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A REVIEW PAPER ON STUDY OF WEAR ANALYSIS OF BEARING MATERIAL.

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ABSTRACT

Bearing material should have the special properties such as more load carrying capacity low friction resistance ,good conductor of electricity abrasion as well as wear resistance this are the various properties which eally consider for the selection of the it is understand that there is much use of connecting rod between the part of piston and crankshaft ,mainly journal material for the journal bearing. In the world as it is found that there are various properties from which we do understand the properties of the bearing.
In this paper we had studied or realize the various properties of these and suggested some kid of materials for the better working and reducing properties which are undesired in test we studied that there is new material aciform reducing such characteristics. Which is mainly having low frictional resistance and such materials produced thus really having cheap in nature and have good mechanical properties. Wear resistances good characteristics of the bearing material, in the world various much /many study have been taken for in to get or avoid wear resistance. While there is great affect in the various fields such as chemical industry ,mechanical industry, aeronautical, civil metallurgy industry due to which interest for working into the research station for the progress is generally increasing in the nowadays.

I. INTRODUCTION

Friction and wear are the properties always observed in the various material which are used for the transmission of the power from one shaft to another these properties always affect the efficiency of this parts as the efficiency reduced due to such undesired properties there is no advantage of the machine in the industrial sector there is need of research on the tribological properties of the parts of the various machines .as the actual understanding of the word is rubbing means properties of friction ,scratching, wearof the parts lubrication of the material. Actual word to word understanding of the word “tribology” is to manipulate the friction .that the friction may be maximum or minimum.

This objective of this can be known only by the knowing the temperature, kinetic energy, surface finish, accuracy, oiling and by another properties. The bushes have various characteristics such as temperature coefficient, high sensitive to the heat, good load carrying capacity. These characteristics affect the life of the bushes in the way of harming or changing the properties of fatigue or wear. Instead of the various materials we introduce the materials such as brass and the Babbitt for the showing better properties of the material.

Study of the Wear

At the 1977 Euro rib conference a “block-on-ring” method for characterizing the response of boundary-lubricated bearing materials to abrasive particles in the lubricant was presented. In this method a block with rectangular cross section, made from the bearing material, was pressed under a known normal force against the curved surface of a rotating ring, made from the journal material. The contact surface of the block was reshaped to fit the radius of curvature of the ring before the test. The specimen assembly was completely immersed in the lubricant. Prior to testing, finely divided abrasive particles were added to the lubricant. In order to prevent sedimentation of the abrasive, the lubricant was vigorously stirred by means of a blade wheel with independent drive. Every 5 min the contact between the block and the ring was interrupted for 10 s to promote the access of fresh abrasive to the contact zone.

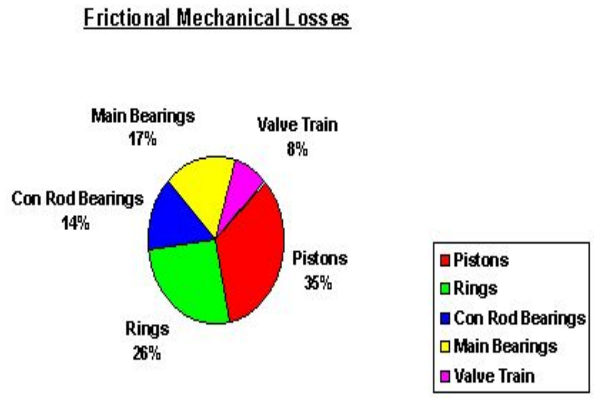
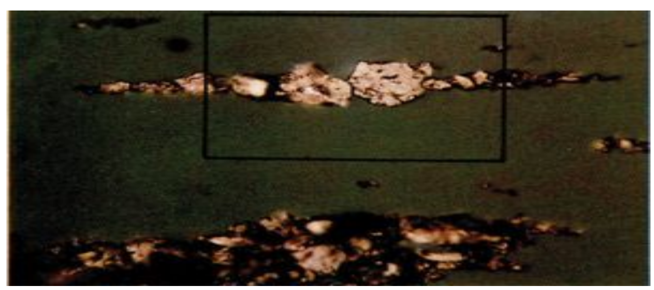


