Journal of Mechanical Engineering and Vocational Education (JoMEVE)

Journal Homepage: https://jurnal.uns.ac.id/jomeve

THE EFFECT OF GASOLINE VARIATION AND GASKET THICKNESS VARIATION ON CYLINDER HEAD TO TORQUE AND POWER ON HONDA SUPRA X 125 FI MOTORCYCLES IN 2015

Febriana Ramdhani Setiawan[1], Husin Bugis[1], Ngatao Rohman[1]
[1]Mechanical Engineering Education, Sebelas Maret University, Surakarta

Email: febriana.rs@student.uns.ac.id

KEYWORDS

Gasket thickness variation
Gasoline variation
Torque
Power

ABSTRACT

The purpose of this study are (1) To identify the effect of variations in gasoline to torque and power on Honda Supra X 125 FI motorbikes in 2015. (2) To identify the effect of cylinder head gasket thickness variations on torque and power on Honda Supra X 125 FI motorcycles 2015. (3) To identify the highest torque and power after making variation on the thickness of the cylinder head gasket by using a variety of gasoline on a Honda Supra X 125 FI motorcycle in 2015. This research used experiment method. Based on the results of the study it can be concluded that: (1) A higher octane value in the type of gasoline fuel affects torque and power on a Honda Supra X 125 FI motorcycle in 2015. (2) The thickness of the cylinder head gasket affects the torque and power on a Honda motorcycle Supra X 125 FI in 2015. Torque and power have decreased in thickness of two cylinders head gaskets (0.6 mm) and thickness of 3-cylinder head gaskets (0.9 mm). (3) A higher-octane value in the type of gasoline fuel and the thickness of the cylinder head gasket affects the torque and power of the Honda Supra X 125 FI motorcycle in 2015. (4) By using Pertalite fuel on the thickness of the standard cylinder head gasket (0, 3 mm) can produce optimal torque that is equal to 11.60 Nm at 4730 rpm engine speed and optimal power that is equal to 11.1 HP at 8407 rpm engine speed on a Honda Supra X 125 FI motorcycle in 2015. To produce the optimal torque and power on Honda Supra X 125 FI motorcycle in 2015 it is suggested to use a Pertalite fuel with the standard head cylinder gasket thickness

INTRODUCTION

The development of science and technology in the world continues to go hand in hand with the emergence of increasingly complex problems in various fields of life, including transportation. One of the most widely used means of transportation for Indonesians so far is motorbikes, whose number continues to increase. The total population of motorcycles in Indonesia in 2016 reached 105,150,082 units (Badan Pusat Statistik, 2018).

Motorbikes have strong engine performance and lower fuel consumption than cars (Sukidjo, 2011). Engine performance is influenced by several factors, including engine size, compression rate, temperature and pressure of the surrounding air, combustion process, and fuel quality (Ferguson, 1986).

The first factor that affects engine performance is the quality of the fuel. Fuels come in various types and shapes. Gasoline is a type of liquid fuel. Gasoline is the result of the distillation process of petroleum into the desired fractions. The main constituents of gasoline are carbon (C) and hydrogen (H). Gasoline consists of octane (C_8H1_8) and nepthane (C_7H_{16}) (Bugis, 2013).

e-ISSN : 2615-5699

https://doi.org/10.20961/jomeve.v3i2.46015

The second factor affecting torque and power is the thickness of the gasket. A gasket is something that fits easily into place and is placed between two parts. The cylinder head gasket is located between the cylinder block and the cylinder head, which functions to increase or decrease the compression ratio (Nurliansyah, 2013).

