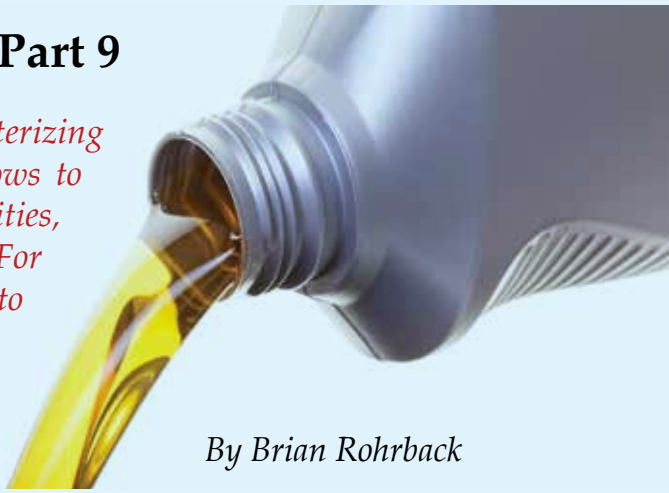
Meandering Through the Oil Industry: Part 9

This technical article is in a series characterizing the process that the oil industry follows to bring us one of our favorite commodities, the gasoline that powers our Classics. For engine life, the name of the game is to reduce friction, but there is more.



THE ROLE OF MOTOR OIL

By Brian Rohrback

There are five main fluids circulating around in our Classics:

1. Gasoline (which this series is beating to death);
2. Water used to cool the engine;
3. Air, a very versatile player, employed to cool the water, cool the engine directly, reduce the heat in various mechanical parts, mix with the gasoline, and fill the tires;
4. Hydraulic fluid – not always employed - the y-vowel of the automotive fluid regime; and
5. Motor oil (to keep the moving bits moving).

We, of course, want to keep these fluids separate from one another and hopefully we succeed most of the time, except for that blending of gasoline and air prior to sparking it into (mostly) carbon dioxide and water. The series has mentioned the listed gasoline and water, but what is motor oil and how much do we need to be concerned with the type and brand we buy?

I will admit that my knowledge of motor oil is far more theoretical than practical. But, the Classic Car Club of America is a veritable fountain of information about every topic even remotely related to cars (I personally am always impressed with what Laurel Gurnsey delivers in this magazine). So, I turned to the expertise of the Indiana Region, the source of "Classic Car Oil". More than a little help from our friends, Dr. John Klein has a series of articles you can find on-line at http://classiccarmotoroil.com/articles.html. EVERYONE should read his articles for an in-depth evaluation of additives that are no longer integrated into everyday brands. I do my breezy paraphrasing here to whet your appetite. But first, an overview.

Originally, motor oil was just a raw production cut from the refining process, but we are far more sophisticated than that now. Clearly, we need oil for its lubricity, but there are other roles we assign to motor oil that causes us to review several, sometimes conflicting, jobs:

1. Foremost, motor oils form a protective layer that keeps adjacent metal parts from munging up one-another, thus minimizing wear. Modern oils have additives that make this process more efficient than the pure hydrocarbon oil would accomplish alone.
2. Oil evens out the temperature profile across the engine, shuffling the heat away from the cylinder area (which can exceed 500 degrees F) to the rest of the engine block.
3. It also keeps corrosion at bay. In my case, with a British Classic, this constitutes extended protection to the exterior of the engine and any of the bits below.
4. Finally, oil keeps an engine clean by spiriting away deposits from the works and encapsulates it much like white blood cells attack invaders. Don't be fooled by the garage mechanic that shows you a drop of new oil and a black drop from your engine to push an oil change; this is just evidence that your oil is doing its job.

Multi-grade versus Mono Grade and Synthetics

As our engines and the outside world vary in temperature, we want to make sure the oil performs its functions regardless of the thermal environment. Single-grade oil has significant limitations when tasked with a transition between cold and hot ambient environments. Multi-grade is designated by two lube performance characteristics. For example, 15W-40 lists the low temp ("Winter") number followed by a viscosity number. The viscosity number tells how thick the oil will be at the boiling point of water (212 degrees F); the higher this number, the thicker. Hot weather means you want a higher number so the oil does not thin out too much. The Winter number indicates the temperature in degrees F where the oil retains the higher temperature flow characteristics. The lower the Winter number, the less it thickens in the cold. Leave the mono-grade oils for your chain saw and lawn mower; it will also work fine in a Bijur system (I use SAE30, non-detergent); a multi-grade oil will outperform in an automobile of pretty much any vintage (I am not sure about the pre-Classics).

You can also choose between a mineral oil base and a synthetic. For my money, the synthetic is the way to go, but really, because Classic owners change their oil well before the oil has worn out its welcome, it should not matter much. Regular 'ole' oil is just a cut from the refinery distillation process that has gone through a step to remove waxes (straight-chain hydrocarbons) that would gum up the works. A synthetic is more expensive in that it is a manufactured entity and does not degrade and form sludge as much as a distillation cut does.

Additives and our Classics

When we think about additives, the key is that they have made their appearance as we learned more about protecting engines and to accommodate the changes in engine design over the years. Because our Classics were designed well before oils we see in the auto aisle of Fred Myer, some additions are beneficial, some are detrimental. Detergents, dispersants, and the antis (anti-wear, anti-oxidants, anti-friction, anti-rust, anti-foam) are good in general. But there is a clash between new and old oils relating to the concentration of zinc and phosphorous in the oil. Zinc dialkyldithiophosphate (ZDDP) is the most common zinc-based additive and is used primarily as an anti-wear agent, providing corrosion and oxidation protection as well. On the other hand, the zinc and phosphorus found in ZDDP reduces the life of the platinum in catalytic converters. The shift was in the mid-1970s, so you should seek higher phosphorous content than what is available in oils from most of the usual suspects. Post-1970s motor oil formulations cut ZDDP levels in half or more and are sacrificing engine protection for our Classic cars. Do check out the link to the Indiana region for an in-depth series as well as the excellent Bumper Guardian articles written by Bill Deibel (Issue 2008-1, page 19, Issue 2009-3, page 15), Les Huggins (Issue 2008-4, page 7), and Gary Russell (Issue 2007-1, page 20) – they are all on-line at https://home.ccca-pnr.org.

I have done some experimentation with motor oil for my Bentley, but after (finally) reading the Indiana Region's articles on motor oil, I am switching to CCMO to keep up my Classic (and support that fine Region of our Club.)