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POWERTRAIN Oil Conditioner Usage in Industrial Applications

After thirty years of use and study, with both commercial and industrial clients, the benefits of using POWERTRAIN in an engine from the onset consistently give tremendous gains in life and performance. Diesel engines broken-in with LubeCorp POWERTRAIN Oil Conditioner are typically smoother, quieter, and more powerful than conventionally maintained engines. This includes the larger V12 and V16 high horsepower engines.

SUMMARY

- LubeCorp POWERTRAIN Oil Conditioner is an industry-proven oil supplement that provides a lubricant compatible, totally effective barrier of boundary lubrication to any metal mechanism.
- POWERTRAIN effectively withstands pressure and temperature and neutralizes metal fusion.
- The effectiveness of POWERTRAIN is a function of its ability to bond to metal surfaces and produce a monomolecular barrier on the contact points between sliding metal components.
    - This occurrence is referred to as the POWERTRAIN's reactivity.
- Under severe metal-to-metal point-load conditions, metal deformation and metallic flow of the bearing substrate can displace the POWERTRAIN's monomolecular barrier.
- Total saturation of the POWERTRAIN barrier to the metal contact surface is required for optimum neutralization of metal-to-metal contact and metal fusion.
- The higher POWERTRAIN's reactivity -the more stable the monomolecular shield will remain, while allowing the effectiveness of POWERTRAIN to eliminate both temperature and wear.
    - The net result is best possible operability and life of the equipment treated.

The question is not so much whether or not POWERTRAIN is an effective supplement to lubricants but rather: What is the effect of its use during engine break-in. During engine break-in metal fusion takes place on an escalated scale. Substrate temperature is caused by the pressure of the contacting metal surfaces and is hot enough to melt the asperities of the metal alloys involved. When these two opposing surfaces contact metal-fusion occurs. The break-away that follows produces abrasive metal particles and filings -into the oil which in turn contributes to this wear phenomenon, but also readily collect in the engine components -i.e. babbitted bearings.

When an engine is allowed to break-in with POWERTRAIN a mono-molecular shield is produced on both the cylinder wall substrate and ring contact surfaces. Rather than disturbing the fresh cross-hatching on an engine's cylinder walls, POWERTRAIN effectively reduces the high degree of metal fusion, and abrasive metal particles, that occur during the break-in period, by neutralizing the occurrence of metal fusion.

However, due to the substrate temperature that is continuously created by contact pressure from the opposing metal surfaces, the engine is still able to break-in -but at a controlled rate. Metal deformation of the asperities on the ring and cylinder wall, rather than metal-fusion, will continue and the desired ring/cylinder wall seal is created.

As POWERTRAIN controls and prolongs the break-in process a smoother, more powerful and longer lasting engine is produced providing a proven advantage over conventional break-in practices.

POWERTRAIN enhances the additive package of a lubricant by providing a stable, chemical based, boundary lubricant compound. Though classified as an additive, POWERTRAIN's function is quite different from that of typical additives, even ZDDP (zinc dithiodialkylphosphate) a common anti-wear agent, found in approved engine oils.

There is a legitimate concern regarding the use of additives in oil particularly during the initial break-in period of an engine. Many of the conventional additives are suspensions of solid-based compounds such as lead, zinc, copper, molybdenum, PTFE (Teflon), etc. These products are reactive to temperature and melt and solidify to create a solid film on heated metal surfaces. It is commonplace to find that solids based additives foul cylinder-hones and interfere with both the ring seating and proper ring cylinder-wall seals. Further problems arise from the soft nature of these compounds at engine temperature and their tendency to be displaced, particularly by the sharp, chrome-molly rings which leads to packing of the ring grooves, oil ports, etc.

How much POWERTRAIN do I use? How often should I use it? Why?

The effectiveness of LubeCorp POWERTRAIN Oil Conditioner (POWERTRAIN) is a function of its ability to bond to metal surfaces and produce a monomolecular barrier on the contact points between sliding metal components. This occurrence is referred to as the 'POWERTRAIN's reactivity'. Total saturation of the POWERTRAIN barrier to the metal contact surface is required for optimum neutralization of metal-to-metal contact and metal fusion (welding).

The ratio of POWERTRAIN to a host lubricant determines its concentration in the lubricant and the higher the concentration the better the reactivity. There are several factors that should be taken into account when determining how much POWERTRAIN product should be used per application:

1. Application types
2. Severity of Load and Friction
3. Ratio of Lubricant to Mechanism
4. Circulation of the Lubricant

1. Application Types

Engines The typical treatment ratio of POWERTRAIN to the carrier lubricant is 3% or 30 ml per liter for all engine applications. Heavy towing and hard running may require additional POWERTRAIN, up to 6% or 60 ml per liter to insure maximum ongoing engine protection.