Honda Supra X 125 FI is a motorcycle that applies the four-step working principle with the EFI (Electronic Fuel Injection) system. The application of electronic fuel injection technology is an effort to improve the performance of the fuel system on a gasoline motorbike, to create a low-emission vehicle with maximum power (Setya, 2007). For this reason, it is necessary to conduct research related to torque and power on the 2015 Honda Supra X 125 FI motorcycle

Electrical energy has a very important role for human life. In fact, in Indonesia this energy has not been fully distributed to all corners of the country. Currently, electricity in Indonesia is mostly still using fossil energy, which results in a large amount of exhaust gas emissions. Apart from having a negative impact on the environment, fossil energy is non-renewable energy, so that in the future this energy will run out. Fossil energy needs to be diverted to other renewable energy sources. The potential for renewable energy in Indonesia is enormous, and the first place is the energy potential from hydropower.

RESEARCH METHODS

The sample used is a 2015 Honda Supra X 125 FI motorcycle. A tool for measuring torque and power uses Sportdyno V3.3. The test flow chart can be seen in Figure 1.

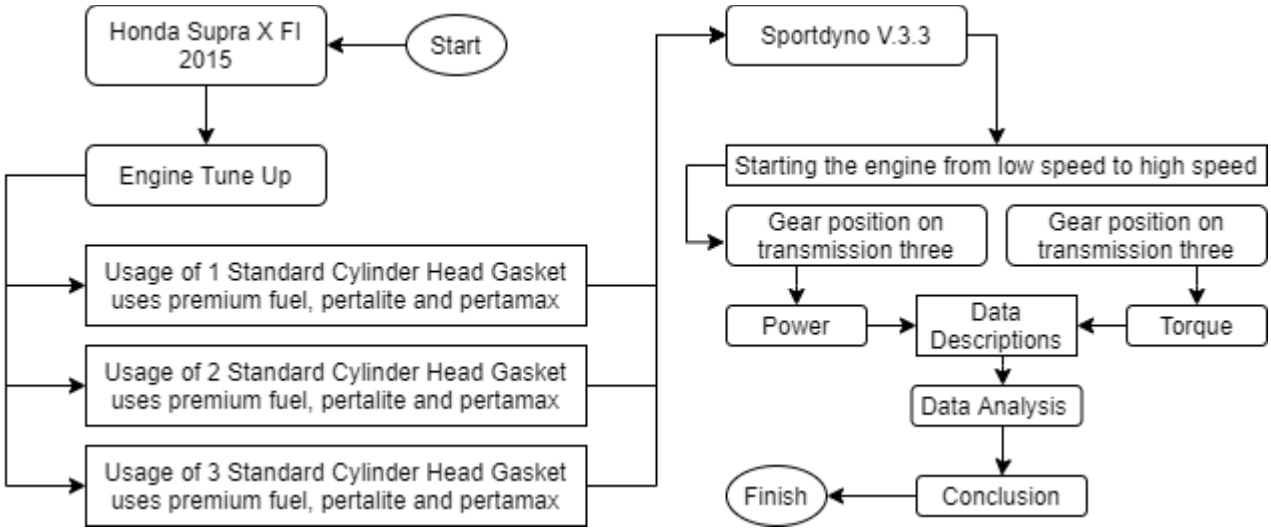


Figure 1. Methodology Research process

RESULTS AND DISCUSSION

Torque

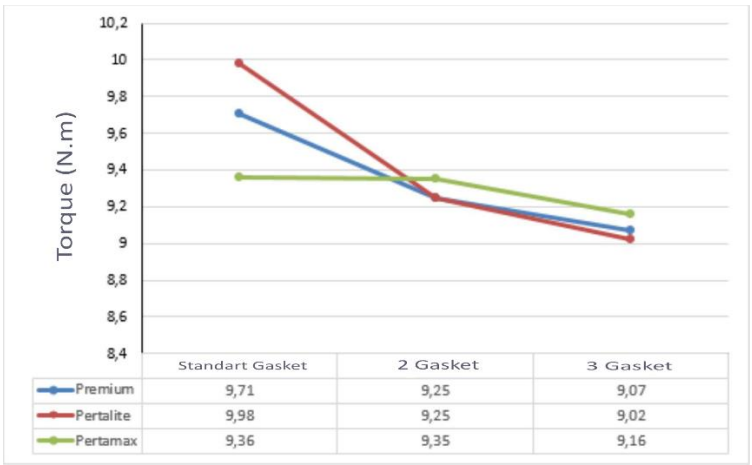
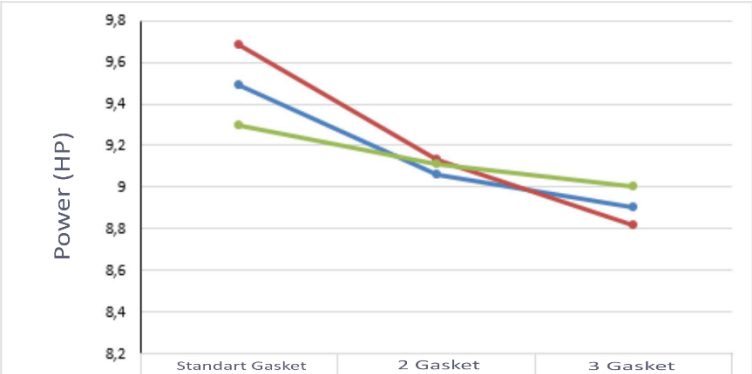


Figure 1. Graph of Torque Relationship with Cylinder Head Gasket Thickness

Based on the data from the measurement of torque at the wheel axle using variations in the thickness of the cylinder head gaskets, the highest torque data was obtained using the thickness of the standard cylinder head gasket (0.3 mm) fueled by pertalite, namely 11.60 N.m engine speed of 4730 rpm. While the torque at the lowest axle uses 3-cylinder head gaskets (0.9 mm) with premium fuel, which is 6.42 N.m engine speed of 9500 rpm, see figure 1.

Power

