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Fabrication of Dual Fuel Bike

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Abstract: ***The inspiration for this project came from the fact that there is only one fuel source available for bikes. So, in this project, the fabrication of dual-fuel bike (petrol and LPG) is completed. The goal is to investigate the feasibility of developing a bike that can run smoothly on LPG for longer trips and reduced load while still having the ability to run on petrol. Capability of switching on petrol for longer as well as shorter excursions but at heavier loads. In this project, an additional LPG cylinder is attached to the bike, as well as all of the gas kit and other equipment required for the integration of LPG fuel into the bike.***

Keywords: Dual fuel bike, Fabrication of LPG cylinder and Gas kit, LPG bike

Introduction:-

The driver of a dual fuel bike may switch the fuel system used in the vehicle based on its needs and performance. LPG fueled vehicles are not a new technology; they were created several decades ago. However, there is no commercially available kit that can be converted to an existing bike. Similarly, a gasoline-powered vehicles is a technology that has already been established. Because of the size constraints, subsequent components may need to be custom fabricated to reduce their sizes, hence this prototype may need to be setup as a bench mount to demonstrate concept. This project calculates the actual outcome difference for both fuels and assists in deciding which fuel to use.

Literature Review:-

A survey of the literature on LPG bikes reveals a variety of studies and articles, including research on their viability, efficiency, and environmental impact. Here are some key findings:

1. Feasibility: Studies have shown that LPG bikes are technically feasible, with the use of a conversion kit to modify a gasoline-powered motorcycle to run on LPG. The

motorcycles, with benefits in terms of fuel efficiency and reduced emissions. However, further research is needed to fully assess their sustainability and safety, as well as to investigate their potential for widespread adoption.

Materials & Specification

To convert the vehicle to run on LPG (Liquid Petroleum Gas), the components we choose must fit the vehicle and be cost effective in order to meet our goals. The following items are required for LPG conversion:

1) Gas Tank: The tank can hold roughly 2.5 kg of LPG and may be filled using LPG fuel pumps. The tank is made of conversion process typically involves installing an LPG tank, regulator, and fuel lines, as well as making adjustments to the carburetor and ignition system.

2. Efficiency: LPG bikes have been found to be more fuel-efficient than gasoline-powered motorcycles, with some studies reporting fuel savings of up to 50%. This is because LPG has a higher octane rating than gasoline, which means it burns more efficiently and produces more power.

3. Environmental impact: LPG bikes are considered to be a more environmentally friendly alternative to gasoline-powered motorcycles, as they emit lower levels of carbon monoxide, hydrocarbons, and particulate matter. However, there is still some debate over whether the use of LPG as a fuel is truly sustainable, as it is a non-renewable fossil fuel.

4. Safety concerns: While LPG bikes are generally considered safe to operate, there are some safety concerns associated with the use of LPG as a fuel. These include the risk of fire or explosion in the event of a fuel leak or mishandling of the fuel tank.

Overall, suggests that LPG bikes are a viable alternative to gasoline-powered

the same material as a commercial LPG cylinder, mild steel with a thickness of 2.5 mm, as shown in the image below.

2) Vaporizer: Its primary function is to transform liquid LPG into gaseous LPG. It also regulates the flow of gas into the engine by utilising the vacuum generated by the engine. This component does not require any additional energy from the battery and operates solely on engine vacuum. The output of the LPG tank is fed into the vaporizer, which reduces the gas pressure to 30 Mbar. The vaporizer also protects against leaks since if any hose pipe is disconnected, the flow of gas to the engine is immediately stopped. The Vaporizer is depicted below.

3) Hope Pipe: The rubber hose pipes will be used to connect the input and output ports of vaporizer to tank and engine intake of vehicle.

4) Regulator: A gas regulator reduces high pressure from the gas bottle to a consistent regulated pressure as required by the application. Gas regulators are used for compressed gases liquefied under pressure, such as LPG gas regulators for LPG bottles and household gas cylinders.

5) Metal Clamps: The are used for fixing all manner of pipes in place.

6) LPG Vacuum Pipe: It is the mechanically operated vacuum pipe It is the safest gas system of the world. The reducer releases the gas only when the piston generates the stroke. If the engines stop for any reasons the gas supply cuts immediately.