Automatic Transmissions Treatment for a transmission subject to heavy towing and severe use should have an initial treatment of 6% or 60 ml per liter of transmission fluid. Subsequent treatments should be maintained at 3% or 30 ml per liter of transmission fluid. The initial treatment of 6% will ensure that all metal inner transmission surfaces, including any metal filings present in the transmission fluid, will come in contact with the protective POWERTRAIN molecules.

Gearboxes Gear-reducers, manual transmissions, differentials, etc. - should run 6% at all times but may require more depending on the severity of the working condition. Under-designed, severe-load gear drives can safely be treated with an increased concentration of POWERTRAIN as high as 12%*. Wherever possible, monitoring of temperature reduction and metal count, after the application of POWERTRAIN, are good methods of determining if the POWERTRAIN concentration is of adequate strength to the application.

*For cost saving purposes, time allowing, you can start at 6% in severe conditions and increase the concentration thereafter until optimum results are achieved.

Bearings There is a broad variety of bearing types and numerous applications. Generally speaking a 3% treatment of POWERTRAIN to the bearing lubricant is sufficient for desirable results. If however, the bearing is under extreme loading or is failing, then the dosage should be increased to 12%.

2. Severity of load and friction

The greater the severity of loads occurring in an application, the greater the need for optimum reactivity of POWERTRAIN. Following are two application comparisons:

I. The typical life expectancy of a diesel engine on a mobile well-servicing rig, before major overhaul without POWERTRAIN, is in the area of 10,000 - 12,000 hours. The continuous use of POWERTRAIN in this application pushed the life expectancy of the same engine to as high as 20,000 hours and longer.

II. A particular mining application utilizing a 12" diameter, heavy duty offset, double-drum roller bearing, in a crusher mill, realized a life extension on this bearing from 6 months to over 4 years. The increase in life span realized here is much more significant than the diesel engine in the order of 800% (results may vary depending on specific applications).

Note: Where the diesel engine required an ongoing ratio of POWERTRAIN of 3% in the host lubricant to maintain adequate reactivity, the crusher bearing, being under exceedingly more load, required a ratio of 10% to maintain optimum reactivity of the POWERTRAIN Oil Conditioner and to achieve the desired results. (The increase product cost at 10% was far more than offset by the tremendous increase in bearing life realized by the mining operation).

A lower ratio of POWERTRAIN in the crusher bearing would have resulted in a shorter life span of the bearing. The degree of wear reduction is directly proportionate to the success of maintaining a complete monomolecular barrier on the contact surfaces of the bearing, bearing retainers and race.

Severe metal-to-metal point load pressure will create temperatures on the bearing substrate high enough to melt the metal alloys at the microscopic level. A monomolecular layer of POWERTRAIN will effectively withstand such severe pressure and temperature and thereby neutralize metal fusion.

Note: Under severe load, metal deformation and metallic flow of the bearing substrate can displace the POWERTRAIN's monomolecular barrier. The higher the POWERTRAIN's reactivity the swifter the repair of the monomolecular shield will occur and consequently the more effective the reduction in friction, temperature and wear.

3. Ratio of Lubricant to Mechanism

Another factor in determining the concentration of POWERTRAIN, and equally as important, is:
- the ratio of the host lubricant to the surface area of the metal components.

The following comparisons will help in understanding this concept:
- The reservoir of a typical automotive steering pump holds 1 liter of lubricant.
- The reservoir of a hydraulic pump holds 100 liters of lubricant.

Note: The hydraulic pump has perhaps 10 times the metal surface area; but it holds 100 times the amount of lubricant due to the hydraulic hoses, lines and controls as well as a large reservoir for cooling purposes for the system.

The difference in the ratio of the lubricant to the mechanism is in the order of 10 times more for the hydraulic pump than for the power steering pump.

The recommended amount of POWERTRAIN for the steering pump is 3%. The amount of POWERTRAIN for the hydraulic system can be reduced to 1.5 to 2% due to the increase in the lubricant to mechanism ratio. The reactivity time of the POWERTRAIN, to replace its monomolecular barrier, would be slower than if there was more POWERTRAIN. But, the 1.5% to 2% should be an adequate amount of POWERTRAIN in the fluid to maintain a 100% effective barrier under normal operating conditions.

Note: Spectrograph analysis of the oil, temperature monitoring, as well as unit history, help determine if a unit is under a higher than desired amount of load. If the hydraulic system in question is operating under a severe amount of load and temperature, a 3% concentration of POWERTRAIN should be maintained.

4. Circulation of the lubricant

Most equipment is provided with a steady, adequate supply of lubricant. However, certain applications provide slow lubricant circulation through the mechanism and many mechanisms are 'splash lubricated'. These units during start-up, especially in cold conditions, can suffer from lubricant starvation.

When maintained at a minimum 6% in the lubricant POWERTRAIN forms a tenacious, residual barrier that remains intact prior to start-up and during poor lubricant supply.

The use of POWERTRAIN in Arctic conditions reveals that the margin of lubrication it provides can mean the difference between failure and operability under severe cold environments.

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Benjamin Vroon, CEO
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