The Evaluation of Efficiency Of Different Types of Fuel for Proton Car

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Abstract*: *This paper presents the overall view of the method for obtaining information on the use of fuels on the Proton Saga FLX 1.3 car. Proton Saga FLX 1.3 is used because the car is a car that is often used by Malaysians. This is based on its low price and has an ergonomic that is fit for Malaysians. To see which fuels is more effective on the Proton Saga FLX 1.3 car. This study conducted tests on three different roads. This is to identify whether friction on each road or additional force when mounting a hill contributes to the use of fuels. In addition, this study was repeated three times for more accurate data. The roads used are highways, domestic and hilly roads. The fuels used in this study is RON 95 and RON 97 fuels. This is because the fuels are the ideal fuel for Proton Saga cars. In addition, this fuel is often found in petrol stations in Malaysia. So it can help people in choosing the best fuel on their Proton Saga car.

Index Terms*: *Fuels, Road, Proton FLX, Malaysia.

I. INTRODUCTION

This research is to analyse the effect of different types of fuel such as RON95 and RON97 on the performance of Proton Saga car at different type of road. RON is stand for research octane number. The 97 or 95 is stand for the compound of the fuels. The performance is specific on the litre used for each fuel. The research will use a constant Proton Saga car, but different type of fuel and type of road. The type of road that we will using is domestic, highway and uphill/downhill road. The parameter that we can check is the friction of the road and the load that exerted on the car.

In Malaysia, we usually heard about petrol and diesel only. This research will use petrol fuels RON 95 and RON 97 and determine the efficiency of the fuel. Diesel will not be used as Proton car use petrol as their fuel. For the car, Proton car have been chosen because of it price and the common car in Malaysia. Proton is among the cheapest car in Malaysia so it is commonly used car. Also Proton meet the ergonomic of Malaysia user, as it was Malaysia brand. Different car has different efficiency of fuels. Proton Saga have been chosen because it is the first model of Proton car which also the first Malaysian car.

The software that will be used for the analysis is SPSS software. "SPSS stand for Statistical Package for the Social Science. In this software this research will run ANOVA. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, descriptive statistics and complex statistical analysis and plots of distributions and trends.

II. METHODOLOGY

A. Types of Fuel

In this research data is obtained by how many litre of fuel is used for each fuels. Proton Saga car is being used as a car, two type of fuel will be tested which is Ron 95 and Ron 97.

Fig. 1: Fuel Ron 95

Fig. 2: Fuel Ron 97

Firstly, Ron 95 fuel will be fill full tank and then the car will be drive for 20KM. After that, the fuel is refill and we will know how many litre fuel is used by the amount of the refill fuels. Then, the fuel is changed into Ron 97 with the same way and the data is recorded. The speed of the car will be constant between the ranges with is 50 to 60 Km/h.

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B. Roads

Next, the test will be conducted at the different type of road, which is highway, domestic and uphill/downhill.

Fig. 3: Highway road

Fig. 4: Domestic road

Fig. 5: Uphill downhill road

Then, the data is recorded. This experiment will be conducted 3 times for each type of fuel to get more accurate results. For the fuels we use PETRONAS brand from PETRONAS station. For the type of road, highway we choose SPA highway. Then, for domestic road we choose Ayer Keroh domestic road. Lastly for uphill and downhill road, we choose Balik Pulau road at Pulau Pinang in Malaysia.

Fig. 6: Proton Saga FLX 1.3

C. Experimental Data

Table 1, 2 and **3** shows the result obtain from the experiment. The experiment conducted at SPA Highway, Ayer Keroh domestic area and Balik Pulau road for uphill and downhill. RON used for this experiment is from PETRONAS station. The test is repeated three times to get accurate value.

Table 1: Data for litre used Highway Road

Fuel/ Road	Highway (litre)		
Test	1	2	3
RON 95	1.308	1.304	1.316
RON 97	1.344	1.326	1.338

Table 2: Data for litre used Domestic Road

Fuel/ Road	Domestic (litre)		
Test	1	2	3
RON 95	1.280	1.282	1.288
RON 97	1.296	1.294	1.302

Table 3: Data for litre used Uphill/Downhill Road

Fuel/ Road	Uphill/Downhill (litre)		
Test	1	2	3
RON 95	1.408	1.398	1.404
RON 97	1.386	1.390	1.382

Table 4 shows a mean value table. For RON 95, mean value in highway is 1.309. For domestic is 1.283 and for uphill and downhill road is 1.403. Next, for RON 97, mean value in highway is 1.336, in domestic road is 1.297 and for uphill and downhill road is 1.386. Based on these values, the result show that RON 95 used less fuel than RON 97 for highway and domestic road. On the other hand, RON 97 used less fuels than RON 95 for uphill and downhill road.