Specification of Bike :

Model : VECTOR (TVS) 2005

Engine Volume	97.2 cc
Engine Type	Air Cooled, 4 Stroke
No. of Cylinders	1
Valves per Cylinder	2

Max Power	7.5 Bhp @8000 rpm
Max Torque	7.95 Nm @5000 rpm
Bore x stroke	50mm49.50mm
Fuel type	PETROL
Starter	KICK

Transmission

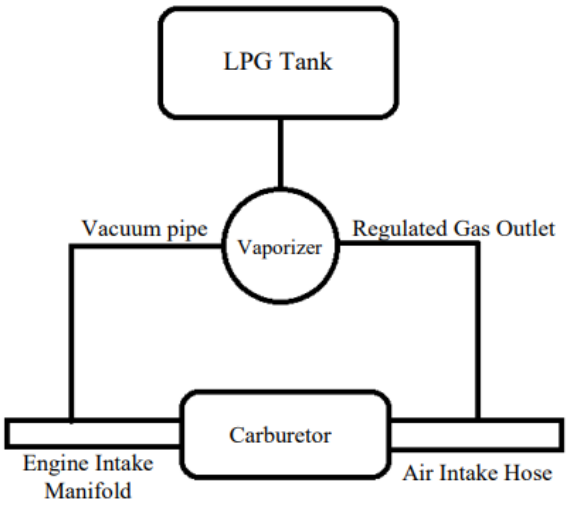
Transmission type	Manual
Number of speeds	Gears 4
Final drive (rear wheel)	Chain

Suspension

Front Suspension	Telescopic hydraulic shock absorbers
Rear Suspension	Swing Arm with Adjustable Hydraulic Shock Absorber
Front brake	130mm DRUM
Rear brake	130mm DRUM

Fabrication:

Connection From Tank to Carburetor



Steps:-

Step 1

First of all, mount the dikki for holding gas tank.

Step 2

We have installed the gas kit at the side of the bike. We have mounted it with the help of nut and bolt.

Step 3

The hosepipes are allowed to pass under the petrol tank chamber to the carburettor of the engine.

Step 4

We installed the gas kit nozzle on the top of the inlet manifold of the engine. This nozzle has two delivery valves, one of which is directly connected to the gas kit by which the gas is being supplied to the engine for burning the fuel. Here the gas nozzle is fitted below the carburettor, because the gas has no connection with petrol.

Step 5

Now the most important step and vital job is to place the cylinder of LPG, due to high ignition temperature of LPG it become very risky to put the chamber near the engine. So, the cylinder was put away from the engine compartment.

Step 6

The cylinder was fitted inside the side dikki with the help of nuts and bolts.

Step 7

Dual fuel bike is ready. As shown in fig.

Calculation:-

Use of gas (gm) = Before Use of GasTank Weight – After Use of Gas Tank Weight

Result after air ratio is change

Sr. No	Tank Weight In kg	Use of Gas in gm	Dia-meter of air filter in mm	Dist-ance in Km	Speed (Kmph)	Time in Min
1	5.380	0	3	0	0	0
2	5.359	21	4	2	30-40	5
3	5.342	17	5	2	35-40	4
4	5.317	25	6	2	35-40	7
5	5.317	0	7	0	0	0

Pollution Report

Date : 05 \05 \ 2023

Bike R.N. MH 27 S 4642

Fuel : Petrol

Sr. No.	Pollutant As applicable	Units As applicable	Emission limits	Measured Value(upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)	3.0	1.4
	Hydrocarbon,(THC / HC)	ppm	3000	174.0

Date : 05 \05 \ 2023

Bike R.N. MH 27 S 4642

Fuel : LPG

Sr. No.	Pollutant As applicable	Units As applicable	Emission limits	Measured Value(upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)	3.0	1.2
	Hydrocarbon,(THC / HC)	ppm	3000	120

Conclusion

LPG on bike is an appropriate solution for reducing air pollution. A carburettor system combining a vaporizer and LPG tank allow the use of LPG in these kinds of vehicles. The system allows the engines to work with the optimal mixture composition of air and fuel in the operating conditions. The whole system can be domestically manufactured, which can cut the cost of production and increase the rate of domesticated parts in our vehicle industry. Also, the cost of modifying the two-wheeler is very low, i.e., 5000–6000 rupees compared to other alternative fuel options. At the current fuel prices, using LPG instead of petrol can help save 50% of fuel costs. Using LPG-driven vehicles will contribute to reducing air pollution by 60 to 80% in comparison with a petrol-driven one.

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