

Major Project
Entitled
MODELING & SIMULATION OF PISTON CYLINDER
ASSEMBLY BASED ON SURFACE TEXTURE
METHOD

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CERTIFICATE

It is to certify that the dissertation entitled “ **MODELLING & SIMULATION OF PISTON CYLINDER ASSYEMBLY BASED ON SURFACE TEXTURE METHOD**” submitted by Gaurav Kumar (02 Pro 08) in partial fulfillment for the award of the Degree of Master of Engineering in Production Engineering, is an authentic record of student’s own work carried out by him under our guidance and supervision. It is also certified that this dissertation has not been submitted to any other Institute/University for the award of any degree or diploma.

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ABSTRACT

The Tribological (friction, wear and lubrication between two adjacent medium) study is one of the most important parameters to the efficient working of an Internal Combustion Engine. According to the researchers the maximum (nearly 60%) of the total frictional loss is at piston cylinder assembly of a reciprocating internal combustion engine. The works are being done to reduce the friction in this area and give engine a better and reliable life. Present work deals with one such method of SURFACE TEXTURING to reduce friction at desired interface. A simulation experimental analysis has been done in a modified Pin on disc experimental setup with creating dimples on the disc. The different parameters has been analyzed and graphs have been plotted with WIDUCOM software. On the basis of result obtained, it is established that micro texturing method can be used in a real engine to enhance tribological properties. Along with it a detailed study is carried out for the lubricating oil used. The film of lubricating oil save the friction loss as well as increases the life of engine. It restrains from seizure of piston. The emphasis is laid on types, function, characteristics of the lubricating oil and effect of water in the lubricating oil. Wear tests have been performed by lubricating oil on pin-on-disc experimental set-up in Dynamics of Machines Laboratory and it has been found out that wear has many phases and depends on physical properties, lubrication and working conditions. The spectroscopy test in different modes for different types of lubricating oils (fresh and contaminated) were carried out in CASRAE (Center for Advanced Studies and Research in Automotive Engineering) and it has been found out that use of ineffective lubricant in an IC Engine not only wears the engine but also results in power loss, incomplete combustion, compression losses and risk of backfiring. The lubrication of IC Engine is governed by Reynold's equation which is carried on mass balancing, differential control volume. Flow chart is developed for solving Reynold's equation and also to find film thickness and other properties for given boundary condition.

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