

# GMB BASED DESIGN OF ELECTRIC CONCEPTION VEHICLE

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## ***Abstract:***

Due to the problems caused by the gasoline engine on the environment and people, the automotive industry has turned to the electrical powered vehicle. But in electric vehicles the major work is, more time required to get the vehicle fully charge and it's necessary to provide a supply to the battery after certain time. The only source in electric vehicle is battery to run the vehicle, so recharging of battery is necessary frequently, nowadays the electric vehicles couldn't possibly run for long distance on the road because of less charging stations and requires much more time to recharge. Hence our motto is to charge the battery while vehicle in running condition. On this topic from

the world automotive electric industries are working together to solve this particular problem. If we notice about the pollution from the current gasoline engine is harmful to the environment and also for human beings. If we compare the gasoline engine vehicles with electric vehicles, people always prefer to gasoline engine vehicles because of power and abilities. Hence our mission is to fulfil the requirements to turn the people towards electric vehicles

**Keywords:-GMB, Electric Vehicle, Gasoline Engine.**

## 1.Introduction

The purpose of this report is to describe the technology used to produce an electric vehicle and explain why the electric engine is better than the internal combustion engine. It includes reasons why the electric vehicle grew rapidly and the reason it is a necessity to better the world today. The report describes the most important parts in an electric vehicle and hybrid vehicle. It compares the electric to the hybrid and internal combustion engine vehicle. It also includes the future of the electric vehicle.

The overall impact of the electric vehicle ultimately benefits the people. Compared to gasoline powered vehicles, electric vehicles are considered to be ninety-seven percent cleaner, producing no tailpipe emissions that can place particulate matter into the air. Particulate matter, carcinogens released into the atmosphere by gas-powered vehicles, “can increase asthma conditions, as well as irritate respiratory systems”

The system electric conception vehicle GMB will design on the basis of electric vehicle some changes has done for the electric generation while vehicle in running condition. The system will work for maximum generation of electric current or voltage to store and use that extra battery when the main battery get discharge. The purpose is to avoid the extra load of the electric generator on vehicle to improve the efficiency of battery. Hence the system will distribute the load of generator on wheels which can use as motor or vice versa.

## 2.Flow Of Work

The idea of this project came from the electric vehicle .which is necessity to turn the people towards the electric vehicle.The electric vehicle is not able as compared to gasoline engine because of recharging the time required to get recharge is more .As world the automotive industries are working together to solve this problem .The system ‘Electric conception vehicle GMB will help to reduce this particular problem.

### 3.LITERATURE SURVEY

Sr.no	Author	Title	Conclusion
1	Yoshio nazaki - 1986	Control system for induction motor driven electric car	Control system for driven motor car by the comprising varying voltage Inverter
2	Israel 2008 IEEEI 2008	Motor and Generators Modes of thyristor operated machine	These thyristor connections could control the voltage on the induction machine which operates as motor
3	Junzhi Zhang and Chen Lv and XiaoweiYue and MingzheQiu and Jinfang Gou and Chengkun	Development of the Electrically-Controlled Regenerative Braking System for Electrified Passenger Vehicle	The energy consumption of vehicle reduced by EABS developed is over 25% under ECE driving cycle.
4	AmbarishKulkarni and Ajay Kapoor and ShashankArora	Battery Packaging and System Design for an Electric Vehicle	Final specification sheet was developed indicating all the key parameters and system design of the developed EV
5	Da Silveira, M., Gertz, L., Cervieri, A., Rodrigues	Selection of a DC Motor Employed to Propel an Electric Car	The study showed that the car would require a mechanical power of 58 W, when it was at 20 km/h.
6	Mr. Marcello Contestabile Dr Gregory Offer Dr Robin North	Electric Vehicles: A Synthesis of the Current Literature with a Focus on Economic and Environmental Viability	EVs have the potential to deliver significant GHG emission savings in road transport in a cost-effective way, particularly after 2030.
7	Yan Zhou, Todd Levin, and Steven E. Plotkin	Plug-in Electric Vehicle Policy Effectiveness	Market formation incentives, sales targets, and lower relative per-mile fuel costs may be contributing to higher PEV market shares
8	<u>M. A. Hannan</u>	Hybrid electric vehicles and their challenges	EMS supports these hybrid vehicle power systems by managing current flows and coordinating multi power sources efficiently

## 4. Existing System

### Plug-in electric vehicle

A plug-in electric vehicle (PEV) is any motor vehicle that can be recharged from an external source of electricity, such as wall sockets, and the electricity stored in the rechargeable battery packs drives or contributes to drive the wheels. PEV is a subset of electric vehicles that includes all-electric or battery electric vehicles (BEVs), plug-in hybrid vehicles (PHEVs), and electric vehicle conversions of hybrid electric vehicles and conventional internal combustion engine vehicles. In China, plug-in electric vehicles are called new energy vehicles (NEVs).

