International Journal of Scientific Research & Engineering Trends
Volume 7, Issue 4, July-Aug-2021, ISSN (Online): 2395-566X

# A Review on Three Wheeler Electric Vehicle

**Pramod K N, Prashant D H, Akash Shetty, Karthik K, Abhishek B**
Dept. of Mechanical Engineering,
Alvas Institute of Engineering & Technology,
pramodnk90@gmail.com

***Abstract*- Electric vehicles are believed to be an effective solution for reducing greenhouse gas emissions. Despite extensive study on the attributes and characteristics of electric vehicles and their charging infrastructure design, the development and network modelling of electric vehicles are still evolving and limited. This article provides a comprehensive review of electric vehicle studies and identifies existing research gaps in the aspects of theories, modelling approaches, solution algorithms and applications.**

**Keywords- Powerstrain System, Chassis, Bodywork, Suspension, Handling, Battery, Three Wheeler.**

## I. INTRODUCTION

Into days India has a huge vehicle population over its area. Moreover, two wheelers, including gasoline powered bikes and mopeds are leading category for population, this category of vehicles is one of the biggest factor for noise and air pollution as they emit a huge amount of C02, CO, NO. Thus, electrical tricycle is proposed as an alternative to replace gasoline powered two wheelers.

In the last couple of years, there has been a lot of discussion around the prices of fuel – apart from the deregulation of petrol prices. Moreover, the threat of disruption of supplies from the Middle- East has led to the increase in the debate on energy security, this has resulted in the use of alternate drivetrain technologies.

The potential for alternative technologies in automobiles such as electric vehicles (EV) in India, depends on improving battery technologies, driving ranges, government incentives, regulations, lower prices and better charging infrastructure

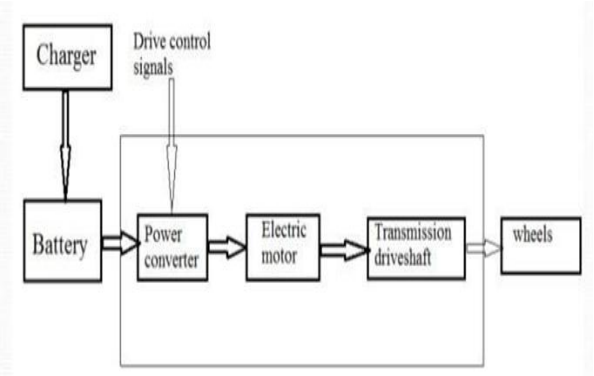


Fig 1. Block diagram of Electric vehicle.

As the population is increasing there is increase in demand of automobiles. Due to increase in automobiles, people will require space for driving and also for parking.

As we know there is limited space available and due to increase in the number of cars on roads they are causing traffic congestion and with that they require a place for parking. In addition to these pollution is also a priority nowadays. The pollution is reaching new limits day by day. So the idea of a portable electrical vehicle comes into concept

## II. POWERTRAIN SYSTEM

Identified the major challenges for HEV design which were managing multiple energy source, highly dependent on driving cycles, battery sizing and battery management.

Electric scooter prototype was developed with design and analysis. Real time traffic and speed were recorded for further analysis. S.M.H.S. a series of analyses to design, optimize and control the performance of a powertrain FC electric vehicle to be used in participating in energy-efficient races.

Several experiments were conducted beforehand regarding controlling the vehicle, FC efficiency testing, vehicle dynamics modeling, track mapping analysis, DC motor characteristics and driving strategy techniques. These ensured the optimized sizing of the powertrain system for the vehicle and that the vehicle was controlled automatically to operate at maximum efficiency in each part of the powertrain system. Through technology review and comparative analysis it shows that HEVs can significantly reduce harmful emissions of gases.

This paper summarizes the key initiatives and features of showed that automation of maximum quasi-static loads calculation (using twoway connected MBD and CAD-model) and automatic loads transfer to FEA allows saving time costs for full geometry-loads-stress evaluation cycle. This significantly reduced time costs for cyclic loads and stress recalculation due to frequent geometry update.

There was increase in loads and stress simulation accuracy and reliability. performed analysis on a single coil spring removed from a vehicle after failing in service. They did visual observation, studied the spring material and did the microscopic analysis.

