diesel generators, solar power generators, inverters etc. majorly we will discuss in this paper about diesel generators. The rate at which diesel engine is maintained is measured in hours, a normal service hour is two hundred hours. Whenever the engine runs for 200 hours its due for preventive maintenance which is been done to prolong the engine life and increase the engine performance. When the engine is been discovered not to meet up with the power generation requirement, then the corrective maintenance is been done to regulate the engine performance. Costs of owning and operating including the preventive & corrective maintenance cost of diesel engine is very important for deciding the appropriate time to replace the diesel engine on basis of repair & maintenance cost. The new engine failure are occurring rarely therefore less maintenance cost, but age increase the maintenance cost is increase. Models for the repair and maintenance costs of Perkins engine provide planner and policy makers and also owner an opportunity to evaluate performance of diesel engine economic.

2. DATA COLLECTION

This study is carried out at authorized OandO service station (isheri ishaga). Failure & maintenance cost data is collected & sorted from forty same make & model of Perkins engine. The Perkins parts that meet the ISO standards are been purchased and used to reassemble the engine to attain high engine performance.

3. COST ANALYSIS

S/N	Perkins Parts	Quantity	Unit Cost ₦	Total Cost ₦
1	Piston	3	13,500	40,500
2	Ring	3	8,000	24,000
3	Main Bearing	1	7,500	7,500

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4	Con- Bearing	1	7,000	7,000
5	Front Oil Seal	1	3,500	3,500
6	Back Oil Seal	1	15,000	15,000
7	Oil And Fuel Filters	2	3,000	3,000
8	Top Gasket	1	5,000	5,000
9	Engine Oil	2	2,300	4,600
10	Servicing Of Pump And Nozzle	1	8,000	8,000
	Total			**118,100**

Material cost = 118,100

Labour cost = 15% of material cost

I.e. 15% of 118,100

$$= \frac{15 \times 118{,}100}{100}$$

= ₦17, 715

Overhead cost = 20% of material cost

$$= \frac{20 \times 118{,}100}{100}$$

= 23,620

Maintenance cost = material cost + labour cost+ overhead cost

= 188,100 + 17,715 + 23,620

= ₦ 229,435

4. RESEARCH METHODOLOGY

This part of the paper deals with the explanation of methods which are employed in carrying out the corrective maintenance and achieving the aim of increasing the engine performance to meet up the regulated requirements. Pictures below show the work procedures during the overhauling and the completion.

Figure 1.1 Dismantling The Engine

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Figure 1.2 Parts Arrangement

Figure 1.3 Reassembling Process

Figure 1.4 Completion of Corrective Maintenance.

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5. RESULT & DISCUSSION

The engine plays a very important role in power generation all over the world and as farm power mechanics in some part of the world. The objectives of this work are to increase the engine performance and control the smoke to normal emission standard.

6. CONCLUSION

In a nutshell, this paper will largely discuss means of eliminating low engine performance and poor emission, control in Perkins engine, and also create ideas on maintenance time and cost.

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