The Tractor Fuel Problem

Comparative efficiency, cost and convenience of Gasoline and Kerosene as fuel

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The tractor fuel problem is a live one at present. Large numbers of gas engines are now being purchased and this spring will see a greatly increased use of such power. The name "gas engines" in this article is used with reference to all internal combustion engines, no matter what fuel is burned. The gas engine has now become a very important factor in the agriculture of the West, in fact so important has it become that the writer has observed in connection with his work on the Extension Service of the Agricultural College, that it has become the most popular subject at the Winter Short Course Schools thruout Manitoba.

A farm is hardly up-to-date nowadays unless its equipment includes a gas engine of some kind. It may only be a small engine used for pumping water for the stock or for doing household work, such as running the churn, cream separator, or washing machine, altho we have observed that the engine for pumping the water—a man's job—is usually purchased before the one used for household work. Where much stock is kept, larger engines are used for crushing grain, filling silos, etc., and a very large number of small tractors are now being sold to do traction as well as stationary work. The shortage of suitable farm labor has greatly increased the interest in small tractors, as the small tractor is primarily a labor saving device, just as much as the binder or mower. The writer does not believe that the tractor will ever displace the horse on our farms, but it will cut down the man power required and has as useful a place on the farm today as most of our other modern machines.

Many problems present themselves to the prospective purchaser of a small tractor, problems of weight, design, etc., but there is one problem which is presented to the present owner as well as the prospective owner, which is of great interest at present. This is the problem—whether it is more profitable to burn gasoline or kerosene.

Gasoline versus Kerosene

Farmers are being told by some salesmen who are selling kerosene tractors that a gallon of kerosene contains more power than a gallon of gasoline; other salesmen go further and say that a gallon of kerosene produces more power than a gallon of gasoline. There may be a great difference between

The tractor will steadily cut down the man power required. One of the greatest problems is to secure competent engineers. The various short course schools are doing good work in correcting this difficulty.

"contains" and "produces." If the latter statement were true, there would be absolutely no argument in favor of gasoline and we would all burn kerosene, but such is not the case, as the writer will show in this article.

Heat is directly related to power. Without going into a scientific discussion of this subject we can here explain that all fuels are said to contain a certain quantity of heat per pound. In measuring heat we have a unit of measurement as in measuring anything. For instance, one pound is our unit of weight, one foot our unit of length, and so on. The unit used for measuring quantities of heat is called a British thermal unit, expressed by the letters B.t.u. One pound of gasoline contains 18,000 to 20,000 B.t.u. of heat, while one pound of kerosene contains 22,000 to 24,000 B.t.u. of heat. It can therefore be plainly seen that if heat is directly related to power that one pound of kerosene contains more power than one pound of gasoline, and as kerosene is heavier than gasoline, the difference per gallon would be greater than the difference per pound.

In burning fuel in an engine cylinder a great amount of heat is lost in many ways, and we judge the efficiency of an engine by the percentage of heat units transformed into work. This percentage is known as the thermal efficiency of the engine. Gasoline engines show a higher thermal efficiency than kerosene engines.

Motor Contest Results

The only available records of tests conducted in this country are the records of the Winnipeg motor contests, so let us study the following calculations made from the official records.

The average amounts of fuel required to produce one horsepower hour each year for the last three years of the contests are as follows:

1911—Gasoline average .0995 gallons per h.p.h.
1911—Kerosene average .1188 gallons per h.p.h.
1912—Gasoline average .0966 gallons per h.p.h.
1912—Kerosene average .1246 gallons per h.p.h.
1913—Gasoline average .0968 gallons per h.p.h.
1913—Kerosene average .1114 gallons per h.p.h.

Gasoline average for three years .0976 gallons per h.p.h.

Kerosene average for three years .1189 gallons per h.p.h.

From the above figures we can see that it always

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Getting Uniformity in Power Ratings

Too much confusion—All parties to blame—A testing bureau proposed

By J. McGregor Smith, Associate Professor of Farm Engineering, University of Saskatchewan

"I have a well known tractor running a 24x42 ——separator. The engine pulley is 14 inch and runs about 600 revolutions per minute. The separator runs about 1,000 r.p.m. It has all attachments, bagger and stacker. The belt slips off and will not begin to drive the separator. Would it do any good to lag the engine pulley? Please tell me how to lag a pulley.—G. M., Eston, Sask."

Answer: "It seems that your engine has not sufficient power to drive the separator, as I understand the make of tractor you mention is rated at 12.24. However, it might be as well to lag the pulley on your engine as it cannot do any harm and may be of some assistance. This will have the effect of making the cylinder of your separator run at a higher speed. If the separator pulley runs too fast, you could also lag it. To lag your pulley, soak the leather well in water until it is very soft and pliable, then cut the end square and start at any point on the rim of the drive pulley, using copper rivets. I would place them about two inches apart across the face of the pulley and about three or four inches apart on the circumference. By placing the lagging on when it is wet, you will have a good tight job, after it dries. otherwise the lagging would not stay on at all."

The above question, sent in by a small thresherman, represents a state of affairs which has been a source of great confusion and trouble, and, indeed, always will be until something is done and done very soon. Who is to blame? The answer is that both manufacturer and farmer are at fault and both are equally desirous of finding a solution to the problem. The ever increasing demand for the small tractor which is flooding the West, just as its big brother did a few years ago, makes the situation acute. Let us go back.

Prior to the introduction of the gasoline tractor there was not much confusion in tractor ratings. While steam tractors were under-rated, they were all under-rated in about the same proportion. The fact that there was practically no trouble on this basis shows that farmers will soon adapt themselves to any method of rating which may be chosen, provided all reliable manufacturers conform to that standard, whatever it may be. In rating gas tractors no attention was paid to the customary method of rating steamers. Gas tractors were rated on brake horse power (B.H.P., power developed at the belt) and draw bar horse power (D.B.H.P., power developed at the drawbar). It is also a curious fact that while to makers of steam engines there was a real or supposed advantage in under-rating, yet to the gas engine manufacturers it was exactly the reverse and a large percentage of gas tractors for sale are over-rated and cannot develop their advertised capacity. In some cases this over-rating is deliberate, while in others it is due to the fact that some gas tractor concerns get their motors from a plant which specializes in this line and no consideration is taken of the power which must be lost in the transmission of the power from the engine to the belt pulley or the drawbar, as the case may be. In other cases over-rating was due to failure to make proper allowance for change from gasoline to kerosene equipment. From the standpoint of the farmer it is highly desirable that tractor ratings should be put on a rational and uniform basis. It would also seem that tractor interests in the long run would profit by conservative and uniform ratings—that the practice of over-rating is short sighted.

Breaking brush on the farm of J. M. McCaskills, Foxwarren, Man. One of the greatest uses to which the tractor can be put and one at which lots of power is needed.

The Farmer Is The Goat

From this general discussion let us proceed to see what is the present situation regarding tractors and threshing machines. A man goes to a dealer and asks the question: "How many plows will your engine pull?" He might just as well ask: "How long will it last?" as far as a definite answer is concerned. It may take 500 pounds or 1,500 pounds to pull a 14 inch plow in breaking, depending on the kind of soil. But on the other hand, should the farmer ask "What drawbar horsepower has your engine?" i.e., how

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