### Hybrid EVs

A hybrid electric vehicle combines a conventional (usually fossil fuel-powered) powertrain with some form of electric propulsion. As of April 2016, over 11 million hybrid electric vehicles have been sold worldwide since their inception in 1997. Japan is the market leader with more than 5 million hybrids sold, followed by the United States with cumulative sales of over 4 million units since 1999, and Europe with about 1.5 million hybrids delivered since 2000. Japan has the world's highest hybrid market penetration. By 2013 the hybrid market share accounted for more than 30% of new standard passenger car sold, and about 20% new passenger vehicle sales including kei cars. Norway ranks second with a hybrid market share of 6.9% of new car sales in 2014, followed by the Netherlands with 3.7%

Global hybrid sales are by Toyota Motor Company with more than 9 million Lexus and Toyota hybrids sold as of April 2016, followed by Honda

Motor Co., Ltd. with cumulative global sales of more than 1.35 million hybrids as of June 2014, Ford Motor Corporation with over 424,000 hybrids sold in the United States through June 2015, and the Hyundai Group with cumulative global sales of 200,000 hybrids as of March 2014, including both Hyundai Motor Company and Kia Motors hybrid models.<sup>[59]</sup> As of April 2016, worldwide hybrid sales are led by the Toyota Prius lift back, with cumulative sales of over 3.7 million units. The Prius nameplate has sold more than 5.7 million hybrids up to April 2016.

### Regenerative Brake

Electric motors, when used in reverse function as generators, convert mechanical energy into electrical energy. Vehicles propelled by electric motors use them as generators when using regenerative braking, braking by transferring mechanical energy from the wheels to an electrical load. Early examples of this system were the front-wheel drive conversions of horse-drawn cabs by Louis Antoine Krieger in Paris in the 1890s. The Krieger electric landaulet had a drive motor in each front wheel with a second set of parallel windings (bifilar coil) for regenerative braking. In England, "automatic regenerative control" was introduced to tramway operators by John S. Raworth's Traction Patents 1903–1908, offering them economic and operational benefits as explained in some detail by his son Alfred Raworth. These included tramway systems at Devonport (1903), Rawtenstall, Birmingham, Crystal Palace-Croydon (1906), and many others. Slowing the speed of the cars or keeping it in control on descending gradients, the motors worked as generators and braked the vehicles.

## 5. Our Implementation

The system electric conception vehicle GMB will design on the basis of electric vehicle some changes has done for the electric generation while vehicle in running condition. The system will work for maximum generation of electric current or voltage to store and use that extra battery when the main battery get discharge. The purpose is to avoid the extra load of the electric generator on vehicle to improve the efficiency of battery. Hence the system will distribute the load of generator on wheels which can use as motor or vice versa.

### BEV'S (Battery Electric Vehicle)

In system "GMB Electric Conception vehicle" we use battery electric concept to drive the vehicle, the battery is only the source from which we get supply of electric required current. In this system lithium content battery [4] is mostly preferable. In most of the electric vehicles the cooling system of batteries to maintain the temperature when supply is on to the motor. Two types of cooling systems are used i.e. Internal cooling and External cooling from which we use external air cooling system. To maintain the flow of current the DC potentiometer is used towards the motor.

### Induction Motor

Back in the 1990s all of the electric vehicles except one were powered by DC brushless drives. Today, all the hybrids are powered by DC brushless drives, with no exceptions. The only notable uses of induction drives have been the General Motors EV-1; the AC Propulsion vehicles,

including the tzero; and the Tesla Roadster.

Both DC brushless and induction drives use motors having similar stators. The only differences are the rotors and the inverter controls. And with digital controllers, the only control differences are with control code. DC brushless drives require an absolute position sensor, while induction drives require only a speed sensor; these differences are relatively small. (Thethyristor connections could control the voltage on the induction machine which operates as motor<sup>[2]</sup>)

