Oil or Grease: Operation & Motion (Part 2/4)

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Factors #2 & #3: Hours of Operation and Motion

Weather extremes are hard to miss. Even if you don't have a thermometer somewhere nearby or an app on your phone (or a degree in meteorology), it doesn't take much to realize what sweltering hot or blistering cold feels like. As a result, it's not too much of a stretch to think that when you are feeling the elements, so are the motors around you.

But what about on that perfect, sunny-with-a-light-breeze kind of day? Or when you've masterfully selected that perfect temperature for your home where you can walk in and feel instant relief from the outdoors? What about your motors then?

Depending on how much use they are getting, they might not be experiencing the same relaxed atmosphere. In fact, their internal climates might be more like an inner Sahara Desert instead of the cooler temperatures around them. This can occur because the operation of an application for more than 20 or 30 minutes is considered continuous activity—regardless of whether or not it set for two hours before and will continue to set idle for two hours after. (The classification of "continuous" or "intermittent" is dependent on the amount of time that the application is loaded at full power, i.e. 20 minutes.)

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That being said, as a general rule, heavy usage of an application increases heat. It's basic friction. Think of how you rub your hands together to stay warm when you forget your mittens in the winter or how wilderness campers rub sticks together to produce fire.

This same concept applies with the inner workings of the motor, and thus, can change the consistency of the lubricant within the motor (just like how the external environment can). The more the motor components move (and the more points of friction that occur), the more its grease softens due to the increased heat that is produced (although certain additives can help avoid this problem).

It is important to note that oil is best for constantly changing temperatures, but grease is potentially a more practical lubricant for specific applications used primarily in extreme temperatures.

As it does with climate, bleeding (when lubrication flows away from necessary metal-to-metal contact areas) and oxidation (the rusting of metal parts) occur when the overall heat index is raised. At extremely high temperatures, the oil base (or the actual oil itself if you aren't using grease) evaporates, causing lubrication deficiencies. Oxidation, on the other hand, produces a gummy substance, which also affects lubrication effectiveness. Continued high-heat conditions increase this oxidation.

Oil is less susceptible to temperature-related viscosity issues, because its free-flowing nature carries heat away from moving parts (and typically produces less noise. As a result, it is important to note that the increased viscosity of grease tends to increase the noise level of the application. Grease, then, due to its thickeners alone, will potentially perform with heightened noise output.

Beyond temperature, additional factors for concern would be the moving parts themselves. The load they are expected to carry (which will be discussed in the next blog post of this series), their orientation, cleanliness, and resulting efficiency also contribute to grease and oil function.

For further information on hours of operation and how it applies to the selection of your next motor, feel free to read our Finding the Best Motor For Intermittent Duty Applications blog post.

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