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## Fabrication of dual fuel (CNG + Electric) motorcycle

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### ABSTRACT

*The aim of this examination is an investigation of the achievability and preferences of utilizing the natural gas as a contrasting option to gasoline as a fuel for hybrid electric vehicles. Using CNG vehicles are extremely valuable in India considering the way that gasoline fuel is offered at a vigorously sponsored cost and consequently, by converting a significant portion of the automobiles to run on CNG, the gasoline fuel utilization could be lessened. This will bring about more oil being accessible for trade which will be valuable to the economy of the nation. This process assessed a test examination on Compressed Natural Gas as an elective fuel for four-stroke start motor and furthermore Battery worked. The essential target of the investigation was to determine the performance and the fumes emanations of the motor utilizing distinctive fuel. The motor utilized as a part of the examination was initially a single cylinder, four-stroke start motor and minor alterations were done to allow the trials to keep running on CNG fuel. Amid the running, the engine was coupled to a ropeway dynamometer to quantify a few motor execution parameters and a gas analyzer was embedded into the motor fumes tailpipe for estimating the fumes emanations. The engine execution considers were led with engine setup. Parameters like brake power, brake fuel utilization and brake thermal efficiency were ascertained. The test outcome showed that CNG fuel has the closer performance to Gasoline fuel. The focus levels of CO<sub>2</sub> and unburnt HC recorded are observed to be lower than the gas-fuelled motor.*

**Keywords:** CNG, Energy consumption, Emission, Efficiency, Hybrid electric vehicle.

### 1. INTRODUCTION

Compressed Natural Gas (CNG) has developed as one of the cleaner types of transportation and it has been demonstrated that the vehicles working on CNG deliver less smog and air pollutants than gasoline-fuelled counterparts. Dedicated plant assembled CNG vehicles are the cleanest internal combustion vehicles accessible today and are less polluting than conventional vehicles. The increasing expense of gasoline fuel has truly influenced the economies of numerous nations and the financial capacities of the general population around the globe. Changing over the cars running on gasoline to Compressed Natural Gas (CNG) could provide a superior option by not just utilizing a more affordable fuel contrasted with gasoline, yet in addition by diminishing the reliance on oil and meeting the environmental regulations and concerns.

## **2. BRIEF DESCRIPTION**

Our project is dual fuel bike which can be capable of running on two types of fuel i.e. CNG and Battery. Both can be interchangeable in running condition. It means when your bike is running on CNG then you can change the fuel system i.e. from CNG to Battery or vice a versa. CNG gives high power and battery gives better millage and eco-friendly. So, it gives advantages of both.

## **3. DUAL-FUEL BIKE**

DUAL-FUEL term itself suggest us that the using of two fuels in a system. Our dual-fuel bike project is to run a bike on two fuels i.e. CNG and BATTERY. Usually, a bike normally runs on a petrol fuel in some cases diesel powered bikes are also available in markets, but the problem is that these fuel's resources are in the danger of scarcity and also burning these fuels raises global warming which is also a great threat to the entire world.

Running bike on CNG and Battery is a combination from which we can actually select what we want, POWER or EFFICIENCY. Although we can run the bike entirely on CNG as we can see in the recently available BS4 pollution control BHARAT norms rated cars and busses which is capable of running on CNG, the problem is that we can't put a bigger CNG tank as we have space limitation in the bike.

## **4. COMPRESSED NATURAL GAS (CNG)**

The use of gaseous fuel i.e. Compressed Natural Gas (CNG) for a car application has been under taken in various parts of the world for shifting reasons. Various Committees has reviewed the global scenario, in particular, the status of the CNG and LPG vehicle commercialization programs took up in various countries. The Committee has taken note of the on-going efforts for promoting the use of these alternative fuels in the country.

The idea behind this project generated by observing the CNG operated I.C. engine car. The same gas aspirated engine can be used to drive the two-wheeled vehicle. From CNG cylinder the gas is supplied for burning the gas inside the engine cylinder. The separate GAS KIT we are going to install on Bike to feed the metered amount of gas mixed with the air to the engine cylinder finally through the carburetor.

## **5. OBJECTIVE**

- Reducing the maintenance cost of the vehicle by using cheaper fuel in the engine.
- Avoiding emission of the engine by burning a clean fuel in the engine.
- Preventing scarcity of Non-regenerative fuels by reducing their uses.

