

Tune Up System on Toyota 4k Series Engines

Daadang Rustandi ^{1*}, Kasum ², Yoga Nurahmato ³

D3 Mechanical Engineering Study Program, Akademi Teknologi Bogor
Jl. Bina Marga No.17, RT.05/RW.08, Baranangsiang, Kec. Bogor Tim., Kota Bogor, Jawa Barat 16143,
Indonesia

ABSTRACT

Tune up is conditioning the car engine to return to normal after being used for daily purposes, tune-up is not a repair but rather a car engine maintenance, so that the car is always in prime condition in other words will not break down if used for daily purposes. To produce maximum tune-up work, of course, you must follow the correct procedure and in the tune-up not all components are checked, this depends on the kilometers that the machine has traveled, and the length of time since the last time the service was carried out and from the condition of the machine itself.

Keywords: Components, Tune Up.

Corresponding author: dadangrust@yahoo.com

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

Introduction

In modern times, technological developments seem to be very advanced. In the development of technology in the automotive sector in particular, where people are competing to have super luxury vehicles with sophisticated engines and technology. Many of the latest cars released in 2018, some of them are the facelifted model Honda HR-V, Mitsubishi Xpander with Sport and GLS transmission, Nissan Terra, Datsun Go-Live M/T and CVT, facelifted version of Chevrolet Trailblazer, Toyota Land Cruiser 200 VX, and many more. These cars are designed with a more attractive design and of course have the latest and advanced automotive technology to attract consumers.

However, it is undeniable that even though we are in modern times like today, old cars that existed in their time can still be seen on the streets. One of these old cars is the Toyota Kijang I and II generations which came out in 1977 and 1981. Toyota Kijang is the most popular vehicle model for the minibus class in Indonesia since 1977. This type of car is indeed one of the commercially successful cars to date so that it can be easily found in all corners of Indonesia.

Toyota Kijang is still showing its existence in the automotive world. This type of car does have advantages such as its classic appearance, stronger body, and cheap car taxes and maintenance. However, equivalent to these advantages, Toyota Kijang also has many disadvantages when juxtaposed with the latest cars today where the early generation Toyota Kijang is famous for having many diseases, one of which is in the engine part which requires vehicle owners to do Tune Up or periodic repairs.

In this study, the object of the research is the Toyota Kijang Doyok Generation II 4K Engine Series which came out in 1981. The car underwent periodic repairs or Tune Up because the engine had been operating for a long time so that all its components were not in their standard condition. If you look at it, the engine oil is diluted and pitch black, the fan strap is cracked and broken because it is not

maintained. In addition, the car's battery lacks power. In the distributor there is dirt that causes the flow of sparks to be blocked and the valve gap is fragile and the spark plug is wet due to oil.

The problems that exist in the Toyota Kijang Doyok Generation II 4K Engine Series can actually be overcome if the car gets regular maintenance properly and correctly. Therefore, to overcome these problems, regular maintenance or Tune Up is needed. This is done so that the car remains in good condition. With that, this research is aimed at finding out how to perform maintenance or Tune Up on the Toyota Kijang Doyok Generation II 4K Engine Series.

Based on the background as described above, the problem can be formulated as follows:

1. How to maintain or tune up a Toyota Kijang 4K series engine?
2. What components must be considered in Tune Up on the Toyota Kijang 4K series?

Research Objectives

Based on the research questions above, the objectives of this study include:

1. To find out how to maintain or tune up on a Toyota Kijang 4K series engine
2. To find out what components must be considered in Tune Up on a Toyota Kijang 4K series engine

Toeri Foundation

The engine has also undergone changes so that the deer are more powerful. At the beginning of its appearance, this car was equipped with the same 4k engine as the Toyota Corolla DX engine. The Toyota 4k engine has a capacity of 1290 cc (1300cc) which still uses an OHV (Overhead Valve) pushrod. This 4k engine is able to produce 74 hp at 5600 rpm and 105 Nm of torque at 3600 rpm.

In 1984, Toyota gave a facelift to this generation of antelope, seeing changes to the grille and bumper and the displacement of the turn signals on the side of the lights while the headlights changed from round to square. The engine used was upgraded by Toyota with a 5k 1500 cc engine which would also be used by the super kijang. In addition to the engine upgrade, the facelifted Kijang Doyok has also adopted a brake booster, and a change in the transmission differential ratio.



Figure 3.3. Toyota Kijang 4k Series Engine

Weaknesses of Technology Architecture

In the Toyota Kijang 4k series engine, there are weaknesses in the engine itself that cause a decrease in engine performance, including:

- Masih OHV (Overhead Valve)
- Still using a carburetor
- Not wearing valves with hydraulic adjustment system
- Still using platinum and condenser
- Wasteful fuel

Result and Discussion

Based on the description above, the tune up on the 4 K monil includes various checks and tests that are related to the engine and ignition system. The test results can be seen in the table below.

