

# Reformulated Gasoline and Your Motorcar Engine

By Mike Paul

Many articles have appeared in past issues of various motorcar publications regarding the type of oil to mix with the gasoline of the two-stroke motorcar engines, but nothing has been said about the use of oxygenated fuel. In the Milwaukee area last winter, oxygenated fuel was required by EPA (as was its use in other major metropolitan areas across the country), and was the only fuel that could be purchased. There were a number of complaints about two-stroke snowmobile engines seizing while using this fuel.

In the recent issue of a major recreational vehicle publication was an article about oxygenated gasoline, or RFG (Federal Reformulated Gasoline). The following information is based on information gathered from that article, and does not constitute my recommendation in any way regarding the use of RFG in motorcar engines.

RFG has an alcohol-based additive which contains oxygen molecules. This has the effect of adding more oxygen to the fuel mixture of a fixed-jet carburetor, which causes the fuel-air mixture to be leaner. Fortunately, the Fairmont two-strokers have a manually adjustable needle valve, so the mixture can be richened to offset the oxygen-rich RFG. Unfortunately, Onan engines don't have a readily adjustable main jet. The extra oxygen in RFG ensures more complete burning of the fuel-air mixture according to EPA, which avowedly reduces air pollution. That's the good news. The bad news is that lean mixtures can increase engine heat which, in extreme cases, can result in engine damage.

There are two types of RFG additives that gasoline manufacturers can choose from: MTBE (Methyl Tertiary-Butyl Ether) and ETBE (Ethyl Tertiary-Butyl Ether). It's easier if you remember only the first initial, and associate the "M" with methanol (methyl alcohol) and the "E" with ethanol (ethyl alcohol).

The problem with ethanol is that it attracts moisture. When enough moisture is present in the tank, the fuel will separate into two layers--an upper gasoline layer and a lower ethanol-water layer. When this lower layer comes in contact

with certain metal fuel system components, it can cause severe corrosion and, consequently, fuel leaks. Unfortunately for two-stroke engines, this is only the beginning of problems!

The oil mixed with the fuel for lubrication can separate into the top layer of fuel because oil is lighter than the ethanol-water layer. Because most fuel tanks draw from the bottom, the engine may not have adequate lubrication upon startup and could eventually seize. RFG containing MTBE is not susceptible to these problems.

Additionally, both types of RFG may loosen deposits in the fuel system because it is a better solvent than conventional gasoline. The loosened deposits can plug fuel filters and carburetor passages. Although this is not a common problem, it is most likely to occur when older vehicles are first fueled with RFG.

And finally, questions have also arisen about the compatibility of RFG with the seals, elastomers, o-rings, and hoses used in older engine fuel systems. There have been claims that RFG may cause damage to those components.

So what's a motorcar owner to do! Based on the information I've obtained, I personally will use straight gasoline when I can get it, and if I can't, I will use RFG containing MTBE. I haven't yet been faced with the dilemma of having no choice but ETBE gasoline, and I can't tell you what I would do if faced with that dilemma! In closing, I would restate what I said at the beginning of this article, that I am not recommending what type of gasoline you should or should not use in your motorcar engines. Only you can make that choice.

## The Engine Oil Controversy

By Dick Ray

*(This article first appeared in the Summer 1988 issue of THE SETOFF.)*

Recently, there have been a number of discussions between NARCOA members about the pros and cons of different types of engine oils for two-cycle, single-, and twin-cylinder motorcars. These discussions have centered primarily upon the advantages and possible disadvantages of using either "standard" 30-weight, non-deter-

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gent oil (as recommended in Fairmont operating manuals), or modern two-cycle (outboard type) oil, such as Pennzoil, Kendall, Castrol, and many others. With this article, I am presenting to you my findings and opinions after having spent a reasonable amount of time researching the subject.

Up front, I will state that I use a modern two-cycle oil, mixed 16:1 (one quart of oil to four gallons of gas), for my Fairmont single-cylinder M9 motor car, instead of the 30-weight, non-detergent oil recommended by Fairmont.

