



## AGRICULTURAL ENGINEERING NEWS LETTER

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# A Full Load for the Tractor, Why and How

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Tractors on farms are of various sizes, but most of them are either for two or three plows. A small percentage of the farm tractors are larger than the three-plow size. Recently the so-called one-plow tractor was placed on the market and sold in large numbers. Under ordinary conditions the one-plow tractor is equivalent to four horses for field work and the two-plow tractor will replace six or seven horses. The three-plow tractor is considered equivalent to nine or ten horses.

The farm operator using horses as his source of power is in position easily to adjust the size of the power unit to fit the load. If he is operating a gang plow he will generally use five or six horses. If he has a smaller load, such as pulling a mower, he will use only two horses. The number of horses used is no greater than necessary to do the job at hand satisfactorily.

### Some Characteristics of Tractor Power

Tractor power differs in many respects from animal power. It is not possible to divide the power unit and use only part of it. When a farmer uses his three-plow tractor, it is as though he were driving a ten-horse team, and whenever he operates the one-plow tractor he has available a quantity of power which is equivalent to four horses.

Slightly more fuel per hour is usually required with a full load than with a part load. The increased amount of fuel required per hour as the load increases, however, is very small with most tractors. The same is true with regard to most other factors of tractor cost. Depreciation and interest costs are based on the life of the tractor. Unless the tractor is abused, its life would not be shortened appreciably by operating it at its full rated load instead of a part load. It follows that the cost per hour of operating a three-plow tractor is nearly the same when it is doing the work of two horses

as it would be if it were doing the work of ten horses.

### A Full Load Is Most Economical

Let us assume that the cost per hour of operating a tractor, not including the operator, is sixty cents when it is pulling a full load and doing the work of ten horses and that it is fifty cents when a three-horse load is pulled. While the tractor is pulling the heavy load the cost per hour for the work of one horse would be six cents, whereas the cost per hour for the work of one horse with the small load would be about seventeen cents.

If tractor power is to be managed in the most economical manner, a load should be provided which will be as nearly as possible the largest that the tractor will handle well. To accomplish this it may be necessary to change some of the farm practices. The characteristics of tractor power must be kept in mind when equipment is purchased and when farm operations are planned and performed.

### Methods of Providing a Full Load

There are several possible ways in which the situation might be improved. One method consists in using a machine of sufficient size to provide a suitable load. Another possibility is to hitch together two or more machines and to perform two or more operations at the same time. A third is to increase the speed with which the tractor is operated.

### A Large Machine May Be Used

Using a sufficiently large machine is possible for the heavy field work, but this method has its practical limitations. With the small tractors such operations as cultivating corn will provide a satisfactory load. With tractors of the three-plow size and often with two-plow tractors, it is not practical on the average farm to perform all operations with a machine large enough to furnish a suitable load. Such practices would necessitate too large an investment per acre in machinery.

### Two or More Operations May Be Performed at One Time

Performing two or three operations at the same time should be practiced more

than it is. In many cases this practice is not followed because it is not customary. There are some difficulties but most of them are more imaginary than real and with slight changes in methods, many of these can readily be overcome. The smoothing harrow can be pulled with the plow, disk harrow, field cultivator, roller or grain drill. Other combinations that are possible and entirely feasible under some conditions include roller and grain drill, disk harrow or field cultivator and grain drill, mower and side delivery rake. Combinations that make a desirable load for the tractor, both because of the size of the load and because of the resulting reduction in side draft, are the wagon pulled with corn binder equipped with bundle loader and the wagon pulled beside the corn picker.

### Speed May Be Increased

Most field work done with the tractor is performed at a higher rate of speed than with horses. The speed, however, can be increased only to a certain point. Many of the machines in use today are not of suitable design to stand up under high speeds and the quality of their work would not be satisfactory. However, for some operations, the speed can be increased one or two miles per hour, thus proportionally increasing the amount of work done in a given time and reducing the number of hours that the tractor will need to run to complete a given job.

When a farmer hires a custom outfit at a certain cost per hour, he is interested in getting as much work done in an hour as possible. For good management of tractor power the operator should have the same objective. The cost per hour of running the tractor is nearly fixed, and is an important factor of production costs. The tractor should not be allowed to loaf along idly and accomplish little. With proper management it may be made to pay a profit on the investment in fuel and oil. It has also been hired to work by the year. It should be kept employed advantageously as many hours as possible so that the cost of depreciation and interest per unit of work may be kept low.