IJMTST is UGC Approved Journal with Journal Id: 43137

International Journal for Modern Trends in Science and Technology, 8(S06):38-40, 2022

ISSN: 2455-3778 online
DOI: https://doi.org/10.46501/IJMTST08S0608
Available online at: https://www.ijmtst.com/vol8si06.html

Elecrification of Maruti 800

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To Cite this Article
Avupati Venu Madhava, Kodali Anil, S MD Zameer Sohaiel, Thota Vijay and K. Aruna. Elecrification of Maruti 800. International Journal for Modern Trends in Science and Technology 2022, 8(S06), pp. 38-40. https://doi.org/10.46501/IJMTST08S0608

Article Info
Received: 26 April 2022; Accepted: 24 May 2022; Published: 30 May 2022.

ABSTRACT

The ain of this project is to convert Maruti 800 car into Electric vehicles abiding to the ongoing vehicle norms and meeting global warming that are being emitted by Internal Combustion engines, and also due to increased fuel cost. The advantages of Electrification of vehicles include reduced vehicle emissions, low running cost etc. The axle linkages and mountings will be modified as per requirement. An electric motor is installed on the rear axle and the corresponding components are modified accordingly

KEYWORDS: electrical vehicle, hybrid electric vehicle, green car, Maruti 800 Electification

1. INTRODUCTION

The Electric Vehicle (EV) is not a recent invention infact, electric engine vehicles are older than Internal Combustion engines, first electric vehicle was produced in 1880 itself but during that time they were not much considered because of non-rechargeable batteries.

Between the end of 19th century and the beginning of 20th century Electric vehicles again came into existence as global warming and emissions from the vehicles tend to increase and fossil fuels over the years. Due to their superior reliability cleanliness to that of vehicles driven by internal combustion engines.

On the otherhand Electric vehicles has enormous advantages over ICEngines are simpler to use and require less use and replacement of parts, resulting in lower maintenance costs they're considered as green cars as they don't emit pollutants. However, their production cost is much higher when compared to IC Engines as per [1]In order to verify the possibility of converting a conventional vehicle into an electric vehicle at a reasonable cost and achieving a good performance and good kWh/km ratio as per

EV brings zero emission concepts as the positive result of electric motor propulsion system.Just like EVs, the electric vehicle conversion performance requirements dependon few targets which are trip distance, speed and cost. The electric vehicle conversion based on daily trip distance can be designed according to the required battery capacity. The capacity of the battery divided by the average of energy consumption of each kilometer can be used to predict the range distance from fully to low charged of EV batteries. Speed target depends upon the electric motor power used.

When more speed is needed the more power is needed from the electric motor. The electric motor power affects voltage and current specification required. Hence affects the battery specifications. Increasing the battery voltage can increase the electric motor power, instead reduced the battery maximum current. One of the problems of electric vehicle conversion is the cost as per [2]

Conversion of a conventional vehicle to a battery electric vehicle in the framework of an educational projectB. Van Hooreweder, F. De Coninck, P. Sas K.U.Leuven Department of Mechanical Engineering, PMA Celestijnenlaan 300b – B3001 Leuven, Belgium Brecht.VanHooreweder@mech.kuleuven.be This paper describes the conversion of an ICE vehicle into a battery powered electric vehicle in the framework of an educational project. This project is part of the integrated lab sessions for the first year master students of the mechanical engineering department at K.U.Leuven. Thirteen students work in a team to electrify a conventional vehicle using a limited budget, off-the-shelf components and a time frame of only 160 hours which is the equivalent of twenty working days. In order to successfully complete this multidisciplinary task students are formed six subteams, each with well assigned tasks and responsibilitiesAlso a teamleader is appointed for communication between the subteams and to set up clear milestones and deadlines. Result is reliable,fully electrically driven vehicle consisting of the following electrical components: lead acidbattery package with monitoring system (96V, 5.5kWh, 160kg), three phase induction motor (15-30kW)Curtismotor controller (50kW, regenerative braking option), onboard chargers and solar cells (12V, 136W). The electromotor is connected to the original gearbox and differential via an adaptor plate and rigid shaft coupling. The traditional clutch is removed but a gear shifting algorith enables the use of the gearswithout disengaging the driveline. This ensures drivingup steephills as well as travelling at high speeds (120km/h). Furthermore, a multibody model ofelectric- vehicle developed using LMS Virtual.Lab to study and analyse the ride and handling behaviour. The described configuration was successfully tested on a test track. In this first test, nearly 100km was driven without any technical problems and with an average energy consumption of 0.1kWh/km leading to an equivalent CO2-emission of 25g/km. As per [3]

