

## Design and fabrication of electromagnetic braking system for four wheeler

**M. Sampathkumar<sup>1,\*</sup>, A. Sakthivel<sup>1</sup>, P. Tharun Prasad<sup>1</sup>, S. Vinothkumar<sup>1</sup>, R. Vinothkumar<sup>1</sup>**

<sup>a</sup> Department of Mechanical Engineering, Nandha Engineering College, Erode-52, Tamil Nadu, India.

**\*Corresponding Author**

[vmssampathkumar7070@gmail.com](mailto:vmssampathkumar7070@gmail.com)

(M. Sampathkumar)  
Tel.: 044 2729 4569

Received : 29-01-2019  
Accepted : 09-02-2019

**ABSTRACT:** These brakes designed by controlling for equipment, automobiles and movers are suitable for AC&DC power supplies up to 12v to 220v and are suitable for wide range of drum sizes 10 to 380mm dia these brakes are suitable with a rated torque ranging from 100kg-cm for the smallest brake up to 2000kg-cm for a 380mm dia at 50% coil rating, the coil remains in circuit for a maximum 5min out of every 10min. Since these brakes are closed position, the release of brake shoes is affected by energizing the electromagnetic coil which over comes the spring force and shoes are moved clear of drum by lever system so that the drum is free to rotate without any friction. When the power given to the electromagnetic coil the coil gets energized and in turns the plunger pulls down. The plunger in turn operates the arm of the brake and the brake opens. When specied brake drum both pin bush type and flexible geared type can be supplied along with the brakes.

**Keywords:** brakes, automobiles, electromagnet, friction



**M. Sampathkumar** was born on 10.06.1975 at, Erode, Tamilnadu. He did his schooling in Government higher secondary school, Erode. He did his diploma in Kongu Polytechnic College, Perundurai, Erode. He obtained B.E (Mechanical Engineering) from the Maharaja Engineering College, Avinashi, Coimbatore in 2002 and M.E (Manufacturing Process) from the Erode Sengunthar Engineering College, Thudupathi, Erode in 2008. At present he is working as Associate Professor in the Department of Mechanical Engineering, Nandha Engineering College, Erode, Tamil Nadu, India. He has 10 years of teaching experience. His areas of interests are Foundary.



**A. Sakthivel** was born on 22<sup>rd</sup> June 1998 at Erode and his full name is Sakthivel Alagappan. He completed SSLC in Government higher secondary school, lakkapuram, Erode district with 81.2% and also he completed HSC in Government higher secondary

school, lakkapuram, Erode district with 64%.After completing school studies, because of very much interest in mechanical engineering, he was enter into Nandha Engineering College which is locate at Erode. Now he is studying final year of mechanical engineering with %.He is member of Indian Society for Technical Education. He was very much interested in the area of design, so he took his final year project title is "Design and fabrication of electromagnetic breaking system for four wheeler".



**P. Tharun prasad** was born on 7<sup>th</sup> September 1997 at Erode and his full name is Tharun Prasad periyasamy. He completed SSLC in BKN higher secondary school, Nasiyanur, Erode district with 79.2% and also he completed HSC in Al Ameen matriculation higher secondary school, Ellapalayam, Erode district with 78.9%.After completing school studies, because of very much interest in mechanical engineering, he was enter into Nandha Engineering College which is locate at Erode. Now he is studying final year of mechanical engineering with 75%.He is member of Indian Society for Technical Education. He was very much

interested in the area of Manufacturing, so he took his final year project title is "Design and fabrication of electromagnetic braking system for four wheeler"



**S. Vinothkumar** was born on 28<sup>th</sup> November 1997 at Eddapadi in Salem district and his full name is Vinothkumar Selvaraj. He completed SSLC in S.S.M Lakshmiammal higher secondary school in Komarapalayam, Erode district with 75.6% and also he completed HSC in same school with 60.4%. After completing school studies, because of very much interest in mechanical engineering, he was entered into Nandha Engineering College which is located at Erode. Now he is studying final year of mechanical engineering with 70%. He is a member of Indian Society for Technical Education. He was very much interested in the area of Manufacturing, so he took his final year project title is "Design and fabrication of electromagnetic braking system for four wheeler".



**R. Vinothkumar** was born on 22<sup>th</sup> December 1997 at Rasipuram in Namakkal district and his full name is Vinothkumar Ravi. He completed SSLC in Vivekananda vidyalaya matriculation school, Puduchatram, Namakkal with 87.6% and also he completed HSC in Sri BVM matriculation higher secondary school, Gurusamipalayam, Namakkal with 79.25%. After completing school studies, because of very much interest in mechanical engineering, he was entered into Nandha Engineering College which is located at Erode. Now he is studying final year of mechanical engineering with 75%. He is a member of Indian Society for Technical Education. He was very much interested in the area of Manufacturing, so he took his final year project title is "Design and fabrication of electromagnetic braking system for four wheeler".

## 1. Introduction

A car has three braking systems- the accelerator, the gears and brakes themselves. A control will be anticipated and unhurried act of slowing down or stopping will involve the use of all the three and with proper observation of the road and the traffic ahead, a driver can see the need for a reduction in speed long before he has to apply the brakes. The accelerator becomes a brake as soon as the foot is lifted. The period of deceleration should ideally, always precede the use of the foot brake. Gear becomes a braking system while the vehicle is shifted to a lower gear [1-5].

