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### How to Figure Operating Costs of Farm Machines

Cooperative Extension South Dakota State University

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# *How to Figure*

## Operating Costs of Farm Machines

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- 1 *Depreciation*
- 2 *Interest on Investment*
- 3 *Repairs and Overhead*
- 4 *Fuel Costs*
- 5 *Labor Costs*

*All Are Your Expense*

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## How to Figure the Cost of Operation of Farm Machinery

A typical problem is stated, and then is worked out. By using the blank columns, similar problems can be worked.	New Set of Figures	
First Cost of Tractor = \$1200.....		
First Cost of Plow = \$150.....		
Years life of both = 15 years.....		
Days Used per Year: plow 10, tractor 100.....		
Interest Rate = 6 per cent on $\frac{1}{2}$ First Cost.....		
Hours per Day = 10.....		
Belt HP = 25.....		
Gasoline = 15c per Gallon.....		

Item to be Figured	Method of Figuring	Daily Cost			
Depreciation of Tractor	$\frac{\text{First Cost} = \$1200.00}{\text{Yrs. life} \times \text{days/yr.} \quad 15 \times 100}$	a.	\$ .80		
Depreciation of Machine	$\frac{\text{First Cost} = \$150.00}{\text{Yrs. life} \times \text{days/yr.} \quad 15 \times 10}$	b.	1.00		
Interest on Tractor	$\frac{\text{First Cost} \times .03 = \$1200 \times .03}{\text{days/yr.} \quad 100}$	c.	.36		
Interest on Machine	$\frac{\text{First Cost} \times .03 = \$150 \times .03}{\text{days/yr.} \quad 10}$	d.	.45		
Repairs, Overhead on Tractor	$\frac{\text{First Cost} \times .05 = \$1200 \times .05}{\text{days/yr.} \quad 100}$	e.	.60		
Repairs, Overhead on Plow	$\frac{\text{First Cost} \times .07 = \$150 \times .07}{\text{days/yr.} \quad 10}$	f.	1.05		
Total Machine Cost	Add a, b, c, d, e and f.	g.	4.26		
Fuel Cost per day	*Belt HP $\times$ .8 $\times$ price/gal.	h.	3.00		
Labor Cost per day	Number of men $\times$ wage rate	i.	8.00		
Other Operating Costs	(Twine, baling wire, etc.)	j.	0.00		
Total Operating Costs	Add g, h, i and j.	k.	15.26		
Total cost per hour, per acre, per ton, etc.	$\frac{\text{Daily cost} = \$15.26}{\text{Daily production} \quad 15A}$	l.	1.02		

\*When no accurate figures are known on fuel consumption, use the short cut method above. This also allows enough to cover oils and greases.



# *An Explanation of the Factors Which Make up the Total Machine Operation Cost*

## ▶ Depreciation

Depreciation is the loss in value, usually on an annual basis, of a piece of property which is subject to wear or deterioration. Farm machines are in this class. We need not charge the full purchase price of a machine against its work the first year, but rather divide the first cost by the number of years it is expected to last.

Usually, in machinery cost problems we need the daily depreciation cost. This involves dividing the yearly depreciation cost by the total days that particular machine is used in an average year. Thus by equation:

$$\text{Daily depreciation} = \frac{\text{First Cost}}{\text{Yrs. life} \times \text{days/year}}$$

Those machines which are used only 4 or 5 days per year have a very high daily depreciation. It is also true that machines used only a few days a year may not last any longer than machines used more often. Machines deteriorate by standing idle, especially if they are not housed. They also become obsolete and are discarded or traded for newer models. Machine life averages about 15 years. Most machines could be made to last much longer if exceptional care were given them.

## ▶ Interest on Investment

It is customary to charge an interest cost on machinery against the work done by it. The usual rate is 6 per cent.

If the operator had borrowed money to buy this machine, the interest would have to be paid, and the machine should earn the interest through its work. Each year the value of the machine drops and therefore the interest on the investment should become less. In order to make each year's interest charge the same, it is customary to take 6 per cent of one-half of the first cost. The equation for daily interest charge would be:

$$\text{Daily interest cost} = \frac{\text{First cost} \times .06}{2 \times \text{days used/year}}$$

## 3 Repairs and Overhead

Repair costs are hard to figure exactly. The large repair bills need not be charged up to one year's expense, but rather equalized with other years. Such items as insurance, taxes and housing costs can also be added to the repair cost. The total is then stated as a per cent of the first cost. A table gives some suggestions as to life of certain machines and a fair rate for repairs and overhead. Experience may prompt the operator to raise or lower these figures to fit his machine.

Machine Group	Years Life	Rate for Repairs
Tractor .....	12	4 to 6%
Plows .....	16	7 to 8%
Disks and Drills .....	18	3 to 4%
Hay Tools .....	18	3 to 4%
Combine, Corn picker or Baler ..	10	5 to 6%

## 4 Fuel Costs

Most operators will know the average daily fuel costs and the additional costs of oils and greases. If these figures are not known the following estimates can be made:

- (1) Gallons of distillate per 10 hr. day = the belt HP.
- (2) Gallons of gasoline per 10 hr. day = .8 x belt HP.

The daily cost will be the price per gallon multiplied by the gallons of fuel used.

## 5 Labor Costs

This item is very flexible and is one of the larger items. It is so changeable, year to year, as to make some machinery cost figures obsolete after one season. The "going" wage for your community should be noted. Consideration should be given to the skill and experience of the operator.

## How to Work the Problem

- a. Use the table on the reverse side of the sheet. There you will find a sample problem worked out. Follow it through step by step.
- b. You may not agree with all figures used. For your own problem you can change them to fit the needs of your machine, community and farming conditions.
- c. Assign proper first cost, years of life, etc., figures at the top of the page where it says "New Set of Figures," then work down the column until the cost per day or cost per acre is found.