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SUDEEP SINGH BAGHEL

**ABSTRACT:**

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Although the world’s economy is slowing down day by day, the automobile industry in India is still booming. The engine of an automobile is equivalent to its heart. Engine’s life and its power output performance depends upon the wear rate of its piston. In this research, wear rate of light weight piston material (Aluminium silicon alloy- aluminium 83.2%, silicon 11 to 13 %, Manganese 0.2%) was studied which are used in medium and sedan car industries. Pistons were produced by casting process of aluminium alloy and plates were cut from the piston itself. It was then cut having diameter 90 mm and coating on this like Hard Anodizing & Tin coating was successfully prepared. To study the wear rate, there are different wear tests such as scratch test, slurry abrasion test, erosion test and pin on the disc test. The selection of the wear test depends on the material of the coating and its applications. For automobile applications of the coating, slurry erosion and corrosion test are preferred. But in case of dry applications of the coating, the pin on disc and scratch test are commonly performed. For the present study one variable was selected for wear test: load (30 N, 40N and 50N) and sliding speeds (500 rpm). Sliding distance (1200 m) was taken as a constant. Wear test of the coating was conducted on pin on disc machine under dry conditions. The wear rate was calculated using mass loss methods. The wear disc was weighed before and after the wear test on an electronic balance having least count of 0.0001g. The coefficient of friction was found with LVDT which gave the frictional force during wear test. The surfaces morphology of worn surfaces of the coating was analysed with scanning electron microscope. The wear rate of the coating was found to be increased with increased in load. The co-efficient of friction of the coating was found to decrease with increased load. The microstructure of the worn surfaces of the coating was also examined with optical telescope and no change in microstructure of the coating due to frictional heat was found. The micro hardness at the cross section of the coating at wear track was found to decrease away from the wear track. The main wear mechanism observed through scanning electron microscope was adhesion, deformation and microcutting.

**Key words:** Hard Anodising, Tin coating**,** pin on disc, microstructure, wear rate, aluminum alloy coating.