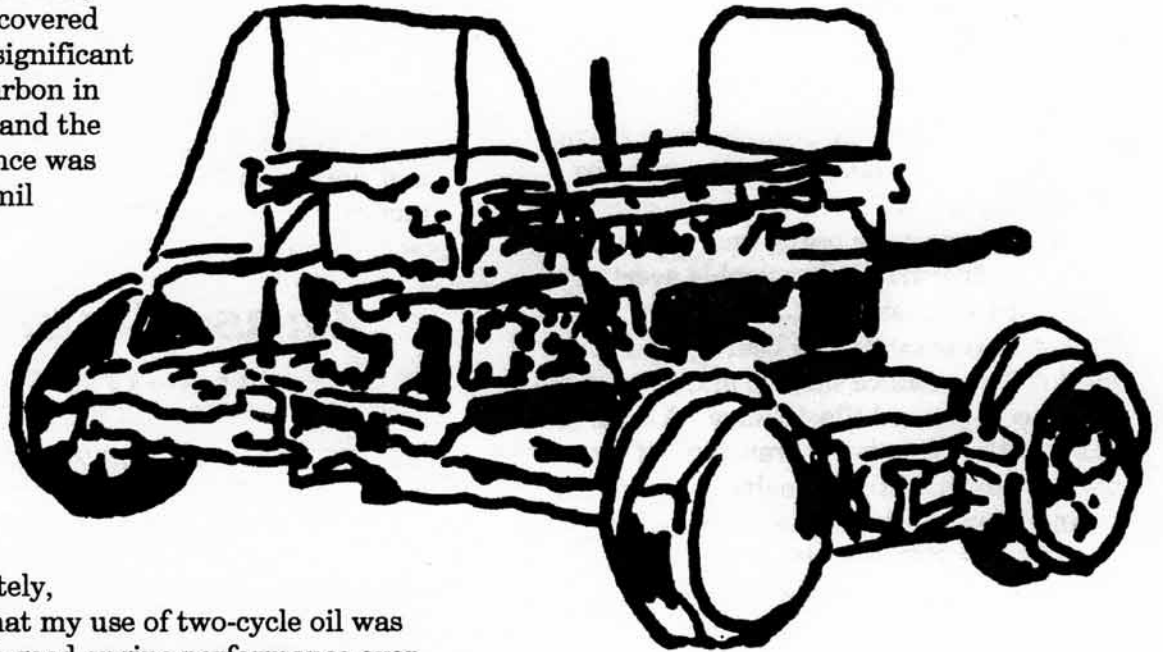
During a recent inspection of my 1951 Fairmont RO-C engine, with perhaps 4,000 miles of my own mileage on it, I discovered that there was no significant accumulation of carbon in the exhaust ports, and the rod bearing clearance was still in the 2- to 3-mil tolerance suggested by Fairmont. Additionally, all of the piston rings were free in their grooves, and the piston crown had very little carbon buildup. Immediately, I had the feeling that my use of two-cycle oil was the reason for such good engine performance over the years, as well as the "clean" condition of my engine.

Although I was personally convinced that two-cycle oil was the way to go, I decided to contact some oil industry experts to get some other opinions. I wound up talking with several staff engineers at three major oil companies to get their recommendations. I described our Fairmont engines, and our type of operating conditions.

All of the engineers agreed that "regular" engine oil would certainly work at providing satisfactory lubrication of the bearings (as does two-cycle oil), but none of the engineers would

recommend using it in our engines. Their reasoning was that regular, non-detergent oil is difficult to mix with gas into a uniform mixture (as some NARCOA owners have found). They also stated that even nondetergent oil will leave ash and deposits that can foul plugs, and cause cylinder wear, pre-ignition, and carbon buildup.

One engineer, Mr. Charles Pross, of Castrol, Inc., discussed the oil question with service department personnel at Fairmont, and afterwards, recommended that an oil with a TC-W (two-cycle/water cooled) rating be used for our engines. This is the highest rating of the Boating Industry Association (BIA). These oils are ash free, and contain more concentrated lubricating additives. He stated that they could be used in smaller concentrations than 16:1 (up to 50:1), however, I would be reluctant to use concentrations less than 16:1 since our engines need oil



lubrication while descending grades with the throttle mostly closed. I feel that if there is little or no carbon buildup in the ports or in the innermost portions of the engine, then there is no harm in providing this extra lubrication safeguard.

Incidentally, an easy way to mix these two-cycle oils with your gas is to leave one or two quarts of gas mix in the can, then pour in the oil and head for the gas station. The mixture will then mix easily when the "new" gas is pumped into the can.