

Anti Lock and Regenerative Braking System in Two wheelers

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Abstract— Many of the road accidents are caused due to hard braking system, which causes the wheels to lockup. In such cases the driver will not have control over the vehicle steering. Anti-Lock Braking System prevents wheels from being locked up during braking by using a non-continuous form of braking known as Pulse Width Modulation (PWM) braking. This system provides the driver at any time to control the vehicle even while braking. Because of ABS, the wheels will get better grip on tricky road surfaces like icy or wet road surfaces and the stopping distances also reduce significantly.

In the braking system, most of the kinetic energy applied during braking is generally lost in the form of heat due to friction between the brake pads. By using a Regenerative Braking technique this energy can be recovered. The excess energy in this technique is stored temporarily in the capacitor banks before it gets converted into heat energy and lost. This system extends the life of the battery by recharging the battery utilizing the stored energy. With a single battery charge, the mileage of the electric vehicle also increases and travels extra distance. Together, these two approaches helps to make electric vehicle more energy efficient, easier to use and safer, thereby preventing and avoiding the number of accidents.

I. INTRODUCTION

An electric vehicle can be described as a vehicle which runs using an onboard electric generator like electric battery or a hydrogen fuel cell as its primary source of energy. An electric vehicle uses electric motors (either ac or dc) to move. In an age where fossil fuels like petrol, diesel are diminishing as well as getting costlier, Electric Vehicles hold a lot of importance today. Electric vehicles offer us an alternative to the vehicles driven using fossil fuels, which pollute the environment and also are getting costlier. Electric vehicles provide a smoother operation, stronger acceleration and are quieter as compared to conventional vehicles with Internal Combustion Engine (ICE).

II. MOTIVATION

An electric vehicle provides a clear alternative to the internal combustion engine vehicles which run on fossil fuels like petrol and diesel. The fuels are depleting fast and alternative energy resources must be used as the consumption of fossil fuels goes on increasing every year due to usage of more vehicle but the production of these fuels is not keeping pace with the increasing demand. An electric vehicle provides many benefits as mentioned above and is environmentally friendly. Because of such benefits of electric vehicles, it is important that an electric vehicle be given the latest systems

in braking, as it is an important part in the use of any vehicle. Braking systems like ABS and regenerative braking which will make the electric vehicle safer and easier to use as well as make it energy efficient should be implemented in the vehicles. If such systems are incorporated in electric vehicles and their advantages are seen by all, then the use and sale of electric vehicles all over the world will increase, especially in India which has a huge market for vehicles and is suffering from the ill effects of pollution due to vehicles in major cities. Increase in the number of electric vehicles will be beneficial to the society and to the environment. Also, wide use of Anti-lock Braking System will lead to fewer accidents on the streets and will save many lives by preventing many accidents.

III. OBJECTIVES

The objective of the project is –

1. To build a circuit for Anti-Lock Braking System which will prevent the skidding of wheels during hard braking and keep the control of the vehicle at all times with the driver in Electric Vehicles by keeping the slip ratio in the control region.
2. To include a Regenerative Braking sub-system which will recover lost energy in the circuit and give it back to the battery.
3. To analyse the performance of the entire system to check its utility and confirm that Antilock Braking System along with regeneration makes an electric vehicle easier and safer to use as well as makes it more energy efficient.

IV. BRAKING SYSTEM IN VEHICLES

Brake Systems in electric vehicles can be of different types. In some vehicles, conventional friction brakes are used. In such systems, continuous braking is applied which produces friction and stops the wheels from rotating, thereby slowing down the vehicle. In such brake systems, the brake pads heat up and this leads to energy wastage in the form of heat. Another type of brake system is the Anti-Lock Brake System. Here, continuous braking is not applied. Instead, a non continuous braking pattern is applied which slows or stops the vehicle as needed. Such a system is more efficient than the conventional braking system and gives a superior