Paper Publication

S. No	Student Name	Journal Details	Year of Publications
Academic Year 2014-15			
1	VengadeshPrasadh M	Design and Analysis of Disc Brake with Titanium Alloy, International Journal of Innovative Science, Engineering & Technology, vol. 2, pp. 1044-1050, ISSN 2348-7968	**May 2015**
2	Vishnuhasan A		
3	Vimalraj T		
4	Velusamy M		
5	Azhagendran K	Design and Analysis of Automotive Shackle, International Journal of Innovative Science, Engineering & Technology, vol. 2, pp. 1058-1062, ISSN 2348-7968	**May 2015**
6	Mohanlal K		
7	Ponraj P		
8	Nivas R		
9	Divakar S	Influence of module, Material Properties, No of teeth & Rim Thickness on Load Sharing Behaviour of Spur Gear Drives, International Journal of Innovative Science, Engineering & Technology, vol. 2, pp. 352-355, ISSN 2348-7968	**March 2015**
10	GowthamKarthik S		
11	Gulshen S		
12	Naveen Kumar M	Design and optimization of ventilated disc Brake for heat dissipation, International Journal of Innovative Science, Engineering & Technology, vol. 2, pp. 692-694, ISSN 2348-7968	**March 2015**
13	Sarath Kumar B		
14	Gopinath M		
15	Inbasekar B		
16	KarthikPandian A	Design of Solar Powered Electric Four-Wheeler for Disabled People, International Journal of Innovative Research in Science, Engineering and Technology, Volume 4, Special Issue 4, pp.115-118, ISSN 2319-8753.	**March 2015**
17	Pradeep A		
18	Arunkumar R		
19	Karthik M		

Academic Year 2015-16			
1	Manoj Priyadharson K	Amalgamation in Coil Winding Process, International Journal of Innovative Research in Science Engineering and Technology, Vol 5, Issue 5, pp. 7208-7215, ISSN 2319-8753	**May 2016**
2	BalaMurugan N		
3	Murugan S		
4	Aravind Krishna N	Design and Analysis in Ventilated Disc Brake for Two Wheelers, International Journal of Innovative Research in Technology, Volume 2 Issue 11, pp.278-280, ISSN: 2349-6002	**April 2016**
5	Manikandan S		
6	Praveen Kumar S		
7	Aswatha Narayanan G	CFD Analysis of A FSAE Car Equipped with Front and Rear Wings, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 5, Issue 4, pp.5573-5582, ISSN(Online) : 2319-8753	**April 2016**
8	DeivaManojkannan R		
9	Gowtham M		
10	Tamil Selvan R	Experimental Analysis of Bio Oil under Transestrification Process by Using Babool Tree Seeds, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 5, Issue 4, pp.5492-5498, ISSN(Online) : 2319-8753	**April 2016**
11	SriramGopal		
12	KavinPrasanth K		
13	VarunSagar V	Optimization of Hydraulic Oil Seal in Earth Movers, International Journal of Science and Research, Vol 5, Issue 2, pp.2156-2162, ISSN 2319-7064	**Feb 2016**
14	Vishnun Ram P		
15	HariPrasanth N		
16	Prasanth Kumar K	Numerical Design Of Open Wheel Race Car Suspension System, Journal of Chemical and Pharmaceutical Sciences, special issue 7, pp. 331-334, ISSN: 0974-2115.	**2015**
17	Vishnu M		
18	Suresh M	Speed reducer of two wheelers using radio frequency sensors, Quest-Journal of Research in Mechanical Engineering, Volume 2 ~ Issue 8 (2015) pp: 01-05, ISSN: 2321-8185	**October 2015**
19	Siva M		
20	Nanthakumar S		
21	Kingsly A	Starter motor control system, International Journal of Innovative Science, Vol. 2 Issue 9, pp. 515-520, ISSN 2348 – 7968	**September 2015**
22	Karthikeyan P		
23	Muthukumarn R		
24	Saran B		

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DESIGN AND OPTIMIZATION OF VENTILATED DISC BRAKE FOR HEAT DISSIPATION

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Abstract

Braking is a process of converting kinetic energy of the moving object into heat energy. It is done by the process of producing friction to stop or slow down the moving object in case of automobiles. The heat produced is stored and later conduct into the air. But during hard braking and routine braking increase its thermal stress, hence this frictional heat stored in the disc would cause excessive temperature .lead to most undesirable effects such as premature wear, elastic instability and brake vibrations. In order to minimize this ventilated disc is used to maximize the heat dissipation. Here various shapes are used as ventilated holes. The modeling is done by SOLIDWORKS and the thermal and structural analysis of disc brake rotor is done using ANSYS , which is a dedicated finite element package used for determining the temperature distribution, variation of the stresses and deformation across the disc brake profile. The best type of Disc brake has been suggested based on the magnitude of Von misses stresses, temperature distribution and deformation.

Keywords- Disc brake, Heat dissipation, Ventilated holes, Finite element method

1. INTRODUCTION

Disc brake is one of the types of brake which uses calipers to push the stationary pads to hold the rotating disc produce a friction. Friction slow down the rotation of disc which is attached to the wheel or axle .brakes converts the kinetic energy into the heat and too much of heat cause the ineffective braking known as brake fade. The brake disc made of the aluminum matrix composites Swapnil R. Abhang, [1] his analysis, suggested composite material is more efficient than the cast iron material by thermal and modal analysis to calculate heat flux and deflection. Based on it the composite material can be used for effective braking effect. M.A. Maleque et al [6], analyzed the material to be selected based on the mechanical properties such as compressive strength, friction coefficient, wear resistance, thermal conductivity, specific gravity and cost results aluminum metal matrix is more efficient material to be used as the best material for brake disc. Material change alone won't help in maximizing the heat dissipation of the disc brake .hence solid brake has been made into ventilated disc brake. Conventional ventilated disc brake has circular profile. Hence various profile like circular, square, hexagon, etc... are used to find out maximum heat dissipated and less deformed shape as each profile is analyzed. Thermal and static analysis was done on each profile.

2. THEORETICAL CALCULATION

The Specification of Maruthi Swift car is taken for calculating the heat flux created during maximum speed condition. The maximum friction force created will be found to find the deceleration to find the time taken to stop the vehicle.

Table-1 Disc specification

Disc diameter(D)	240mm
Disc material	Aluminum metal matrix
Coefficient of friction(μ)	0.7
Mass of the vehicle(M)	1400 kg
Maximum speed (V)	45.833 m/s
Acceleration due to gravity (g)	9.81 m/s^2
Area of the disc (A)	0.03573m^2

$$F=\mu.M.g \quad \ldots\ldots (1)$$

$$= (0.7)\ (1480)\ (9.81)$$

$$=10163.16\ N$$

Hence deceleration of the vehicle is

$$a=F/M \quad \ldots\ldots (2)$$

$$=10163.16/1480$$

$$=6.87 m/s^2$$

Time taken to stop the vehicle is

$$=45.833/6.87$$

$$=6.67s$$

In this case it is assumed that entire Kinetic energy is converted into heat energy hence Kinetic energy is

$$K.E=0.5\,M\,V^2 \quad \ldots\ldots (4)$$

$$=0.5(1480)\ (45.83^2) =1554.502KJ$$

As its kinetic energy is entirely converted which lasts for 6seconds the power produced will be