

# INVESTIGATION OF WEAR BEHAVIOUR OF AL ALLOY & SILICON CARBIDE COMPOSITE USED IN DISC BRAKE

Kiran Jadhav.<sup>1</sup>, Manoj Jadhav<sup>2</sup>, Ganesh Jejurkar<sup>3</sup>, Kiran Kawade<sup>4</sup>

<sup>1</sup> Student, Mechanical Department, SND COLLAGE OF ENGINEERING & RESEARCH CENTER  
YEOLA, NASHIK-423401, Maharashtra, India

<sup>2</sup> Student, Mechanical Department, SND COLLAGE OF ENGINEERING & RESEARCH CENTER  
YEOLA, NASHIK-423401, Maharashtra, India

<sup>3</sup> Student, Mechanical Department, SND COLLAGE OF ENGINEERING & RESEARCH CENTER  
YEOLA, NASHIK-423401, Maharashtra, India

<sup>4</sup> Student, Mechanical Department, SND COLLAGE OF ENGINEERING & RESEARCH CENTER  
YEOLA, NASHIK-423401, Maharashtra, India

## ABSTRACT

The aim of this review paper is to represent alternative material for brake pad material. Generally, the material used for brake pad is ASBESTOS, ARAMIDE, FIBER TUFF, RUBBER. To replace this material the composite material used that is composition of aluminum alloy and silicon carbide which is made of simple melting and casting process. The cost required for this material is low and also light in weight. The testing of properties of material that is wear, coefficient of friction, thermal conductivity is measured on PIN ON DISC MACHINE. This combined material shows a superior properties and eliminate the unrequired properties. All properties are investing using predicted TAGUCHI method.

**Keywords:** TAGUCHI method, PIN ON DISC machine.

## 1. INTRODUCTION

A brake is a device which is used to slow down the vehicle by converting kinetic energy into heat energy. Due to the high wear resistance, high friction resistance, high thermal conductivity the aluminum silicon alloy is very important. It is used in many ferrous component and in heavy weight application. The brake pad material should achieve a stable and adequate coefficient of friction and should produce low wear. In this study the conventional brake pad material which are ASBESTOS, ARAMIDE by composite materials aluminium alloy and silicon carbide are used as an alternative material. There are two types of brake system that is drum brake and disc brake. In drum brake rubber pads used to slow down the vehicle and in disc brake generally asbestos, aramid or Kevlar is used as pad material but they having low coefficient of friction and wear and having high cost. To improve this tribological properties the alternative Al alloy and silicon carbide composite materials is required to be used.

## MATERIAL AND METHOD

The material selected for brake pad material was commercially available Al alloy and silicon carbide using green sand moulding process material is formed having size diameter 14 mm & length 150 mm. Basic step is used to make a casted specimen is melting, pouring, cooling and inspection. The chemical composition of Al alloy (LMG) & silicon carbide (SIC) as shown in table.

