

A Review on Human and Electric Powered VehicleVikas Verma¹, Dr. S S Chauhan², Asst. Prof. Ranjeet Kumar³¹M.tech Research Scholar, ²Guide & Head, ³Co-guide & Assistant Professor^{1,2,3} Department of Mechanical Engineering, Vaishnavi Institute of Technology and Science, Bhopal,

Abstract- In present scenario the whole world is suffering from the problem related to the scarcity of fossil fuel for the future and pollution from the burning of fossil fuel. Here we focus on the transportation sector. This review is basically dealing with the some alternative of the fossil fuel based transportation in urban area for small distance transportation and a vehicle which is powered by human as well as electricity could be a good option for small distance travel in urban areas.

Key words- Fossil fuel, Human power, electric power, motor, battery.

INTRODUCTION

Nowadays almost all the countries of the earth are suffering from the two common problems related to the fossil fuels. The first one is the pollution by burning of fossil fuels and second one is the limitation of fossil fuels available for future. There are many ways of pollution occurring by burning of fossil fuels and transportation sector is one of them. Here I am mainly focused on the transportation sector. This project basically gives an alternative approach of short distance transportation in urban areas and it can also be used as a fun vehicle in cities. It is a combined vehicle run by human power and electric power.

Hybrid human and electric powered vehicle is the vehicle which is driven by human muscular power as well as electric power. We can say it uses the combination of both human power source and electric power source. This is a three wheeled vehicle, driven by maximum two member with side by side seating arrangement, it can also made with tandem type seating arrangement. The vehicle would be equipped with a BLDC 400 Watt electric motor, 2 sealed lead acid battery (each of 24 Volts) and belt drive used for electric power transmission, beside this two manual pedaling system also provided for the human power transmission based on the principal of bicycle. Whenever we want we can change the mode of drive. The tadpole type configuration is used for this vehicle in which two wheels are mounted in front side and one wheel in back side of the vehicle. The vehicle has a drag link type steering system handled by one driver (Right hand side). Disc brakes with sliding calipers in direct connection are provided in all the three wheels for proper and effective braking. For the transmission of power chain drive with derailleur and belt drives have been used.

**OBJECTIVE**

We all know about the problems related to fossil fuels from which we are suffering and we will suffer in future so this review paper showing the study of some alternatives of above problem related to fossil flues. The main objectives of this study are

1. To develop such kind of technology to run the vehicle which would not based on the fossil fuel.
2. The vehicle is not produces any harmful effect on the environment.

LITERATURE REVIEW

- I. T. Buchert et al. have presented a case study in the field of sustainable manufacturing, which deals with a the multi-disciplinary research project that focuses on the design and development of a sustainable pedal electric cycle (Pedelec). The results of the project show how different scientific approaches for bottom-up improvement can be applied together in a concrete case.
- II. Vikas Gulati et. al. studied about alternative of conventional fueled based transportation medium and presents a design of an eco-friendly vehicle which runs from the human power with a compounded electric drive system. Their main focus has been laid on the simplicity in design, high performance, easy maintenance and safety at very reasonable prices. They used tadpole type trike for their vehicle and analyzed the design in FEM based software ANSYS 13.0.
- III. Puttaratorn Ekapun et al. researched for the project “Design and Performance Analysis of an Electromagnetic Tricycle Operated in an Airport”. In the project they design an tricycle which was driven by electromagnetic wheels and utilized the theory of automotive dynamics and a brushless DC motor. The design methodology comprises theoretical calculation and design optimization for EMT. The theoretical calculation focused on performance and size specification of electromagnetic wheels. All frame structure for the model prototype was analyzed in both static and dynamic tests using ABAQUS software.
- IV. Sidhu Suresh et. al. have designed a efficient tricycle for Effi-cycle 2012 competition conducted by the SAE-NIS. Their design consideration and parameters were based on the rule book given by the Society of Automotive Engineers. The methodology of the project involves the mathematical calculation for frame, braking system, transmission system, suspension system. The tri-cycle is powered by two humans simultaneously and also by a 400W BLDC motor. The Kinetic Energy Recovery System inbuilt into it, harness the energy lost during braking. The Finite Element Analysis done on the frame by Ansys 14.0 and a tadpole semi-recumbent topology was adopted.
- V. Tricycle rickshaw is used in various cities and rural areas of India for short distance transportation; it is a cheap means of transportation generally propelled by human power. P.P. Dutta et. al. studied about the design feasibility and ergonomic behavior of the tricycle rickshaw and they observed that traditional rickshaws use age-old technology, poor mechanical design and hence non-ergonomic in maneuverability. They put their effort to design a lightweight, high strength, and ergonomic both human pulled and electric powered hybrid rickshaws. The proposed model is powered with 400 W, 24 V DC permanent magnet motor, in addition to human power.
- VI. P. JEYARAMAN et. al. have developed solar tricycle specially for handicapped persons. They put their effort on conversion of solar energy into electrical energy to run the tricycle by the use of Solar PV panel, Brushless PMDC motor, Charge controller and battery. All the designs specification considered after analyzing the problems of the handicapped person.
- VII. Susan Handya et. al. researched on the field of transportation with the topic “**Promoting Cycling for Transport: Research Needs and Challenges**”. Cycling as a mode of transportation has many advantages for both cyclists and society: it is a low-cost, low-polluting, health-improving way to travel. In light of these benefits, a growing number of cities throughout the world are implementing policies to promote cycling, though they continue to struggle to identify the most effective ways to spend their limited resources. In response, transport researchers are also increasingly focusing their efforts on cycling, addressing a broader range of questions than in the past, including: how much cycling is there? What strategies will increase cycling? What are the benefits of increased cycling?

RESULT & CONCLUSION

This study shows that the combination of the human and electric powered vehicle could be a good alternative of conventional fuel based vehicles used in urban areas for small distance traveling.

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