## **6. LIST OF COMPONENTS REQUIRED**

- A bike
- CNG kit
- CNG Cylinder
- The gas level Indicator unit
- Small Fire Extinguisher
- BLDC motor
- Control Unit
- Throttle
- 12V24AH Battery

## **7. SIGNIFICANCE**

Carburettor technology has failed to control the uneven supply of petrol with the incoming air stream to the engine at various levels. It is an inbuilt and inherent draw back that in some circumstances the sucking air stream sucks excess petrol at carburettor venturi, resulting in petrol wastage and pollution.

Now let us supplant this redundant carburettor technology with new progressive CNG gas and Battery mode running innovation, which promises:

- Increased fuel efficiency.
- With clean exhaust and Zero Pollution

In the event that this new innovation is executed with right spirit in India alone, on being used vehicles (Existing Vehicles) in addition to new vehicles included amid the year, at that point the new CNG gas and Battery driven innovation will spare fuel worth Rs.200 crores every day or 73000 Crore rupees annually in foreign exchange. Significantly more vitally this will forestall passage

of 1.5 crores huge amounts of carbon and NO<sub>x</sub> toxin from the air every day in India alone. CNG + Battery Project will definitely enhance Air quality, a large number of urban individuals experiencing Air Pollution.

## **8. LIMITATIONS**

There are some limitations of our project. They are:

- Less CNG refueling stations across India.
- Rural areas don't have Natural gas filling stations.
- Small CNG tank.
- Cost for conversion of the bike is high.
- No battery charging point.

Although the project has some limitations, those limitations can be avoided by implying a company fitted CNG kit bike. This will reduce the cost of the CNG conversion and company can fit a bigger CNG tank in a better place rather install it in the Dicky. If the company fitted CNG kit bike will be available in the future, it will demand more Natural gas stations for refueling them which force government to increase the number of natural gas fuelling stations.

Also, BLDC motor rim of larger size (same as that of a typical bike) can be manufactured and company can make proper arrangements for fitting the batteries.

## **9. IMPLEMENTATION**

We don't have to purchase a new CNG-controlled vehicle to begin utilizing clean and safe CNG and diminish our carbon impression. Any vehicle running on gasoline can be changed over to CNG+Electric. Natural gas conversion may cost a significant amount of money. At the conversion center, there are talented professionals that can install CNG setup in our vehicle. And as per demand, the electric-battery setup can also be installed. These parts when introduced make CNG the primary fuel for your vehicle with battery operation as secondary or vice-versa. A thumb throttle can be installed with usual twist throttle that will enable the driver to physically choose either CNG or Electric. CNG cylinder can be installed on rear left or right side as per the convenience with batteries being connected and kept in a box attached to the rear end. Stainless steel lines and tubes will transport the CNG to the regulator in the vehicle's engine compartment to reduce the pressure. The CNG will then go through a fuel-air mixer to the intake manifold which is to be introduced for combustion. Similarly, suitable connections can be made between batteries, BLDC motor, controller set and thumb throttle so that on the requirement, the electric source could be used to run the vehicle. Drivers can switch from CNG to Electric even while driving, idling or parked.

## **10. ADVANTAGES**

CNG does not have any lead content. CNG powered vehicle has a low maintenance cost. The CNG fuel system is fixed, which keeps the fuel misfortune from spills or evaporation. It has increased the life of lubricating oils. CNG is gaseous fuel and it mixed easily in the air. CNG creates more efficiency and less pollution. Switching to CNG can help to reduce greenhouse gas emissions. CNG is less costly than other fuels and price fluctuation is rare in CNG.

Electric Hybrid setup would lead to a clean and pure form of energy with less noise and less maintenance. By incorporating electric hybrid setup, riding in go-stop situations would be easy as a quick response would be achieved and no use of CNG in those situations, thus saving fuel and hence money.

## **11. FUTURE SCOPE**

In this revolutionary time, where technology is improving and advancing every day, Automobile sector is one such field where results are visible. In today's time when there is a need for alternatives for petrol and diesel, CNG and electric energy prove to be a better option. But, there is ample room for improvement. In this project, there are many areas where improvements in future are needed. They are:

- Designing of Casing or Tank in a shape that covers CNG cylinder and adds to the aesthetic presence of two-wheelers.
- BLDC motor rim of a size similar to that of ideal bike tyre size so that balancing and alignment could be done properly.
- Throttling mechanism.
- Making space or compartments for batteries.

## **12. CONCLUSION**

The aim of the project is to increase the fuel economy of Bike and making it useful for daily use by reducing its cost. Also, to provide a better alternative to petrol and diesel which is clean has fewer emissions and cost-effective. CNG is preferable because it has a host of advantages as against traditional fuels. CNG is available in abundance, environment-friendly and economic. And as the prices of diesel and petrol increase dynamically high, CNG and electric energy via battery is comparatively cheap, which Indian customers look for.

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