No	Name Component	Symptom	Repair Steps
1	Engine Oil	Black oil	Drain the oil and replace it New Oil
		Reduced oil height	Add n oil
		Clogged oil filter	Replace the filter with a new one
		Oil mixed with water	Oil drain and change the oil to a new

Engine Oil Inspection

Engine oil quality standard: clear and viscous
Standard oil height : point F (Fuel)

Fan Strap Inspection

No	Name Component	Symptom	Step Repair
1	Fan Rope	Fan strap crack	Replace the fan strap with a new one
		Fan strap Exposed Oil/Slip	Replace the fan strap with a new one
		Rope slack fan	Reset the fan strap

Fan rope voltage standard:

- New: 125 +/- 25 lbs
- Long : 80 +/- 20 lbs

Battery Checks

No	Component Name	Symptom	Repair Steps
1	Battery	Loose battery terminals	Tighten Battery terminals
		Damaged battery terminals	Sandpaper the battery terminals
		Broken battery terminals	Replace the terminal with a new one
		Low battery water	Add battery water
		Voltage battery is less	Battery charge

Standard battery voltage : 12 volts Standard weight of enis : 1.25 – 1.28 at 20o C

Spark Plug Inspection

No	Component Name	Symptom	Repair Steps
1	Spark plug	Dirty spark plug head	Clean the head spark plug
		Electrode discharged	Replace new spark plugs
		Wet spark plug head	Wipe and clean the head spark plug
		Small sparks	Set spark plug gap
2	Cable Busi	No prisoners	Replace the cable new
		Cable leaking spark plug	Isolation Cable Busi
		Cable terminals loose	Set up terminals

Standard spark plug clearance: 0.80 mm (0.031 in)

Recommended spark plugs:

- ND : W 16 EX-U
- NGK : BP 5 EY

Distributor Inspection

No	Component Name	Symptom	Repair Steps
1	Distribut or	Incorrect ignition sequence	Fix the cable sequence
		Platinum closes directly or opens continuously	Adjust platinum slit
		Condenser off	Replace the condenser
		Platinum dirty	Clean the platinum
		Cable terminals Sagging	Set up terminals
		Platinum does not Work	Platinum-plated ganti

Standards for distributors are:

- Gap platinum or pegas peredam 0,05 - 0.45 mm (0.002 – 0.018 in)
- Gap rubbing block 0,4 – 0.5 mm (0.016 - 0.020 in)

Valve Gap Inspection

No	Component Name	Symptom	Repair Steps
	Valve Gap	Squeeze machine	Set the gap valve
		The engine does not stable	Set the gap valve
		The engine does not stable	Set trigger

		Leakage valve	Dismantle Re-skir
		Leaking valve seals	Replace valve seals new

Valve gap standards are:

- Suction valve (In) : 0.20 mm
- Exhaust Valve (Ex) : 0.30 mm

Conclusion

Based on the results of the above writing, it can be concluded that the condition of the engine has experienced a shortage such as oil that has been mixed with water and is black so it must be replaced. The fan strap is cracked so it must be replaced with a new one. The spark plug also experiences a gap in its gap therefore it must be reset according to its standards. The distributor replaced the components on the platinum because it was damaged, and the valve gap already experiencing estrangement, so it must be readjusted according to the standard. However, the condition of the battery is still in a usable condition.

The components of the Toyota Kijang 4k series engine that are tuned up are engine oil, fan ropes, batteries, spark plugs, distributors, and valve gaps. These components are tuned up to get maximum engine performance and also keep the engine in good and excellent condition. If the engine is operated continuously, it will allow for a decrease in engine performance.

Suggestion

1. The wearer is advised to carry out periodic maintenance if it has entered the month for treatment or has entered the predetermined kilometers
2. Use precise measuring tools to get accurate data.
3. Clean the tools before doing the experiment so that they can be used at all times and in good condition

References

- Haster Education Foundation Team. 2000. Car Repair & Maintenance. Bandung: Ppioneer Jaya.
- Hidayat, Wahyu. 2012. Modern Gasoline Motorcycles. Jakarta: Rineka Cipta.
- Akbar, Ali Dan Utom, Eko, dear. 2016. Do It Yourself.Maintenance & Tune Up Motorcycles and Cars. Yogyakarta: Andi.
- Technical Service Division, 2013. Toyota Service Training. Jakarta: Pt Toyota Astra motor