Findings suggested that it was an example of corrosion fatigue failure. demonstrates the growing need for sustainable transportation in the World and the role of HEVs as a possible solution in the paper. Through technology review and comparative analysis it shows that HEVs can significantly reduce harmful emissions of gases. This paper summarizes the key initiatives and features of Hybrid Electric Car adapted by the world to encourage the purchase of fuel-efficient vehicles, particularly hybrid electric vehicles

## III. BRAKES SYSTEM

An easy to way to reduce squeal of Brake to shift Natural frequencies pattern by increasing stiffness. Considering with rib structure of Backplate shows improved results. the vehicle is used as per prescribed and no excessive braking is occurred and no rough driving and intense application of brake is avoided and continuous and sudden application of brakes is also avoided as driving is smoot.

The microstructure analysis revealed that there was uniform distribution of Type A graphite Flakes in Pearlite matrix and the whole microstructure is grey cast iron. the CE (Controlled Expansion) alloy brake drum has less weight, less deformation, minimum temperature at the surface. Hence, the CE (Controlled Expansion) alloys can be a better candidate material for the brake drum applications of light commercial vehicles.

## IV. BODYWORKS SYSTEM

Investigated about the damping properties in aluminum based hybrid nanocomposites. Commercial purity Aluminum as a matrix, Multi Walled Nano Carbon Tube (MWCNT) and Graphene (GR) as reinforcement with a weight percentage of 0.5%, 1%, 1.5%, 2% have been fabricated by Casting and Powder Metallurgy (P/M) techniques. Free vibration test was conducted.

The results revels that, Al/MWCNT/Gr (1.5 wt. %) by P/M technique is having better damping properties. explained about the effect of aerodynamics on small vehicles. A study on the wake zone produced behind the vehicle was done. Simulations were done on a prototype design to reduce the drag created behind. The goals were achieved by incorporation a spoiler which reduced the chances of formation of turbulence of air flow. Gives a study on the reduction of drag in vehicles by using aerodynamic shapes. Three basic models were made and analysis was done.

There is a significant change in the coefficients of lift and drag of the model vans when a more streamlined body design is adopted.

## V. BATTERIES

Li-ion batteries are highly advanced as compared to other commercial rechargeable batteries, in terms of gravi- metric and volumetric energy. compares the energy densities of different commercial rechargeable bat- teries, which clearly shows the superiority

The Li-ion batteries as compared to other batteries A Li-ion battery is constructed by connected basic Li-ion cells in parallel (to increase current), in series (to increase voltage) or combined configurations. Multiple battery cells can be integrated into a module. Multiple modules can be intergrade into a battery pack. For example, the 85 kWh battery pack in a typical Tesla car contains 7104 cells.

Typically, a basic Li-ion cell consists of a cathode (positive electrode) and an anode (negative electrode) which are contacted by an electrolyte containing lithium ions. Li-ion batteries, as one of the most advanced rechargeable batteries, are attracting much attention in the past few decades. They are currently the dominant mobile power sources for portable electronic devices, exclusively used in cell phones and laptop computers Although lithium metal batteries have even higher theoretical energy densities than that of Li-ion batteries, their poor recharge-ability and susceptibility to misuses leading to fire even explosion are known disadvantages.

I anticipate that lithium metal batteries based on solid-state electrolytes with enhanced safety will be commercialized in the next decade. Recently, lithium-air and lithium-sulfur batteries regain wide interest, although the concepts have been proposed for a while. Promising progress has been achieved regard- ing Li-air and Li-sulfur batteries, but it may take another two decades to fully develop those technologies to achieve reliable performances that will be comparable to Li-ion batteries. It is expected that Li-ion batteries will still be dominant in rechargeable battery market, at least for the next decade, for advantages they offer.

## VI. CONCLUSION

The progress that the electric vehicle industry has seen in recent years is not only extremely welcomed, but highly necessary in light of the increasing global greenhouse gas levels. As demonstrated within the economic, social, and environmental analysis sections of this webpage, the benefits of electric vehicles far surpass the costs. The biggest obstacle to the widespread adoption of electric-powered transportation is cost related, as gasoline and the vehicles that run on it are readily available, convenient, and less costly.

As is demonstrated in our timeline, we hope that over the course of the next decade technological advancements and policy changes will help ease the transition from traditional fuel-powered vehicles The various softwares used to design the 3 wheeler electric vehicle makes it easy to understand its behavior in various condition.

Softwares such as solidworks, ansys, etc helps in achieving the desired design Though there are many electric vehicles in the market but there is not much change in their design Li-ion batteries have affected almost everyone in the world. The success of commercial Li-ion batteries was a result of intensive research and contribution by many great scientists over few decades. Recently, much effort was put into further improvement on the performances of Li-ion batteries, achieving certain level of success

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