2. LITERATURE REVIEW:

The improvement of environmental awareness emerges issues on new technology leading to environmentally friendly technology. One of the said technologies is electric vehicle (EV) technology. EV brings zero emission concepts as the positive result of electric motor propulsion system. Zero emission concepts in this term can be applied not only in a built-in EV but also in converting a fossil fueled vehicle into its electric version. Considering financial curb and the available choices of new vehicles, vehicle conversion becomes an effective investment alternative in line with vehicle utility purpose. Just like EVs, the electric vehicle conversion performance requirements depend on few targets which are trip distance, speed and cost. The electric vehicle conversion based on daily trip distance can be designed according to the required battery capacity. The capacity of the battery divided by the average of energy consumption of each kilometer can be used to predict the range distance from fully to low charged of EV batteries. Speed target depends on the electric motor power used. When more speed is needed then more power is needed from electric motor. The electric motor power affects voltage and current specification required. Hence, affects the battery specifications. Increasing the battery voltage can increase the electric motor power, instead reduces the battery maximum current. One of the problems of electric vehicle conversion is the cost. Cost target is the boundaries that appear in addition to technical limits. Optimization of the mileage and speed can be affected by the cost target. The cost effectiveness is also an impact on the determination of EV conversion performance requirements based on the trip distance and speed. About 20-50% of EV conversion cost is the battery. It depends on battery type used. Therefore, when requirement of EV conversion is based on cost it is better to start with determining the battery as per [4]

One of the directions for making cleaner and more economic vehicles is to adopt electric vehicle concept. The paper shows current design concepts for electric vehicles worldwide, as well as current sources for supplying vehicles with electric energy. It describes a conversion of one vehicle so that it can be powered by electric motor. The results of tractive and dynamic characteristics calculation and vehicle stability simulation, before and after the conversion, are shown. Obtained results and influential factors are analysed so they can be optimised in order to influence the final characteristics of the converted vehicle. The conclusion is that the complete optimisation process should be performed before the beginning of vehicle conversion in order to avoid undesirable effects, i.e., undesirable characteristics of converted vehicle and high conversion costsasper [5]

3. MATERIALS AND METHODOLOGY

The given car maruti 800 is to be convereted into hybrid electric vehicle. To convert conventional vehicle into a hybrid vehicle can be an attractive opition for fleets seeking to increase fuel efficiency and lower emissions for conversion into electric vehicle conversion kit

The motor delivers 3.5kilowatts power and attain speed 2000 to 6000 rpm runs on 1 phase its a BLDC motor and has voltage 60v and installed motor on its rear differential. And its parts corresponding to it such as suspension, axlelocks are modified accordingly. And controller is fitted to BLDC motor at downside of the car, we install Engine Control Unit firstly as Maruti 800 doesn't have any stock Engine Control Unit

The purpose of installing Engine Control Unit is to switch between the two energy sources that is IC engines, Electric motor as there will be some extra space needed for the batteries some space should be created and unwanted parts and components should be mitigated, a new wiring system should be installed if to balance weight some aerodynamic changes are done to the body for perfect balance and downforce.

Fig no 1 (simple sketch of Maruti 800)

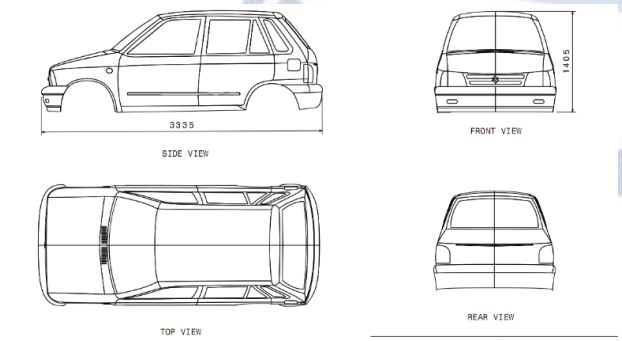

Fig no: 2 (orthographic view of Maruti 800)

Fig no : 3 Electrified Mauti 800

4. RESULTS:

Hence Electrification of Maruti 800 is done and this is so helpful to society as fuel prices and emission norms are more in conventional vehicles moreoverthis conversion is rendered is less harmful to the environment and increases the car's fuel efficiency by 25 to 30% old vintage car collectors can be convert cars into these, typeof, Hybrid Electric Vehicles.

5. CONCLUSION:

Electrificatioin of cars is very helpful to people as it increases fuel efficiency and decreases emissions as result running cost is decresed.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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