CNG: ALERNATIVE FUEL FOR TWO WHEELER

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ABSTRACT

Man has always been in pursuit of energy to meet his ever increasing demand. In recent times due to effects of pollution and global warming this is a need for eco-friendly fuel for two wheeler. The reason for using this device due to global warming. The basic concept of CNG bike is that reduces the pressure of CNG from 200 bar to 7-10 bar by the vaporizer. An increasing number of vehicles a worldwide are being designed to run on CNG. Even existing vehicles can be converted to run on CNG just with the switch of a button. CNG's can also be very easily refueled from any of the existing gas stations. CNG bike are said to be safer than LPG bike also because LPG is very highly combustible whereas CNG is very light in property and dissipateseasilyintotheair. The life of the engine of the bike is also enhanced by CNG due to the fact that this gas is dry and does not leave behind any residue when engaged in the combustion process to propel the bike. Furthermore it restricts tuning of the engine drastically as compared to other fuel engines

Keywords: CNG, Bike, Energy Consumption, Fuel

I. INTRODUCTION

Compressed natural gas (CNG) (Methane stored at high pressure) can be used in place of gasoline (petrol), Diesel fuel and propane/LPG. CNG combustion produces fewer undesirable gases than the fuels mentioned above. It is safer than other fuels in the event of a spill, because natural gas is lighter than air and disperses quickly when released. CNG may be found above oil deposits, or may be collected from landfills or wastewater treatment plants where it is known as biogas. CNG is made by compressing natural gas (which is mainly composed of methane, CH_4), to less than 1 percent of the volume it occupies at standard atmospheric pressure. It is stored and distributed in hard containers at a pressure of 20–25 MPa (2,900–3,600 psi), usually in cylindrical or spherical shapes. CNG is used in traditional gasoline/internal combustion engine automobiles that have been modified or in vehicles which were manufactured for CNG use, either alone ('dedicated'), with a segregated gasoline system to extend range (dual fuel) or in conjunction with another fuel such as diesel (bi-fuel). Natural gas vehicles are increasingly used in Iran, the Asia-Pacific region (especially Pakistan[1] and the Indian capital of Delhi), and other large cities like Ahmadabad, Mumbai, Kolkata, Chennai—as well as cities such as Luck now, Kanpur, etc. Its use is also increasing in Latin America, Europe and North America because of rising gasoline prices.[2] In response to high fuel prices and environmental concerns, CNG is starting to be used also pickup trucks, transit and school buses, and trains.

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II. WHAT IS CNG ?

CNG is a readily available alternative to gasoline that's made by compressing natural gas to less than 1% of its volume at standard atmospheric pressure. Consisting mostly of methane, CNG is odorless, colorless and tasteless. It's drawn from domestically drilled natural gas wells or in conjunction with crude oil production. Natural gas powers more than 12 million vehicles on the road today. Unfortunately, only about 250,000 of these are being used in the U.S., according to GE. The average growth rate in the U.S. shows a 3.7% increase per year since 2000, as contrasted with a booming global growth rate of 30.6% per year. However, as gasoline prices continue to rise, American interest in CNG is rising, and with good reason – CNG costs about 50% less than gasoline or diesel, emits up to 90% fewer emissions than gasoline and* there's an abundant supply right here in America. So it's clean, affordable abundant and American.

Fig.1-Working Model

2.1 CNG Accessories

2.1.1 CNG Cylinder

CNG cylinders are available in four types. Type 1 cylinders are the heaviest and least expensive, and Type 4 tanks are the lightest and most expensive – Cylinders are available in a large range of sizes and configurations. It is also possible to install multiple tanks within one vehicle. CNG is stored on board vehicles in high working pressure rated at either 3,000psi or 3,600psi pounds per square inch. CNG cylinders meet very rigorous safety standards. Cylinders are made of high strength materials that are designed to withstand impact and puncture. If these cylinders are exposed to fire, thermally activated pressure relief devices (PRDs) provide a controlled venting of the gas rather than letting the pressure buildup in the cylinder. CNG cylinder capacity is measured in gasoline-gallon equivalents (GGE). Because natural gas remains in a gaseous state when compressed, a GGE of CNG is calculated based on the equivalent energy content of a gallon of gasoline.