When approaching a hazard the procedure has to be followed is first to decelerate and then application of foot brakes and finally changing to a lower gear. The third part of the braking system consisting of the brakes themselves are the most important part and it is only with this part a vehicle can be brought to rest if needed. With the other to the accelerator and the gear the vehicle loses its momentum very slowly. The electric brakes a type of the braking system not very popular can be used commercially. Most magnetic braking relies on an attractive force generated within a gap magnetic circuit which produces magnetic flux in the circuit.

In this magnetic flux is used to stop the motion of the vehicle [6, 7].

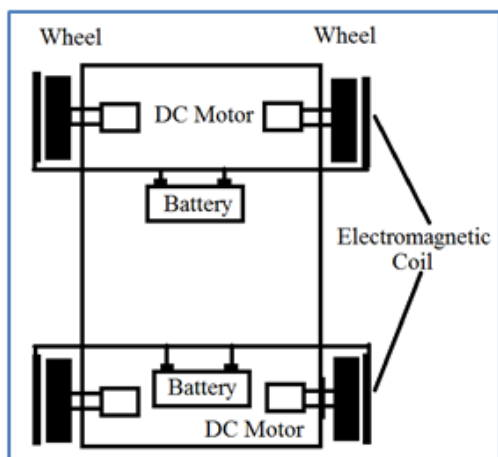
## 2. Electromagnetic Braking

Electromagnetic brakes operate electrically, but transmit torque mechanically [2]. This is why they are used to be referred to as electro-mechanical brakes [2]. Over the years, electromagnetic brakes are referring to their actuation method. Since the brakes started becoming popular over sixty years ago, the variety of applications and brake designs have increased dramatically, but the basic operation remains the same. Single face electromagnetic brakes make up approximately 80% of all of the power applied to the brake applications. Electromagnetic brakes have been used as supplementary retardation equipment in addition to the regular friction brakes on heavy vehicles. Various other types of Electromagnetic Braking Systems are, Electromagnetic Braking System With Brake Pads, Eddy-Current Braking System [2].

### 2.1 Working of Electromagnetic Braking System

The electromagnetic brake consists of a round disc plate in which a small hole is made to rotate by means of a motor coupled to it. The motor's shaft is connected to

the shaft from the round disc plate. The copper coil is wound over the iron piece. When, the motor start running, the disc plate will also rotate in the same direction to the motor. While it reached the certain speed, the proximity sensor senses the speed of vehicle and send signal to the control unit. The control unit give supply to the coil then it will get magnetized, due to electromagnetic attraction the rotating disc will slower down and finally speed level is maintained.



**Fig 1** Electromagnetic Braking system.

### ADVANTAGES

1. Easy to implement
2. Easy to handle
3. Low cost

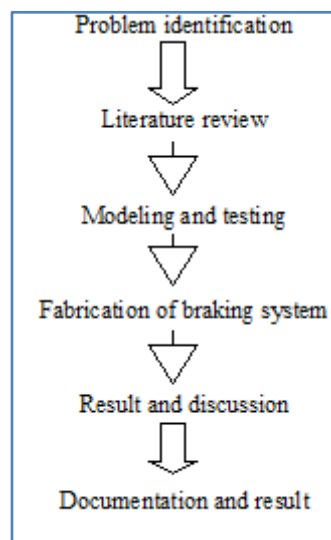
### References

- [1] Abhijeet N. Naikwadi, Janak S. Patil, Omkar S. Mohite (2017), Design and analysis of electromagnetic disc brake for automobiles', ISSN: 2455-5703.
- [2] Akshyakumar S. Puttevar, nagnath U. kakde, (2014), Enhancement of Braking system in Automobile using Electromagnetic Braking, e-ISSN: 2278-1684, p-ISSN: 2320-334X, pp.54-59.
- [3] Krunal Prajapati, RagulVibhandik, DevendrasinhBaria, Yask Patel (2017), Electromagnetic Braking System, pp.233-244.
- [4] Oscar Rodrigues, Omkar Taskar, Shrutika Sawardekar, Girish Dalvi (2016), 'Design and Fabrication of eddy current braking system, e-ISSN: 2395 -0056, pp.809-815.
- [5] Priya Bhosle, Seema Jarhad, Soniya Jadhav, Kamlesh Kuchekar (2015), 'Electromagnetic Braking System'.
- [6] Rhythm Dhoot, Sanket Gaikar, Nitish Kulkarni, Ojus Jain (2016), 'Design and Theoretical Study of Electromagnetic Braking System', e-ISSN: 2278-1684, p-ISSN: 2320-334X, pp.87-96.
- [7] Sevel P, Nirmal Kannan V, Mars Mukesh S (2014), 'Innovative electromagnetic breaking system', ISSN (Online) : 2319 - 8753, pp.46-53.

### Competing Interests:

The authors declare that they have no competing interests.

### METHODOLOGY



### 3. Conclusion

The project carried out by us have made an impressing task in the field of automobile. It is very useful for driver while drive the vehicle without tension. This project have reduce the cost involved in the concern. Our project has been designed to perform the entire requirement task which has also been provided.