

Maintenance of the Lubrication System on the Mazda MR 90

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ABSTRACT

The development of automotive engine technology encourages humans to get cars that are comfortable to drive. If one of the systems does not work properly or experiences a malfunction, then the car engine cannot work optimally. The engine consists of moving metal parts, some of which are directly related to each other, such as crankshafts, wrench rods, and valve mechanisms. Based on the results of the research after being maintained and improved the condition of the lubrication system on the Mazda MR90 Car; it went well from the previous condition that experienced seepage in the crankcase, the condition of the scalding oil in the crankcase and the condition of the oil, the oil filter that needed to be replaced. After the final test, the condition runs optimally. To maintain the condition of the lubrication system running optimally, periodic maintenance such as routine oil and filter changes is needed so that the condition of the lubrication system does not experience disturbances.

Keywords: Maintenance and Repair, Mazda MR90 Car, Lubrication.

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History of Article: Received: July 2023. Revision: August 2023. Published: September 2023.

Introduction

The development of automotive engine technology encourages humans to get cars that are comfortable to drive. If one of the systems does not work properly or experiences a malfunction, then the car engine cannot work optimally. The engine consists of moving metal parts, some of which are directly related to each other, such as crankshafts, wrench rods, and valve mechanisms. When the engine starts to rotate, the friction that occurs between the engine parts will cause a reduction in the power of the engine itself, and quickly the engine parts will wear out and the moving engine components will be fatally damaged. Therefore, there must be supporting factors that support the work of the machine and reduce the occurrence of direct contact of the engine components (Anonymous: 1995:3-24).

To avoid wear and tear on engine components that cause damage, it is necessary to provide an engine work support system, namely a lubrication system. The lubrication system is a system that functions to form a thin layer (oil film), a layer of oil film is formed between the shaft and the bearing so that it can prevent direct contact between two rubbing metal surfaces, can also prevent wear and minimal loss of power. The friction that occurs between the two moving parts remains, but only very little.

Lubricating oil is a mixture of hydrocarbons and added other substances called additives. Lubricating oil has a very large influence on two objects that rub against each other so that the two objects that rub against each other do not quickly damage, so the selection of lubricating oil must be right because it also determines the durability of the vehicle's engine life. Good quality lubricant will

provide several advantages, including extending the life of engine components, longer lubricating oil use time and reducing friction so that engine power is more optimal and can save fuel.

Problem Formulation

To carry out maintenance and repair of the MAZDA MR 90 lubrication system, the author performs: maintenance and repair in the MAZDA MR 90 car lubrication system, Identify the condition of component components that require maintenance in the MAZDA 90 engine lubrication system, Identify what components are maintained and repaired

Research Objectives

The objectives that want to be written in the Final Project report with the title "Maintenance and Repair of the Lubrication System on Mazda Cars Mr 90" are to:

1. Find out the condition of the mebil machine that has been affected after being repaired.
2. Knowing the components contained in the Mazda MR90 lubrication system.
3. Knowing the function of the components that are treated and other components in the lubrication system.

Theoretical Foundations

Lubrication System

The lubrication system is one of the complementary systems in a vehicle with the aim of regulating and distributing lubricating oil to moving engine parts. The lubricating oil used in a car engine is engine oil, which functions to reduce friction as little as possible and as a heat absorption caused by friction between moving engine parts. The main function of lubrication is to prevent direct contact and form a thin layer (oil film) between two parts of the metal surface that rubs against each other and limits wear and minimal loss of power.

Vehicle engines have many parts that are interconnected with movements that rub against each other, and have different load weights.

The lubrication system must be able to reach all parts of the engine that need lubrication. Parts that need to be lubricated, including:

1. Cylindrical walls, tora, torake rings, and torake pens.
2. Crankshaft and its bearings.
3. Nok shaft and its bearings.
4. Valve mechanism.
5. Timing chain and pump shaft.

Symptoms of Lubrication System Damage

1. The oil seal or engine gasket is leaking. The repair can replace the seal.
2. The valve or seal is leaking. If the valve is leaking, replace the valve.
3. Scale in the engine that causes a lack of performance in the engine. Maintenance is carried out by changing the lubricant regularly.