Based on the data from the power measurement results at the wheel axle using variations in the thickness of the cylinder head gaskets, the highest torque data was obtained using the thickness of the standard cylinder head gasket (0.3 mm) fueled by pertalite, namely 11.1 HP 8407 rpm engine speed. While the torque on the lowest axle uses 3 cylinder head gaskets (0.9 mm) with premium fuel, which is 4.4 HP, engine speed is 4500 rpm



	Standart Gasket	2 Gasket	3 Gasket
Premium	9,49	9,06	8,9
Pertalite	9,68	9,13	8,82
Pertamax	9,3	9,11	9

Figure 1. Graph of Power Relationship with Cylinder Head Gasket Thickness

The effect of the type of gasoline fuel on torque and power on the 2015 Honda Supra X 125 FI motorcycle is because pertalite and Pertamax fuels have a higher-octane number than premium fuels, so pertalite and Pertamax fuels are more difficult to burn than fuel. premium. Fuels that are difficult to burn are categorized as good quality fuels. Thus, the torque and power generated will be even greater.

There was an effect of the thickness of the cylinder head gasket on torque and power on the 2015 Honda Supra X 125 FI motorcycle due to the changing volume of the combustion chamber. The compression ratio will be smaller when the volume of the combustion chamber is larger, so the torque and power generated are smaller. The smaller the volume of the combustion chamber will result in a greater compression ratio, so that the torque and power generated is greater.

CONCLUTION

Based on the test results, a higher-octane value on the type of gasoline fuel affects torque and power on the 2015 Honda Supra X 125 FI motorcycle. The thickness of the cylinder head gasket affects the torque and power on the motorbike. Torque and power decreased in thickness of 2-cylinder head gaskets (0.6 mm) and thickness of 3 cylinder head gaskets (0.9 mm). By using pertalite fuel at a standard cylinder head gasket thickness (0.3 mm) it can produce optimal torque of 11.60 N.m at 4730 rpm engine speed. The optimal power is 11.1 HP at 8407 rpm engine speed.

REFERENCES

Anonim. (1995). Toyota New Step 1 Training Manual. Jakarta: PT. Toyota Astra Motor.

Anonim. (2007). Lembar Data Keselamatan Bahan. Direktorat Pemasaran dan Niaga Pertamina. 1 (1), 1-8.

