Cover Page

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:5(1), May:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
DOI: http://ijmer.in.doi./2021/10.05.56
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th May- Publication Date:30th May 2021

POWER GENERATED BY REGENERATIVE BRAKINGSYSTEMS

[1]Yash Bhavsar, [2]Mahaveer Jat and [3]Mrs. Hiralsonkar
[3]Project Guide and HOD
D A Degree Engineering & Technology
Ahmedabad, Gujarat, India

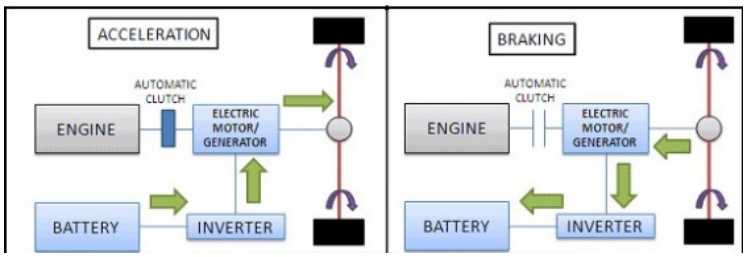
Abstract

Most brakes commonly use friction between two surfaces pressed together to convert the kinetic energy of the moving object into heat, though other methods of energy conversion may be employed as all the energy here is being distributed in the form of heat. Regenerative braking converts much of the energy to electrical energy, which may be stored for later use. Driving an automobile involves many braking events, due to which higher energy losses takes place, with greater potential savings. With buses, taxis, delivery vans and so on there is even more potential for economy. As we know that the regenerative braking, the efficiency is improved as it results in an increase in energy output for a given energy input to a vehicle. The amount of work done by the engine of the vehicle is reduced, in turn reducing the amount of energy required to drive the vehicle. The objective of our project is to study this new type of braking system that can recollect much of the car's kinetic energy and convert it into electrical energy or mechanical energy. We are also going to make a working model of regenerative braking to illustrate the process of conversion of energy from one form to another. Regenerative braking converts a fraction amount of total kinetic energy into mechanical or electrical energy but with further study and research in near future it can play a vital role in saving the non-renewable sources of energy.

Keywords: Regenerative,Braking,Hybrid Vehicles,KineticEnergyRecoverySystem(K.E.R.S.),Flywheel, Motor,HydraulicPower.

Introduction

A brake could be a machine that inhibits motion by absorbing energy from a moving system. it's used for slowing or stopping a moving vehicle, wheel, axle, or to stop its motion, most frequently accomplished by means of friction. The term 'Braking' during a moving vehicle means the appliance of the brakes to cut back its speed or stop its movement, usually by depressing a pedal.



The braking distance is that the distance between the time the brakes are applied and also the time the vehicle involves a whole stop. In braking systems on conventional vehicles, friction is employed to counteract the forward momentum of a moving vehicle.

As the restraint rub against the wheels or a disc that's connected to the axles, excessive energy is formed. This energy dissipates into the air, wasting the maximum amount as 30 percent of the vehicle's generated power. Over time, this cycle of friction and wasted heat reduces the vehicle's fuel efficiency.

More energy from the engine is required to switch the energy that was lost by braking.

Literature Review

(YiminGao and MehrdadEhsani2001) The desirable braking system of a land vehicle is that it can stop the vehicle or reduce the vehicle speed as quickly as possible, maintain the vehicle direction stable and recover kinetic energy of the vehicle as much as possible. In this paper, an electronically controlled braking system for EV and HEV has been proposed, the results show that significant amount of energy can be recovered and braking performance of the vehicle is perfect. (SR Cikanek, KE Bailey - Proceedings of the 2002 American) This paper discusses a regenerative braking system (RBS) for a parallel hybrid electric vehicle (PHEV) that performs regenerative energy recovery based on vehicle attributes, thereby providing improved performance, efficiency

Cover Page

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:5(1), May:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
DOI: http://ijmer.in.doi./2021/10.05.56
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th May- Publication Date:30th May 2021

and reliability at minimal additional cost. A detailed description of the regenerative braking algorithm is presented along with simulation results from a dynamic model of the PHEV exhibiting the regenerative braking performance.(X Nian, F Peng, H Zhang - IEEE Transactions on Industrial …, 2014) Regenerative braking can improve energy usage efficiency and can prolong the driving distance of electric vehicles (EVs). A creative regenerative braking system (RBS) is presented in this paper. The RBS is adapted to brushless dc (BLDC) motor, and it emphasizes on the distribution of the braking force as well as BLDC motor control. In this paper, BLDC motor control utilizes the traditional proportional-integral-derivative (PID) control, and the distribution of braking force adopts fuzzy logic control.

Scope and Objective

1. Use in electrical vehicles for generates the electricity and storage in some unit.
2. World's leading automakers like Ferrari, Renault, BMW, McLaren, Tesla are developing hybrid and also complete electric cars and are trying to add this Regenerative braking systems (RBS) to them.
3. The efficiency of IC engine vehicles is 20-25%.By using electric vehicles the efficiency increases by 50%. (i.e., 70-75%). Using RBS, it contributes to the improvement of the overall efficiency of electric vehicles by providing braking feature and also saving most of the energy at the same time, which gets wasted. So, by this system the efficiency can be increased approximately by 15% (i.e., 85-90%).
4. Maximum efficiency from the automobiles which are to be introduced in near future is possible by this RBS.

