DVVP College of Engg
Vilad Ghat
Ahmednagar
State Name : Maharashtra, Code : 27

CASH PAYMENT Voucher

No. : **595** Dated : **16-Oct-2019**

Particulars	Amount
Account :	
Seminar Exps - Mech	**2,000.00**
Through :	
Cash	
On Account of :	
paid to Sanap Vanita an account of seminar expenses vide enclosed bills.	
Amount (in words) :	
Indian Rupees Two Thousand Only	**₹ 2,000.00**

Receiver's Signature:

Authorised Signatory

PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar

DR. V.V.PATIL COLLEGE OF ENGINEERING
Ahmednagar

VIIT 295

DR VITHALRAO VIKHE PATIL COLLEGE OF ENGINEERING, AHMEDNAGAR

DATE :- 16-10-2019

RECEPT

Received with thanks form Dr Vithalrao Vikhe Patil college of Engineering, Ahmednagar on account of

Account Head

1 Seminar meet

2

Rupees in Word Two thousand only

Rs. 2000/-

Receiver's Signature

PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar

Name

Mo No.

Journal of Interdisciplinary Cycle Research
An UGC-CARE Approved Group - A Journal
An ISO : 7021 - 2008 Certified Journal
ISSN NO: 0022-1945 / web : http://jicrjournal.com / e-mail: submitjicrjournal@gmail.com

Certificate of Publication

This is to certify that the paper entitled

Certificate Id: JICR/2131

"Wear Rate Investigation of Copper Based Metal Matrix Composite"

Authored by :

V.S.Sanap

From

DVVP COE, Ahmednagar

Has been published in

JICR JOURNAL, VOLUME XI, ISSUE X, OCTOBER- 2019

Dr. R. Rezwana Begum, Ph.D Editor-In-Chief
JICR JOURNAL

6.2

ISO 7021-2008

http://jicrjournal.com

Dr. V. V. Patil College of Engineering Ahmednagar

PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar

Wear Rate Investigation of Copper Based Metal Matrix Composite

V.S.Sanap[1], Dr. K.B.Kale[2]

[1]PG Scholar and [2]Professor,

[1,2]DVVP COE, Ahmednagar, India

[1]sanapvanita7@gmail.com

[2]kishorkale.iisc@gmail.com

Abstract— **The applications of Metal Matrix Composites (MMCs) are being increasing day by day in the aerospace, automobile and many more industries, because of their improved properties compared to uniform metals. For high performance of brake pads many materials are introduced which are asbestos-free. The work involves analyzing the suitability of Copper alloy–machining steel cheeps MMC (Cu-Nano particles of Fe MMC) in the automobile brake pad applications in comparison with existing brake pad. The reinforcement of Cu-Fe MMC will be with variable percentage of iron particle by weight. The composite is formed by powder metallurgy route followed by extrusion. Two combinations of composite are tested as 50%, 60% Cu. The wear test is carried out for composites both at ambient temperature by using pin on disc method. Pins are made of composite and tested against cast iron disc. Performance was mainly evaluated on the basis of brake drum coefficient of friction (m). The effects of physical properties, mechanical properties will also be discussed. The wear affecting parameters such as normal load and sliding speed are varied and wear is observed. Also the results of the composite are compared with the results of conventional brake lining material.**

Keywords— **Metal Matrix Composite, Wear behaviour**

I. INTRODUCTION

Wear is a mechanism of removal of material from one surface body with respect to other surface. Factors governing the wear are material properties such as hardness, strength, ductility, surface finish, work hardening, lubrication, load, speed, corrosion, temperature. Types of wear are Adhesive Wear, Abrasive Wear, Erosive Wear, Cavitation Wear etc. It is possible to investigate on inappropriate friction material to get coefficient of friction within limits for the automobile applications. The friction material properties have to be like good resistance to severe temperatures, low compressibility and good resistance to wear [3]. The term "composite" broadly denotes a material system which is poised of a discrete constituent (the reinforcement) dispersed in a continuous phase (the matrix). Particle reinforced composites are light metals & already attracting the attention of materials producers and end users because of their admirable mechanical and physical properties [2].

Brake pad have a variety of constituents such as metals (iron and copper with or without alloying elements), solid lubricants graphite, lead and MoS_2) and ceramic abrasives (silica, mullite, alumina and silicon carbide), being widely used in heavy duty brake systems. To ensure the requirements of heavy duty automobile related to the braking process, the friction material must have a stable and high friction coefficient, low wear rate, mechanical strength at high temperatures and good thermal conductivity. For having a high thermal conductivity combined with good mechanical resistance, copper is one of the most important components in brake systems, added in the form of powders or fibers.

Iron additions in the copper matrix ensure a greater mechanical strength, thermal stability. The ceramic particles act as abrasives. Its high hardness leads to an increase in mechanical strength and wear resistance of the sintered composite. Many studies have shown that zirconium silicate (ZrSiO4) caused considerable increase of the friction coefficient relative to other ceramics used in friction materials such as SiC and SiO_2. The addition of solid lubricants such as graphite and MoS_2 stabilizes friction coefficient and reduces wear. The development of copper matrix composites has relied on the use of ceramic reinforcements with alumina and silicon carbide the most commonly utilized. Several efforts have been made to improve the interface bonding between copper and ceramic particles by exploring surface coating of the ceramic particles, and the use of alternative reinforcing materials such as carbon based graphite and graphene.

II. LITERATURE SURVEY

Asif M et.al. explained three Aluminum based friction composites which are designated as ALM 01, ALM 02 & ALM 03 were formulated. The dry wear test is carried out using a pin-on-disc tribo-tester at constant sliding speed of 9 ms-1 under a load of 50 N. The counter face disc is made of heat treated grey cast iron. During the test, the cumulative wear (gm), Coefficient of friction, temperature rise (oC) and noise level (dB) were recorded. The effect of load at constant