MECHANICAL LUBRICATION

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Mechanical Lubrication

by

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Table of Contents.

Part I.

Introduction.

Definition of Mechanical Lubrication: Mechanical Lubrication is the process of automatically interposing lubricating fluids between solid machine surfaces that are required to slide over each other. The object of lubrication of any kind, whether it be done automatically or by hand, is to lessen friction

Friction is injurious in that it wears away the surfaces in contact and thus destroy the fit between them, and, in that it dissipates and renders useless part of the energy transmitted through the machine.

The essential functions of a lubricant is the mechanicalseparation of the lubricated surfaces by a layer of fluid of finite thickness. Experiments and experience have both shown that continual rubbing, with the consequent heating effects, tend to cause a lubricant to deteriorate and disappear. Lubricants, then, to give a maximum efficency must be renewed at intervals as they are worn away.

The difference between the weat on improperly lubricated surfaces and that on properly lubricated surfaces is so serious that a comparison between the cost of lubrication and the money saved in the avoidance of repairs is superfluous. Experience is doubtless the most convincing argument that can be brought forward in favor of proper lubrication. A line

shaft, carefully put in place and kept in alignment, may, with proper lubrication, run at the rate of from 200 to 300 revolutions per minute, for ten hours a day, year in and year out, without any noticable wear. The reason is, that a film of oil holds the surfaces apart and never permits metallic contact. Metallic surfaces, which, rubbing together become dry, will cut each other and cause an abrasion to take place. The bearing will then require more lubricant, and give a lower efficency. Quite a striking and perhaps the most common example of inefficent lubrication, with the consequent abrasion and excessive friction, is the setting of a vehicle wheel, in which case the friction at the axle is greater than the friction along the ground.

It has been stated that most worn out machines have been discarded for defects which are directly tracable to inefficent lubrication, and an inspection of a junk pile will substantiate such a statement to a surprising degree. The life of a machine, run under proper conditions, with moisture and dirt kept away, is indefinite, as, when properly lubricated, an oil film holds the surfaces apart and prevents metallic contact. Abrasion of the metal will then only occur when dirt and gritty substances find their way into the bearing, via the oil, or through the oil holes.

Engineers have always recognized the need of lubrication. Most machines have been so designed as to permit of the lubrication of rubbing parts. Simple machines require

simple methods of lubrication. It is only with the introduction of steam, gas, and compressed air, that complicated systems of lubrication have been demanded. It may be accepted as a general rule, that the higher the grade and the greater the cost of a machine, the more attention is paid to its proper lubrication. Thus it is in power plants and on other high classes of machinery that there is found, today, the most efficent systems of lubrication. Many of these systems are elaborate and satisfactory in their results as far as they go. They depend upon gravity for their action, and require the attention of the engineer on starting and stopping. When an engineer's only duty is to look after the proper running of his engine, such a lubricating system is little extra care. When, however, an engineer has many other things to look after, as is the case with the automobile chauffeur, the lubricating system should be entirely automatic. It is perfectly evident, too, that a gravity system cannot be satisfactorily and economically arranged to lubricate valves and piston against a pressure of from forty to two hundred pounds per square inch. It is the demand for a pressure lubricating system that has called into existence the various types of force feed lubricators.

Automobiles have doubtless done more than any other one class of machines to bring about perfection in mechanical lubrication. On the early automobiles an oil cup was the only means of lubricating, and it was considered good enough; but