Car Lubrication Mechanism

1. Dry Lubrication System

A dry lubrication system is a lubrication system in which the lubricating oil tank is placed in the engine room so that the crankcase chamber is always dry. This lubrication system lubricating oil flows from the lubricating oil tank located outside the machine, then flows to the parts that need to be lubricated with the lubricating oil pump intermediate.

2. Wet Pump System

A wet lubrication system is a lubrication system that uses an oil tank in the crankcase so that the crankcase space is always wet. In this lubrication, the lubrication process is more perfect, because the oil tank is always wet by the oil and the crankcase is always exposed to

oil so that the engine working process is better. Most cars use this system because it is considered to have a better lubrication process. The wet lubrication system is divided into three lubrication systems, namely the splash lubrication system, the press lubrication system, and the combination lubrication system.

a. Splash Lubrication System

No	EXCESS	DEFICIENCY
1.	Simple construction	Lubrication does not match the amount of revolution of the motor
2.	At axis crank does not get oil drain holes	The distribution of lubricating oil is not the same the number of respectively-specific parts

b. Press Lubrication System

No	EXCESS	DEFICIENCY
1.	The flow of lubricating oil can run regularly	If one of the bearings is damaged then the lubrication will be disrupted
2.	Lubrication can be well regulated by making grooves in the metal mount	If the filter is damaged, the lubricating oil that flows will not be filtered so that dirty

c. Combination Lubrication System

No	EXCESS	DEFICIENCY
1.	This combination lubrication system is more perfect than the press lubrication system and the splash lubrication system	Used in stationary machines
2.	Components machine will get perfect lubrication so that the lifespan will be longer	Rarely used in car engines

Components of the Lubrication System

A lubrication system cannot work without the components working in it. Therefore, a lubrication system requires components that can work continuously and continuously when the engine is running

so that the lubrication system can work properly and the components in the engine can be lubricated perfectly, so the Mazda MR 90 engine uses a lubrication system with full pressure. The components that work on the Mazda mr 90 lubrication system are:

1. Oil Pump
2. Oil Pressure Regulator (Relief Valve)

- a. Relief valve

Relief valve shaped like a piston that serves as a hole cover Bypass who returned to the carter. The way it works, when the oil pressure is 4.0 kg/cm², the valve will be pressurized and fight against the spring so that the hole Bypass open to drain the oil back to the crank.

- b. Valve spring

The valve spring functions to hold relief valve and return it to its original position when it gets pressure from the oil. How it works, if relief valve does not get pressure or the pressure is still below 4.0 kg/cm² the valve spring will hold relief valve to keep the hole closed Bypass When the pressure exceeds 4.0 kg/cm² then the spring will be depressed relief valve and when the pressure is already below it, the valve spring will return relief valve in its original position.

- c. Spring retainer

The spring retainer serves as a support and spring retainer when the spring is depressed by the relief valve. The way the relief valve works is when the oil flows through the inlet (1) and the pressure of the oil flow at the inlet (5) is still below the maximum pressure limit, the bypass hole is closed by the relief valve because the pressure is not yet able to resist the spring, but when the engine rotation rises the amount of lubricant flowing increases, then the pressure will rise beyond the maximum limit of 4.0 kg/cm² so that the relief valve will resist the spring as a result of which the bypass hole (6) opens and some of the lubricant returns to the crankcase and when the pressure is already below the maximum pressure the valve spring will return the relief valve (8) to its original position and the oil flows into the outlet hole (3). The amount of lubricating oil flowing back into the crankcase depends on how large the bypass hole (6) opens at the time the valve is pressurized by lubricating oil.

3. Oil Pressure Indicator

- a. Body

The body is used as the place of the diaphragm, insulator block, sensor, sensor spring, terminal. On the sender body there is a connecting thread that serves as a fastener for the sender body with the cylinder block.