Costaqliola, M. A., dkk. (2016). Performances and Emissions of a 4-Stroke Motorcycle Fuelled with Ethanol/Gasoline Blends. Fuel 183(2016), 470 – 477. Diperoleh 1 Agustus 2018.

Arikunto, Suharsimi. (2009). Prosedur Penelitian Suatu Pendekatan Praktik. Jakarta: Rineka Cipta.Mustafa, S. (2012). Karakteristik Sifat Fisika dan Mekanika Bambu Petung Pada Bambu Muda, Dewasa dan Tua (Studi Kasus: Bagian Pangkal).

Badan Pusat Statistika. (2009). Perkembangan Jumlah Kendaraan Bermotor menurut Jenis tahun 1949 - 2016. Diperoleh 23 November 2017.

Bugis, Husin. (2013). Dasar-dasar Motor Bensin Konvensional. Surakarta : Universitas Sebelas Maret.

Daryanto. (2011). Prinsip Dasar Mesin Otomotif. Bandung: Alfabeta.

Daryanto. (2010). Teknik Konversi Energi. Bandung: Satu Nusa.

Fakultas Keguruan dan Ilmu Pendidikan Universitas Sebelas Maret (2016). Pedoman Penulisan Skripsi. Surakarta : UNS Press.

Keputusan Direktur Jendral Minyak dan Gas Bumi.Nomor : 3674K/24/DJM/2006. tentang Standar dan Mutu (Spesifikasi) Bahan Bakar Minyak Jenis Bensin yang Dipasarkan di dalam Negeri.

Lee, J., Song, H. H. (2014). Experimental And Computational Study On Recompression Reaction Of Pilot-Injected Fuel During Negative Valve Overlap In A Gasoline-Fueled Homogeneous Charge Compression Ignition Engine. International Jurnal of Automotive Technology, Vol. 15, No. 7, pp. 1071-1082. Diperoleh 1 Agustus 2018.

Nelson, N. R., Prasad, N. S. (2016) Sealing Behavior of Twin Gasketed Flange Joints. International Jurnal of Pressure Vessels and Piping 138 (2016), 45 – 50. Diperoleh 1 Agustus 2018.

Putra, Nurliansyah. Bugis, Husin. Ranto. (2014). Pengaruh Bahan Bakar Bensin dan Variasi Rasio Kompresi Pada Sepeda Motor Suzuki Shogun FL 125 SP Tahun 2007. Nosel Jurnal Ilmiah Pendidikan Teknik Mesin, 2 (3), 2-5. Diperoleh 26 November 2018.

Setya Nugraha, Beni. (2007). Aplikasi Teknologi Injeksi Bahan Bakar Elektronik (EFI) Untuk Mengurangi Emisi Gas Buang Sepeda Motor. Profesional Jurnal Ilmiah Populer dan Teknologi Terapan. 5 (2), 692-706. Diperoleh 27 Desember 2017.

Sudjana. (1991). Desain dan Analisis Eksperimen. Bandung: Tarsito.

Sugiyono. (2009). Metode Penelitian Kuantitatif, Kualitatif dan R & D. Bandung: Alfabeta.

Sukidjo, FX. (2011) Performa Mesin Sepeda Motor Empat Langkah Berbahan Bakar Premium dan Pertamax. Forum Teknik, Vol. 34 No. 1. Diperoleh 7 Februari 2018.

Wayan Budi Ariawan, I., Wijaya Kusuma, I.G.B., Bandem Adnyana, I.W. (2016). Pengaruh Penggunaan Bahan Bakar Pertalite Terhadap Unjuk Kerja Daya, Torsi dan Konsumsi Bahan Bakar Pada Sepeda Motor Bertransmisi Otomatis. Jurnal METTEK, 2 (1), 51-58. Diperoleh 1 Agustus 2018.

Widodo, E. (2011). Otomotif Sepeda Motor. Bandung : Yrama Widya