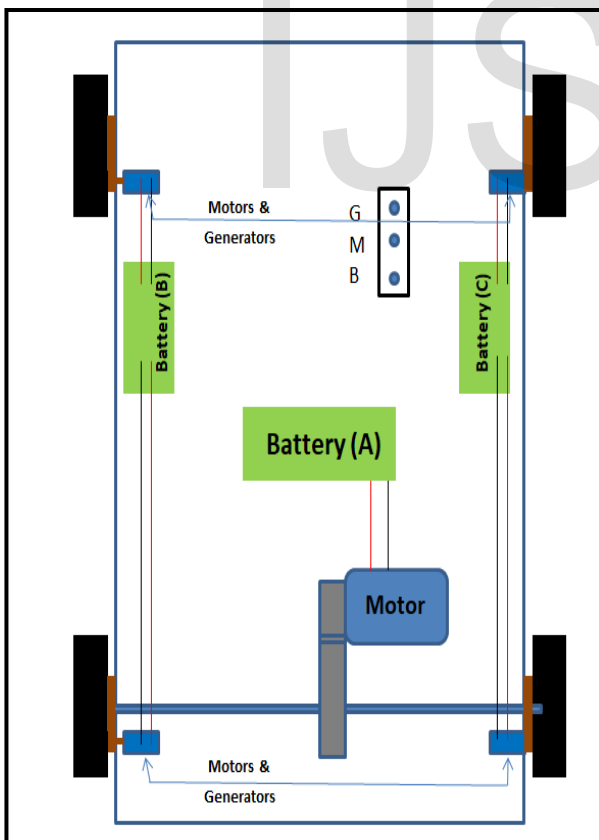
### Electric Generators

In electric vehicles generally the dc electric generators are used which basically work on principles of faradays law of electromagnetic induction. In electricity generation, a generator is a device that converts motive power into electrical power for use in an external circuit. Sources of mechanical energy include steam turbines, gas turbines, water turbines, internal combustion engines and even hand cranks. The first electromagnetic generator, the Faraday disk, was built in 1831 by British scientist Michael Faraday. Generators provide nearly all of the power for electric power grids.

The reverse conversion of electrical energy into mechanical energy is done by an electric motor, and motors and generators have many similarities. Many motors can be mechanically driven to generate electricity and frequently make acceptable manual generators.<sup>[1][4][6]</sup>

## Decelerating Braking System

A Decelerating Brake is an energy recovery mechanism which slows a vehicle or object by converting its kinetic energy into a form which can be either used immediately or stored until needed. This contrasts with conventional braking systems, where the excess kinetic energy is converted to unwanted and wasted heat by friction in the brakes, or with dynamic brakes, where energy is recovered by using electric motors as generators but is immediately dissipated as heat in resistors. In addition to improving the overall efficiency of the vehicle, regeneration can greatly extend the life of the braking system as its parts do not wear as quickly.<sup>[3]</sup>



**BLOCK DIAGRAM OF GMB SYSTEM**

## 6. Research Methodology

The system Design of Electric Conception Vehicle GMB belongs to electric vehicle the methodology of GMB same as electric vehicle but some changes has to done to full fill the requirement of EVs . The GMB denotes the three function Generator , Motor , Brakes<sup>[4][3][1]</sup>. Basically these three thing work on same principle faradays law of electromagnetic induction. The Generator can act as motor motor can act as generator too. Now a days in electric vehicle Regenerative braking system is more popular that provide the maximum electric generation current to battery ..which generates the current when the brakes apply . Our method is to make possible the three function in one device .These three thing in one device will help to reduce the weight instead of using one single Generator .our Main purpose is behind our methodoly is the maximum generation In minimum power consumption .

## 7. Purpose of Project

1. The main purpose of our project is to reduce plug in system
2. To generate maximum electric current in minimum power consumption
3. To improve the efficiency of battery
4. The vehicle has to run for long distance without plug –in
5. To improve initial torque
6. To avoid the weight of One single Generator
7. Worriedness regarding the battery charge can reduce
8. Four wheel assembly with motor can act as e4wd

## 8. Expected outcomes

1. Proper design and stress analysis at different condition
2. Weight is less and Analysis of main driven shaft
3. Less volt amp high torque motor and durable batteries
4. High carrying capacity
5. Proper electric circuits and switch
6. Maximum electric generation
7. More torque at different condition
8. Maximum outcomes

## 9. References

### Online Links:-

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- <https://www.imperial.ac.uk/energy-futures-lab/research/case-studies/low-carbon-transport/what-is-your-battery-trying-to-tell-you/>
- <https://www.netscribes.com/electric-vehicle/>
- <http://www.tandfonline.com/doi/full/10.1080/01441647.2016.1230794>
- <http://technav.ieee.org/tag/627/electric-vehicles>

### Referred Books

- Automobile Mechanical and Electrical Systems by Tom Denton
- Automotive Technology by Jack Erjavec
- The Automotive Chassis: Engineering Principles by JörnßenReimpell
- Electric Vehicle Technology by Wiley Blackwel