- b. Diaphragm

The way it works is that if the diaphragm does not get oil pressure or the oil pressure is less than the minimum pressure (at idle rotation) which is 0.35 kg/cm² then it will go down so that the insulator block no longer presses the sensor contact so that the other sensor contact is connected to the sensor contact related to the terminal so that the terminal turns on the light as a sign that there is no oil pressure. When the oil pressure is applied, the diaphragm will be pushed so that the insulator block will push the contacts and springs so that each contact is not in contact and the terminals turn off the lights.

- c. Sensor contacts

The contact sensor works in tandem with the working of the diaphragm. If the contact is pushed because the diaphragm is pressurized, the contacts are not interconnected so that the current from the terminals is not transmitted, if the diaphragm is not pressurized, the diaphragm will go down and the

insulator block does not press the contacts and the contacts are interconnected so that the current from the terminals is cooked so that the light is on.

d. Contact springs

The contact spring functions as a contact holder and returns it when there is no pressure from the insulator block.

e. Insulator block

The insulator block works to press the contact to resist the spring. When the diaphragm is under pressure, the block will push the contact against the spring, if the diaphragm is not under pressure, it will go down so that the block no longer presses the contact.

t The terminal works based on the sensor on the sender, if the sensor does not get pressure then the terminal will turn on the indicator light and if the sensor has received pressure then the terminal will turn off the light as a sign that there is oil pressure.

The way the oil pressure indicator works is that if the diaphragm does not get pressure or the oil pressure is still below the minimum pressure of 0.35 kg/cm², it will go down so that the insulator block no longer presses the sensor contact against the spring, so that the other sensor contact is connected to the sensor contact related to the terminal, then the spring returns the contact so that the contacts are interconnected and the terminal turns on the light as a sign that there is no oil pressure. When there is already oil pressure, the diaphragm will be pushed so that the insulator block will push the contact against the spring so that each contact is out of contact and the terminal turns off the light.

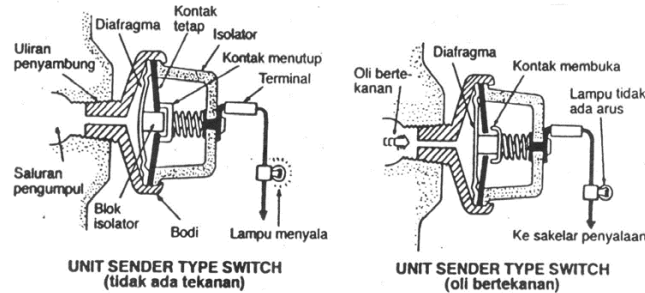


Figure 2.11 Oil Pressure Indicator

4. Oil Filter
5. Carter
6. Oil Level Gauge
7. Oil Cap
8. Engkol Pores
9. Batang Torak
10. Torque and Cylinder
11. Cylinder Head
12. Sumbu Nok (Camshaft)
13. Valve Lifter
14. Pushrod
15. Rocker Arm and Shaft
16. Timing Chain

Research Methodology

The method of writing this final project is as follows, using the observation method, namely by conducting research and knowing the type of lubrication that is good in terms of protection against friction and lubricant replacement in a certain time interval.






Examination analysis


The analysis of the inspection where checking the lubrication volume is sufficient or not and examining whether or not there is a leak in the car engine where the check is done manually.

Analysis of tool and material needs

The needs of researchers in conducting analysis are in the form of tools and teaching materials, here are the tools and materials needed in the maintenance and repair of the Mazda mr 90 car lubrication system. Tools used:




Table 3.1 Tools


No	Tool name	function	Tool drawing
1	1 set of ring and pass combination locks	Used to install and unscrew bolts and mjr	
2	Screwdriver plus (+) and screwdriver (-)	Used to open the coupler	
3	1 set of socket locks	Used to open bolts and nuts	
4	Pliers	Used to hold and remove bolts	
5	Plastic hammer	Used for leveling the crankcase	

6	Kater knife	For cutting paper gaskets	
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Materials used:

Table 3.2 Ingredients

No	Ingredient Name	Function	Picture
1	Shell sae 20W-50 brand oil	as a lubricant for engine components that move with each other..	
2	autosiller	As an adhesive between the carter and gasket	
3	Gasket	Prevent leaks in the charter	

4	Paper Gaket	Prevents oil from leaking out of the crankcase	
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Lubrication System Testing

In the process of maintaining and repairing the lubrication system on the Mazda MR 90 car, the amount of engine oil volume on the crankcase is measured to measure the estimated amount before and after the engine oil is replaced.

