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Experimental and Development of Regenerative Braking System for Produce Energy

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Abstract: This is research of the paper to fabricate and development of regenerative braking system. The fabricate will be able to restore the kinetic energy which would be lost by the locomotive to useful electric energy. Now the kinetic energy that would be lost by the locomotive through braking would get to be stored again into useful form, again this energy is stored in batteries for future uses.

Before being transmitted to the battery the electricity capture is passed in the DC regulator this will regulate the electricity into more stabilized form. As it primarily known that the braking would not offer the braking to the complete halt but what is being done is to just capture some of the kinetic energy. This will offer cyclists and drivers assurance to their need of power , for cyclists it will offer safety LED and for urban normal operations.

I. INTRODUCTION

The first of these systems to be revealed was the flybrid. This system weighjs 24 kg and has an energy capacity of 400KJ after allowing for internal losses. A maximum power boost 0f 60KW(81.6PS, 80.4HP) for 6.67 seconds is available. The 240mm diameter flywheel weighs 5.0Kg and revovels at up to 64500rpm. The maximum torque is 18Nm. The system occupies a volume of 13 litres.

Two minor incidents have been reported during testing of KERS systems in 2008. The first occurred when the Red bull racing team tested their KERS battery for the first time . it malfunctioned and caused a fire scare that led to the teams factory being evacuated. The second was less than a wek later when a BMW sauber mechanic was given an electric shock when he touched Christian kliens KERS equipped car during a test at the Jerez circuit.

II. OBJECTIVE

As the main objective of being engineers is to find and extract solutions on is concerning issue in the environment around us,so we decided to come up with the idea about conservation of energy for the good of the preservation of the total environment around. The idea was to keep awareness on how engineers can put there effort on designing and build green machines . The general pictures of the globe today is not good, then as young engineers decided to fabricate the system that can reflect the idea.

A. Problem Statement

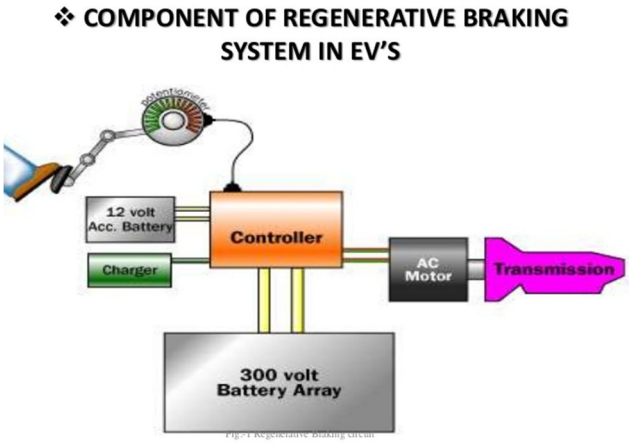
To deal up with problems around the environment is to find solutions concerning the issues. We decided to go up with the idea so as to create the positive awareness that it possible for engineers to think of green machines. Regenerative braking will serve to restore energies that are everyday routine to be lost by locomotives. This will also lead to create good environment for future use of the energy restored by the regenerative braking system.

B. Scope of Research

Slowing or stopping operations on bicycles and other locomotive machine sare dissipative . Friction pads applied to the rotating rim of the tire convert kinetic energy of the cyclist and bicycle into heat, which is irrecoverably lost to the atmosphere by conduction and forced convection. This energy could instead be converted into electrical energy and stored for future use. A regenerative braking system that captures energy for storage in a battery and for use by a rear safety flasher for example.

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Flow chart



Flow chart -1

III. WORKING METHODOLOGY

The regenerative braking system works under the principle of friction and electromagnetism principles, where as the wheel rotating at certain angular speed will give the dynamo portion of its rotational energy to it where as this energy given by the wheel through the rotation of the dynamo will give out elctricty.

A. Product Design Specification

SL.NO	DESCRIPTION	SPECICIFICATION
1	Research method	Regenerative braking
2	Mechanism	Sprocket driven
3	Target customer	Vehicle manufacture
4	Regenerative process	sprocket
5	material	Steel bars
6	manufacturing	Fabrication and modeling
7	Life of product	5 to 6 years

B. Practical Regenerative Braking

Regenerative braking is not by itself sufficient as the sole means of safety bringing a vehicle to a standstill, or slowing it as required so it must be used in conjunction with another braking system such as friction based system.

1) The regenerative braking effect drops off at lower speeds, and cannot bring a vehicle to a complete halt reasonably quickly.

2) A regenerative brake does not immobilize a stationery vehicle physical locking is required for example to prevent vehicles from rolling down hills.

3) Many road vehicles with regenerative braking do not have drive motors on all wheels regenerative braking is normally only applicable to wheels with motors . For safety the ability to brake all wheels is required.