Table 4: Mean value

Fuels/Road	Highway (litre)	Domestic (litre)	Uphill/ Downhill (litre)
RON 95	1.309	1.283	1.403
RON 97	1.336	1.297	1.386

D. Constant Factor

There are few factors that we keep it constant to experience the best condition to take the result. Firstly, the distance for the car travelled is 20 KM. Then, the air conditioner is on while the window is close. This is to prevent the drag effect. The time and weather is also constant.

This is because, the temperature of the surrounding may have effect to the amount of fuel that is pump to the car. The time used in this experiment is during morning and weather is sunny. Next, the speed is also constant within the range. The speed range is 50 to 60 KM per hour. The number of people is constant which only one, the driver is. So, the load that the car received is the same amount of value. The car used is also same model of car with is Proton Saga FLX 1.3. For the brand of fuel, we also keep it changeless, which is from Petronas station.

III. ANALYSIS USING SPSS SOFTWARE

The data that have been recorded will be analyse using SPSS. The data will simulate ANOVA. The data that will be recorded is the litre used for each type of fuel at different type of road with three repetitions. Then, will be running at different type of road. Then, the data will be simulated into the SPSS software to get the ANOVA value.

ANOVA stand for Analysis of variance. ANOVA will be simulated by SPSS software. After the result is obtain, the data will be submitted into this software and run the ANOVA test.

The analysis will provide with fuels is better by the mean litre used for each fuel. Also the software will decide whether type of roads and type of fuels have relation or not with litre used for the car.

Test of between subject effects in **Table 5** shows the outcome of the analysis of variance, where each role show information of a source of a variance. A closer at the Type of Road, Type_of_Fuels and Type_of_Fuels * Type_of_Road show each p less than 0.05 level. These show fuels and roads, and combination of them significantly impact amount of the litre used for the car. The significance value for types of road, types of fuel and types of fuel interact with types of road must be less than 0.05. The result that we had obtained shown that all of the significance value is less than 0.05. The value indicate that the types of road and types of fuel have interaction.

Table 5: Test between subject effects

Dependent Variable: Litre

Source	Type III Sum of Squares	Degree of Freedom (df)	Mean Square	F-value	Significance Value
Corrected model	0.036	5	0.007	219.169	0.000
Intercept	32.123	1	32.123	976706.277	0.000
Type of fuel	0.000	1	0.000	8.277	0.014
type of road condition	0.034	2	0.017	520.385	0.000
type of fuel * type of road condition	0.002	2	0.001	23.399	0.000
Error	0.000	12	3.289E-05		
Total	32.159	18			
Corrected Total	0.036	17			

Fig. 7 shown litre used for RON 95 and RON 97 fuels VS types of roads bar chart. Orange colour indicate for RON 95 while yellow is for RON 97. For the first and second types of road which are highway and domestic, the mean value for RON 95 is lower than RON 97 respectively. For the next type of road, uphill and downhill, the results are slightly different, because RON 97 used less fuels than RON 95.

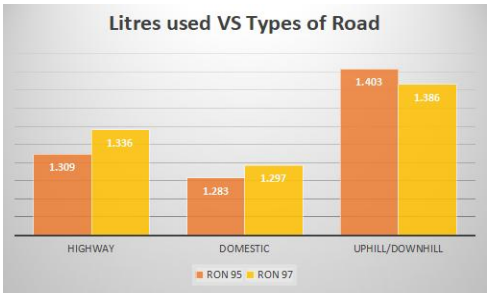

Fig. 7: Litre used VS types of road

IV. CONCLUSION

We can conclude that RON 95 is better than RON 97 for overall litre used. For domestic and highway, the result show that RON 95 is better for Proton Saga car. This statement is based on litre used for RON 95 that is lower than RON 97. So, RON 95 save more fuels than RON 97.

On the other hand, RON 97 is better than RON 95 for hilly road. Because it used less fuels than RON 95. So, RON 97 save more fuels than RON 95 for this type of road. This also prove that based on literature review on chapter 2 that state that RON 97 is better for higher performance engine. So, in hilly road there is more load that the car needed to take.

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