Sample no.	LMG (Weight %)	SIC (Weight %)
1	100	NIL
2	95	15
3	90	10
4	85	5

Table: composition of Al alloy & silicon carbide

**EQUIPMENT VIEW:**

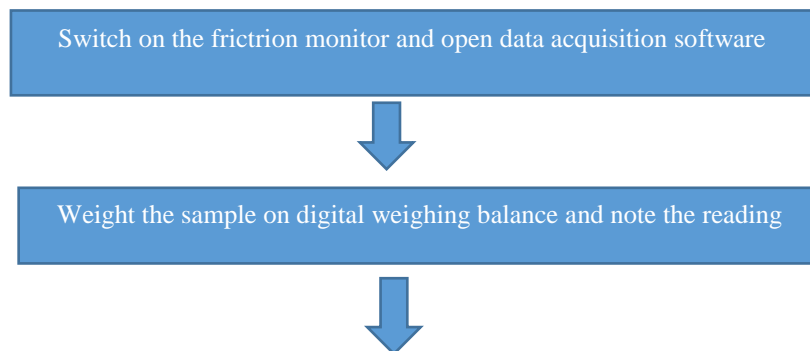
**PIN ON DISC MACHINE**

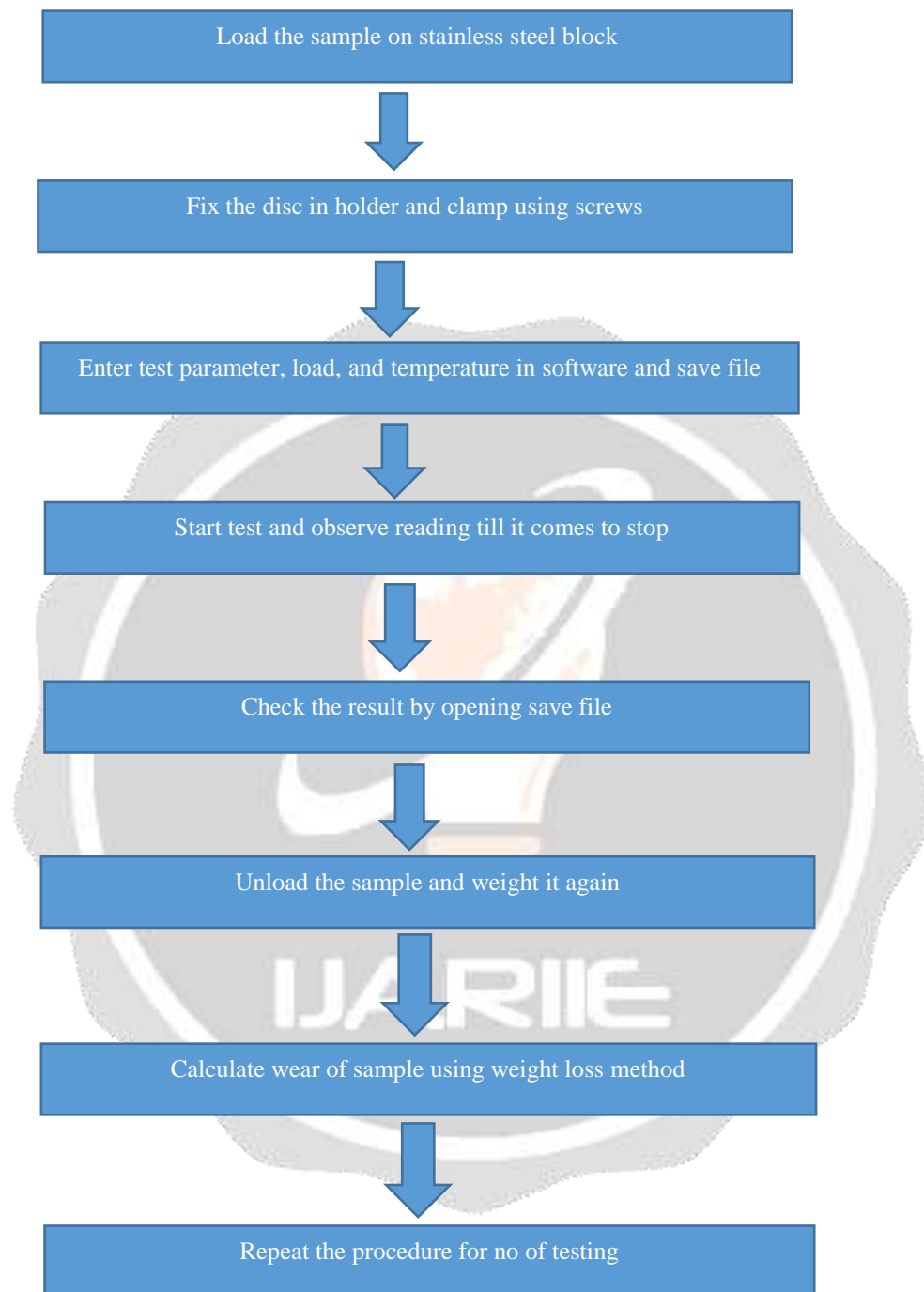


A pin- on –disc machine is used to determine a dry sliding wear. Al silicon alloy composite. The specimen having size 10 mm diameter and 30 mm length is used for testing. the initial weight of component is measured using weight machine(vacuum type) with least count 0.001gm testing is done by processing pins against rotating disc of 60 mm radius with 60hrc hardness. Testing takes at different speed(s),load(N) and sliding distance(n) which is given in table no.2

Load applied on pin(kg)	Sliding speeds(m/s)	RPM of disc
2	1	200
4	2	400
6	3	600

**METHODOLOGY:**



**REFERENCES:**

- [1] Danner, G. E.; Jefferies, J. K. *Society of Automotive Engineers* **1986**, Paper No. 860768.  
[2] Jacko, M. G.; Tsang, P. H. S.; Rhee, S. K. *Wear* **1984**, *100*,

503.