Result

Maintenance and repair of the Mazda MR 90 lubrication system is carried out several times, starting from checking the condition of spare parts and debris in the lubrication system, followed by light maintenance until repairing several parts. After being done, the condition of the car is checked again if there is a possibility of damage that cannot be repaired. After testing the condition of the car, it was stated that it was in order without anything to add according to the results of checking the condition of the car during the proposal session and continued to check on Saturday, June 15, 2024 with the head of the engine study program.

Lubrication System Repair

For the repairs that need to be made to the lubricating system, it is necessary to do the following things:

1. Removing the Lubrication System
 - a. Remove the oil tap bolt using a wrench 14
 - b. Dispose of the existing oil, make sure the oil in the oil tank is completely depleted
 - c. Remove the oil tank fastening bolt using a size 10 wrench/socket
 - d. After the bolts fastening the oil tank are removed, the oil charter is struck slowly using a rubber hammer until it comes out of place.
 - e. The charter is cleaned and washed using a mixture of gasoline and soap.
2. Washing the charter
 - a. Once the charter is removed, clean it using a mixture of gasoline and soap.
 - b. Dry using the air from the compressor.
 - c. Cut the gasket using a cater according to the size of the charter edge
 - d. Install the gasket on the edge of the charter
 - e. Apply the autosiller on the side of the carter
 - f. Wait for the autosiller to dry so that the gasket sticks better and prevents leakage in the charter
 - g. Attach the charter in place.

- h. Tighten the bolts again.
 - i. Check the edge of the charter is smeared by the autosiller
3. Changing the oil filter
- a. Remove the oil filter by using a special release filter lock
 - b. After it is slightly loosened, rotate the oil filter by hand until it comes out of place.
 - c. Control whether the rubber seal is not left on the machine.
4. Changing the oil and measuring the oil
- a. After Carter put the cap back on and bolt the oil cover
 - b. Tighten using wrench 14
 - c. Open the top cover from the oil holder.
 - d. Put 3.5L of oil according to the markings on the oil gauge.
 - e. Make sure the amount of oil is the right size
 - f. Close the oil cap tap again
 - g. Check for leaks in the charter after the car is tried to start and drive a few hundred meters.
 - h. Open the oil pan from the cylinder block by using the t-key. - Clean the oil pan using a cape and brush. 26-
 - i. Installing the oil pan on the cylinder block that has previously been fitted with a new gasket on the oil pan.

Testing

1. Oil pressure check
2. Oil Filter Inspection
3. Oil pump inspection
4. Oil pump inspection

Therapy

1. Unpacking
2. Cleaning
3. Checking
4. Measurement
 - (a). Out of service limit = Repair/Replacement
 - (b). Within service limit = Reinstall
5. Replacement of components because they cannot be repaired due to service life or have exceeded the allowed limit if not replaced will affect the performance of other components.
6. Installed again because the component is still within the permissible limits and

Conclusion

Based on the results of the activities of maintenance and repair and testing on the Mazda MR 90 car lubrication system that has been carried out, the research entitled "Maintenance and repair of the lubrication system on the Mazda MR 90 car" can be concluded as follows:

1. After maintenance and improvement of the condition of the lubrication system, it runs well from the previous condition that seeps into the crankcase,
2. The condition of the crusting oil inside the crankcase and the condition of the oil,
3. Oil filter that needs replacement. After the final test, the condition runs optimally.

Suggestion

To maintain the condition of the lubrication system running optimally, periodic maintenance such as routine oil and filter changes is needed so that the condition of the lubrication system does not experience disturbances.

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