Type 1: All steel

Type 2: Hoop Wrapped Composite

Type 3: Fully Wrapped Composite

Type 4: Fully Wrapped and Non-Metallic Liner

Table: CNG Size Chart

Nominal water capacity	Gas capacity Cu.m.(Approx)	Diameter mm	Length 'L'mm	Approximate Weight (Kg.)
20	5	232	650	25
22	5.4	232	700	28
25	6.3	232	780	32
28	7	232	860	34
30	7.5	232	910	37
50	12.5	232	1450	54
30	7.5	267	725	36

2.1.2 Solenoidal Valve

on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports. Multiple solenoid valves can be placed together on a manifold. Solenoid valves are the most A solenoid valve is an electromechanically operated valve. The valve is controlled by an electric current through a solenoid: in the case of a two-port valve the flow is switched frequently used control elements in fluidics. Their tasks are to shut off, release, dose, distribute or mix fluids. They are found in many application areas. Solenoids offer fast and safe switching, high reliability, long service life, good medium compatibility of the materials used, low control power and compact design. The valve body must be compatible with the fluid; common materials are brass, stainless steel, aluminum, and plastic. The seals must be compatible with the fluid

III. SAFETY

Although CNG is flammable, it has a narrow flammability range, according to the U.S. Environmental Protection Agency, making it an inherently safe fuel. Strict safety standards make CNG vehicles as safe as

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gasoline-powered vehicles. In the event of a spill or accidental release, CNG poses no threat to land or water, as it is nontoxic. CNG also disperses rapidly, minimizing ignition risk when compared to gasoline. Natural gas is lighter than air and will not pool as a liquid or vapor. Nevertheless, indoor leaks can form a flammable mixture in the vicinity of an ignition source. CNG is primarily methane, which is a greenhouse gas that could contribute to global climate change if leaked. Methane is slightly soluble in water and under certain anaerobic conditions does not biodegrade. If excess amounts accumulate, the gas can bubble in water creating a possible risk of fire or explosion.

IV. POLLUTION COMPARISIOIN WITH OTHER FUEL

CNG Is better than Petrol because it has very low moisture content, it's cheap and easy to transport. In spite of these circumstances the number of vehicles in the world that use CNG has grown steadily at a 30 percent annual rate. CNG-powered vehicles have Lower maintenance costs when compared with other hydrocarbon fuel-powered vehicle CNG fuel systems are sealed, which prevents any spill or evaporation losses. Increased life of lubricating oils, as CNG does not. Contaminate and dilute the crankcase oil. Being a gaseous fuel, CNG mixes Easily and evenly in air.§ CNG is less likely to ignite on hot surfaces, since it has a high auto- ignition temperature (540 °C) and a narrow range (5%-15%) of flammability. Less pollution and more efficiency: CNG emits significantly, less pollutants such as carbon dioxide (CO2), unburned hydrocarbons (UHC), Carbon monoxide (CO), nitrogen oxides (Nox), sulfur oxides (Sox) and particulate matter (PM), compared to petrol. For example, an engine running on petrol for100 km emits 22,000 grams of CO2, while covering the same distance on CNG emits only 16,275 grams of CO2. CNG is essentially methane, i.e., CH4 with a calorific value of 900 kJ/mol.

V. CONCLUDING REMARKS

CNG or Compressed Natural Gas is the most viable alternate fuel for automobile companies in the near future. CNG is an alternated fuel which makes the use of compressed natural gas as a clean alternative to other fuels. Throughout the world there are 9.6 million vehicles running on CNG. CNG is viable or preferable because it has a host of advantages as against traditional fuels. CNG is environment friendly; economic, availability is in abundance and high in calorific value. CNG and LPG are slowly and steadily gaining ground in the automobile industry. They surely seem to be the fuel of the future. With the continuous rise in the price of petrol and diesel alternated fuels are becoming the preference of Indian consumers.

Bajaj Auto: The second largest two wheeler manufacturer in India Bajaj Auto has recently launched its first CNG motorcycle called Bajaj RE CNG Auto 4 stroke. The motorcycles will actually be capable of running on LPG/ CNG and as well as gasoline. The rising prices of fuel and also due to the emissions of dangerous greenhouse gases produced by gasoline have led auto giants to think on these lines.

TVS Motors: TVS Motor Company is also all geared up to launch its first ever CNG enabled bike in India in 2011. TVS Motors believe that the automobile companies have to make a green revolution by adopting the future technology for a safe and secure environment. CNG bike also run by petrol so it is also called as Hybrid Bike. The Mileage of CNG bike near about 80kmpl of CNG. CNG bike is very Eco-friendly in nature so this project is very good replacement for petrol running two wheelers

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