Fig.1.Frictional Mechanical Losses

II. TYPES

1) RUBBING WEAR

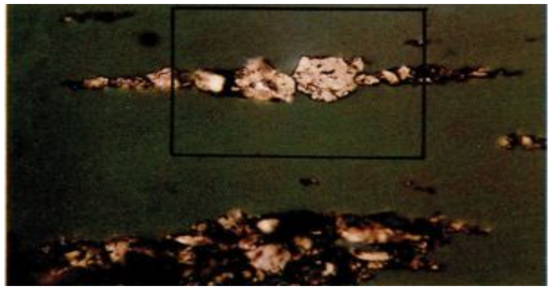
As the most common type of wear, rubbing wear occurs whenever there is surface sliding contact within a machine. During initial surface contact, this type of "break-in" wear should be expected. It usually results in a smoother, low-wearing surface. Particles produced from rubbing wear typically have a platelet (two-dimensional) morphology and smooth topography.



2) CUTTING WEAR

This abnormal wear is produced when two surfaces penetrate one another. As its name suggests, particles are generated from one surface gouging the other surface, creating long, ribbon-like chunks. This wear mode is often compared to machining sward from a lathe but on a much smaller scale.

3)ROLLING WEAR



Rolling surface contact produces surface fatigue. Particles generated from surface fatigue tend to come in the form of spalls, spherical or laminar particles. The formation of pits and spalls as a result of high load and a low-contact surface area leads to the shaping and sizing of these particles as they are forced out of their original setting. This type of wear typically occurs with components of rolling motion contact, such as in the case of ball bearings.

4) ROLLING AND SLIDING WEAR

This abnormal combination of wear modes is caused by fatigue and scuffing. It is commonly associated with gear systems, particularly along the pitch line of gear teeth as well as in conditions with too high of a load or speed and excessive heat generation. For example, the surface contact of gear teeth is a combination of rolling and sliding motion. This combined wear mode region, along with the effects of lubricant contaminants, can generate a complex fusion of wear debris.

5) CHEMIACAL WEAR

Corrosive wear is frequently labeled as fretting corrosion, erosion, stress fatigue, etc. These particles are often too small to distinguish individually and are usually the result of improper fluid properties or heavy contamination from water, acid, salt or bacteria. Heat also plays a major role in corrosion. Most lubricants have rust/corrosion-inhibiting additives to combat the effects of chemical wear.

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Fig.2. Shows Wear On Old Bearing

III. TO PERFORM CERTAIN EXPERIMENT THERE ARE SOME OBJECTIVES OF THAT EXPERIMENT

1)To understand the modes of characteristics of the material and the effect of that on various properties such as speed, load on wear.

2)To understand the co relation between the load and the speed, frictional foretime and creep.

3)To understand the effect of the oiling or lubrication on the material of the bearing

Experimental setup:

In this experiment the materials such as nickel,chromium,brass,babbit ,are selected for finding out the properties and study the characterisyics of the wear. By analysing these material we found the consequence of the material. The wear rate is frequently small in the industry, lubrication are provided for preserving the friction and loading of the material.

Normal load	15-20N
SLIDING VELOCITY	1, 1.5, 2 m/s
Relative Humidity	70 (± 5)%
Length of pin	28mm
Disc rotation speed	150-2100rpm
Pin material	M.S.
Disc material	Copper, aluminum

Two different material are selected

a. Lead base Babbitt's : Lead 84% ; Tin 6% ; Antimony 9.5% ; Copper 0.5%.
b. Copper alloys such as Cu- 10% to 15% Pb.

IV. OBSERVTION/COMPSITION OF THE MATERIAL

Temperature		Tensile Strength		Elongation	Reduction
ºC	ºF	Mpa	Ksi	% (a)	In Area, %
20	168	77	11.2	18	25
49	120	63	9.2	24	27
100	212	45	6.5	23	28
149	300	28	4.0	32	38

Basic modern brass is 67% copper and 33% zinc. Lead commonly is added to brass at a concentration of around 2%.

V. CONCLUSION

1)It is concluded that the material such as lead base Babbitt, and tin base brass can be used.

2) It shows good properties such as less wear ,less corrosiveness.

3) It is base suitable material for the journal bearing because of it's less wear rate, no fluctuations on wear rate, low cost, better mechanical properties than other material.

4) Wear rate increases with the increase in normal load and sliding velocity for both copper and aluminum. At identical condition, wear rate of copper is much lower than that of aluminum for the observed range of normal load and sliding velocity.

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5) Friction coefficient decreases with the increase in normal load while it increases with the increase in sliding velocity for both copper and aluminum. At identical condition, friction coefficient of copper is much lower than that of aluminum within the observed range of normal load and sliding velocity.

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