Regenerative Braking Efficiency

The energy efficiency of a conventional car is only about 20 percent, with the remaining 80 percent of its energy being converted to heat through friction. The miraculous thing about regenerative braking is that it may be able to capture as much as half of that wasted energy and put it back to work. This could reduce fuel consumption by 10 to 25 percent Hydraulic regenerative braking systems could provide even more impressive gains, potentially reducing fuel use by 25 to 45 percent. In a century that may see the end of the vast fossil fuel reserves that have provided us with energy for automotive and other technologies for many years, and in which fears about carbon emissions are coming to a peak, this added efficiency is becoming increasingly important.

Conversion of Kinetic Energy to Electrical Energy Using Motor

The most common sort of regenerative brake involves victimizationan electrical motor as an electrical generator. The operating of the regenerative braking system depends upon the working rule of an electrical motor, that is that the necessary component of the system. motor gets activated once some current is competent it. But, when someexternal force is applied to activate the motor (during the braking), then it behaves as a generator and generates electricity. this implies that whenever motor runs in one direction, the electrical energy gets born-again into mechanical energy, that is then accustomed accelerate the vehicle and whenever the motor runs in other way, it performs functions of a generator, that then converts energy into current, that makes it doable to utilize the movement force of the axleto showthe electrical motors, which ends in createelectrical energy for storage within the battery and at the same time reducing the speed of the automotive with the regenerative resistance of the electricalmotors. This electricity is then used for recharging the battery.

Methodology

Design requirements include dimension restrictions, effectiveness and safety. You have just once started the servo motor and one rode connected the motor and pulley. Regenerative braking is a way of taking the wasted energy from the process of slowing down a car and using it to recharge the car's batteries. ... In these cars, the system is virtually imperceptible to the driver but in hybrid and pure electric cars regenerative braking takes a more active and obvious role. So, when start the motor and rotate the connecting rode and pulley, when pulley is rotated then we give the friction on it by breaks or small pulley. When the friction applied on pulley the k.e energy produce the one type of friction power & this power is go in power transmission machine. And the power is supply in the power bank or any other instruments, then the power is saved in power bank. This power we are used for charging the mobile and use this mechanical energy to produce the electrical energy. And also, to re-charge the battery of electrical vehicles.

Expected Outcomes

1. It should store energy while braking which is its primary objective
2. It should return the stored energy whenever required easily
3. It should be compact and easy to install
4. It should provide adequate stopping/braking force to the vehicle
5. When used in conjunction with conventional braking systems, it should easily switch as per requirement 6. Its design should be flexible so that it can cater to the needs of a wide variety of vehicles

Cover Page

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :7.816(2021); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:10, ISSUE:5(1), May:2021
Online Copy of Article Publication Available: www.ijmer.in
Digital certificate of publication:http://ijmer.in/pdf/e-Certificate%20of%20Publication-IJMER.pdf
DOI: http://ijmer.in.doi./2021/10.05.56
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 10th May- Publication Date:30th May 2021

Conclusion

The beginning of the 21st century could very well mark the final period in which internal combustion engines are commonly used in cars. Already automakers are moving toward alternative energy carriers, like electric batteries, hydrogen fuel and even compressed gas. Regenerative braking may be a small, yet very important, step toward our eventual independence from fossil fuels. These sorts of brakes allow batteries to be used for extended periods of your time without the need to be plugged into an external charger.

These forms of brakes also extend the practice range of fully electric vehicles. In fact, this technology has already helped bring us cars like the Tesla Roadster, which runs entirely on battery power. Sure, these cars may use fossil fuels at the recharging stage that's, if the source of the electricity comes from a fuel like coal -- but when they're there on the road, they will operate with no use of fossil fuels at all, and that's a big step forward.

References

- Bildstein M., Mann K., Richter B. (2014) Regenerative braking system.
- Reif K. (eds) Fundamentals of Automotive and Engine Technology
- Bosch Professional Automotive Information. Springer Vieweg, Wiesbaden. https://doi.org/10.1007/978-3-658-03972-1_22
- Mohammad MostafaGhafouryan, SadeghAtaee, FatemeTavakoliDastjerd, "A novel method for the design of regenerative brake system in an urban automotive," Journal of the Brazilian Society of Mechanical Sciences and Engineering, 2014.

Filename:	26
Directory:	C:\Users\DELL\Documents
Template:	C:\Users\DELL\AppData\Roaming\Microsoft\Templates\Normal.dotm
Title:	
Subject:	
Author:	Windows User
Keywords:	
Comments:	
Creation Date:	5/15/2021 12:19:00 PM
Change Number:	5
Last Saved On:	5/23/2021 9:32:00 PM
Last Saved By:	Murali Korada
Total Editing Time:	26 Minutes
Last Printed On:	6/2/2021 8:42:00 AM
As of Last Complete Printing	
Number of Pages:	3
Number of Words:	1,517 (approx.)
Number of Characters:	8,648 (approx.)