4) The regenerative braking effect available is limited and insufficient in many cases, particularly in emergency situations.

Fabrication parts

a) Wheel
b) Pulley
c) Lever and Links
d) Structure frame
e) Sprockets and chain

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Design and dimensions
Diameter of the wheel = 60-70 cm
Length of the frame = 100cm
Length of the link1 = 20cm
Length of the link 2 = 30cm
Diameter of dynamo wheel = 10cm

IV. DESIGN STRUCTURE OF FRAME

Our design to carry all the load the motor, the dynamo, the battery together the links and DC regulator.

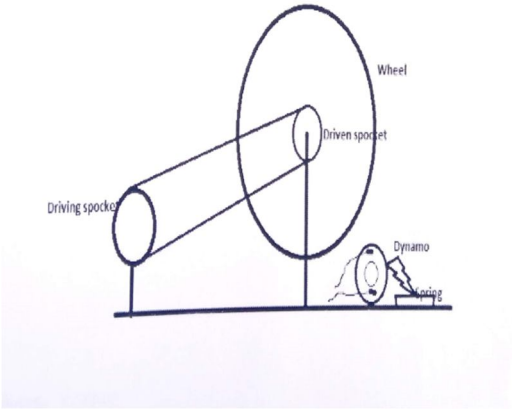


Figure 1 : Frame structure of regenerative braking system

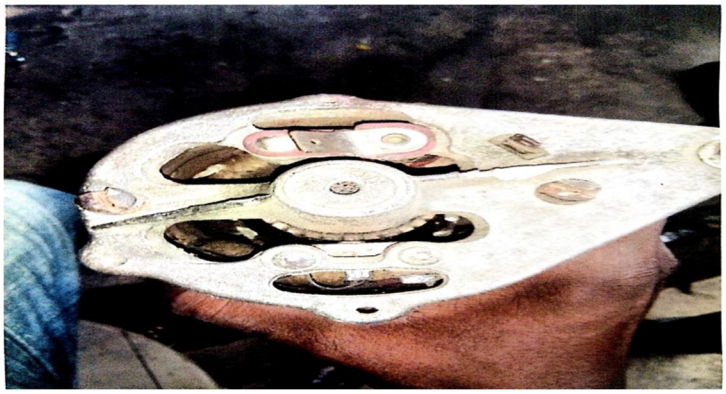


Figure 2 ; fabrication structure with dynamo

A. Working Principle

The regenerative braking system works under the principle of friction and electromagnetism principles, where as the wheel rotating at certain angular speed will give the dynamo portion of its rotational energy to it where as this rotational energy given by the wheel through the rotation of the dynamo will give out electricity.

B. Calculations

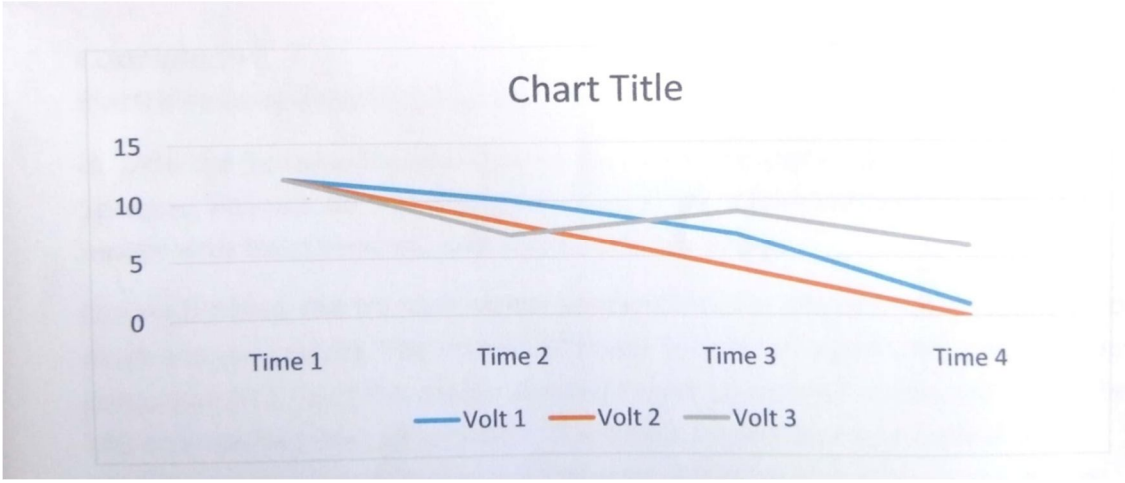
Power = $2\eta NT/60$
=360 W
Torque T =w r
W = 3 x 3.14 xn/60
=157.1 x 0.1 =15.71Nm
Power P = 246.9W

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C. Research Availability And Graphing