- [3] Bijwe, J. *Polymer Composites* **1997**, 18, 378.
- [4] Subramaniam, N.; Brijnaresh, R. S.; Frank, D. B.; Blum; Dharani, L. R.; Yung-Rwei Chen. *SAMPE Quarterly* **1990**, 21, 17.
- [5] Sinha, S. K.; Biswas, S. K. *Journal of Material Science* **1992**, 27, 3085.
- [6] Halvery, L. *Soc. of Automotive Engineers* **1980**, Paper No. 800667.
- [7] Subramaniam, N.; Brijnaresh, R. S.; Frank, D. B.; Dharani, L. R.; Yung-Rwei, C. *Intern. J. Polymeric Mater.* **1991**, 15, 93.
- [8] Hettinger, Jr. W. P.; John, W. N.; Krock, R. R.; Boyer, D. C. *Soc. of Automotive Engineers* **1986**, Paper No. 860767.
- [9] Washabaugh, F. J. *Soc. of Automotive Engineers* **1986**, Paper No. 860630.
- [10] Mohan, N. J. *Soc. of Automotive Engineers* **1980**, Paper No. 800782.
- [11] Feng, D.; Frank, D. B.; Dharani, L. R. *Polymer and Polymer Composites* **1996**, 4, 155

## 8. BIOGRAPHY

	<p>Kiran Dilip Jadhav student of the Snd Collage of Engineering &amp; Research Center Yeola, Nashik-423401, Maharashtra, India.in the year 2014-2017.In the mechanical Engineering. Work on the project “INVESTIGATION OF WEAR BEHAVIOUR OF AL ALLOY &amp; SILICON CARBIDE COMPOSITE USED IN DISC BRAKE”.</p> <p>Email id-<a href="mailto:kiranjadhav1532@gmail.com">kiranjadhav1532@gmail.com</a></p>
	<p>Manoj Balasaheb Jadhav student of the Snd Collage of Engineering &amp; Research Center Yeola, Nashik-423401, Maharashtra, India.in the year 2014-2017.In the mechanical Engineering. Work on the project “INVESTIGATION OF WEAR BEHAVIOUR OF AL ALLOY &amp; SILICON CARBIDE COMPOSITE USED IN DISC BRAKE”.</p> <p>Email id-<a href="mailto:manojjadhav9663@gmail.com">manojjadhav9663@gmail.com</a></p>

	<p>Ganesh Vijay Jejurkar student of the Snd Collage of Engineering &amp; Research Center Yeola, Nashik-423401, Maharashtra, India.in the year 2014-2017.In the mechanical Engineering. Work on the project “INVESTIGATION OF WEAR BEHAVIOUR OF AL ALLOY &amp; SILICON CARBIDE COMPOSITE USED IN DISC BRAKE”.</p> <p>Email id-<a href="mailto:ganeshjejurkar95@gmail.com">ganeshjejurkar95@gmail.com</a></p>
	<p>Kiran Pralhad Kawade student of the Snd Collage of Engineering &amp; Research Center Yeola, Nashik-423401, Maharashtra, India.in the year 2014-2017.In the mechanical Engineering. Work on the project “INVESTIGATION OF WEAR BEHAVIOUR OF AL ALLOY &amp; SILICON CARBIDE COMPOSITE USED IN DISC BRAKE”.</p> <p>Email id-<a href="mailto:kawadekiran055@gmail.com">kawadekiran055@gmail.com</a></p>
	<p>Prof.S.P.Badgujar,H O D of the Snd Collage of Engineering &amp; Research Center Yeola, Nashik-423401. Work on the project “INVESTIGATION OF WEAR BEHAVIOUR OF AL ALLOY &amp; SILICON CARBIDE COMPOSITE USED IN DISC BRAKE”</p> <p>Email id- <a href="mailto:badgujarsp@gmail.com">badgujarsp@gmail.com</a></p>