Vehicle type	Distance of sampling	Time for activeness
Heavy load	10 kms	3’23”
Light load	10 kms	3’31”
Small size	5kms	4’23”

D. Chart With Graph



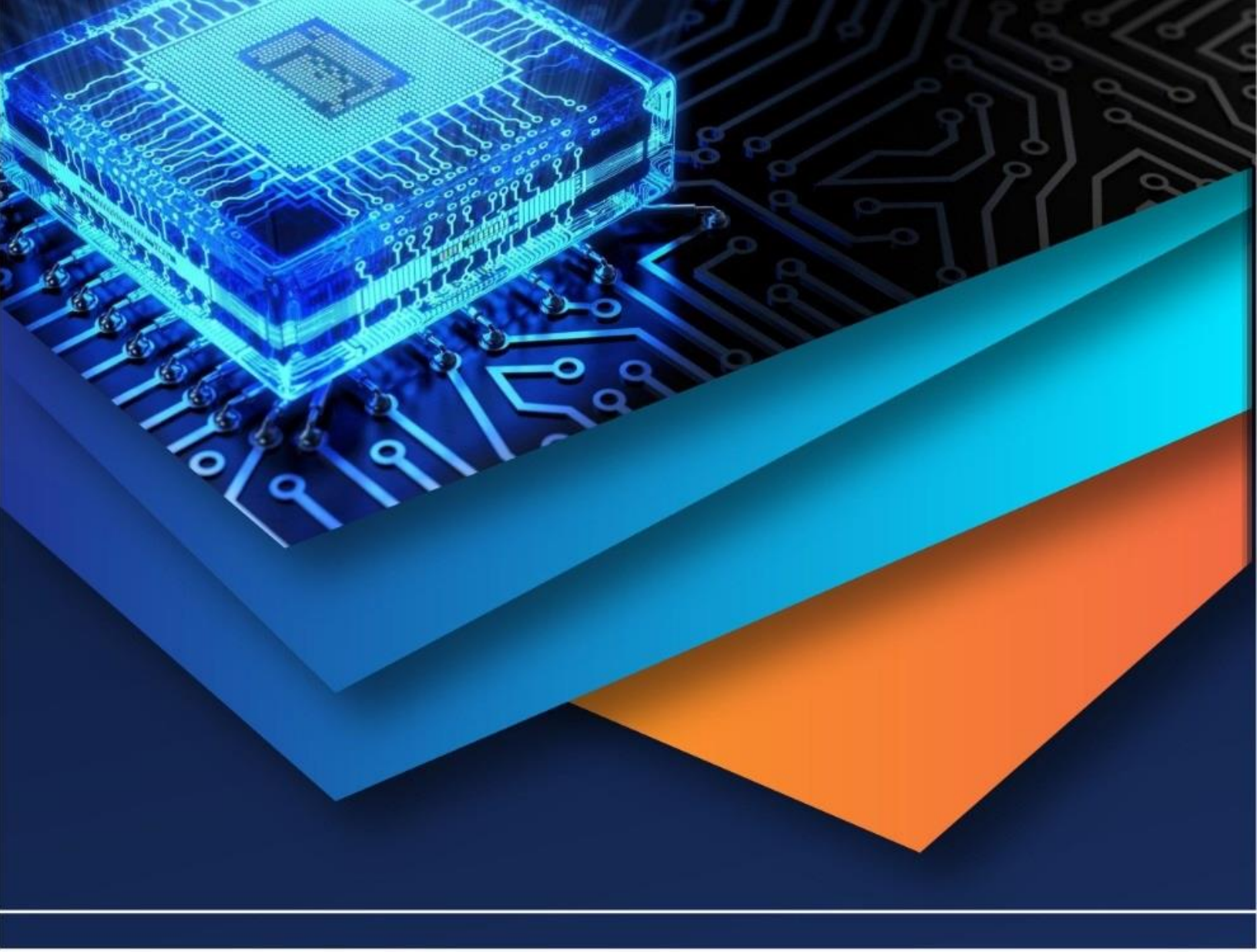
V. CONCLUSION

During braking the traction motor connections are altered to turn them into electrical generators. The motors fields are connected across the main traction generator and the motor armatures are connected across the load. The MG now excites the motor fields. The rolling locomotive or multiple unit wheels turn the motor armatures, and the motors acts as generators, either sending the generated current through onboard resistance. Now the kinetic energy that would be lost by the locomotive through braking would get to be stored again into useful form, again this energy is stored in batteries for future uses. Before being transmitted to the battery the electricity capture is passed in the DC regulator this will regulate the electricity into more stabilized form. As it primarily known that the braking would not offer the braking to the complete halt but what is being done is to just capture some of the kinetic energy. This will offer cyclists and drivers assurance to their need of power , for cyclists it will offer safety LED and for urban normal operations. Now our research project is regenerative braking system successfully updated.

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