Machinery Costs Computer Program

Machinery Costs is a Windows based program that van be run on a Windows 95 or higher system. The program estimates the costs of owning and operating various farm machines.

Installation Instructions

Machinery Costs can be downloaded off the Internet at:
> http://www-agecon.ag.ohio-state.edu/faculty/rmoore/index.htm

Go to the bottom of the page and click on "Farm Management Computer Programs" then click on Machinery Costs. This page contains links to these instructions and to the Machinery Costs computer program. To install the program follow the steps below:

1. Click on the Machinery Costs computer program link.
2. A message box will appear asking if you want to run the program or save this program to disk. Select "save this program to disk" and click OK
3. A Save As box will appear asking where you would like to save the installation program. Select where you would like to save the installation program. It can be saved to anywhere on the hard drive of your computer. Click on "Save".
4. The program will begin to download. After download click "Open Folder" (if your browser does not have an open folder button, manually open the folder that you saved the program to).
5. After opening the folder, double click on the MachCostsInst file.
6. A self-extracting file window box will appear, select a folder to download the program into. Click on "Unzip" button. A folder named MachCosts will be added to the designated folder on your hard drive. The folder will contain three files.
7. Go to the MachCosts folder that contains the three downloaded files, double click on setup.exe.
8. Follow the installation instructions. You may be asked to restart your computer during the installation process. If so, restart your computer then start over at step #7.
9. The program is now loaded and can be started by going to the "Start" button (lower left corner of screen) then "Programs" then "MachCosts".

Screen #1 – Opening Screen

Select the tractor and implement button for estimating costs for a tractor and implement or the combine button for estimating the costs of a combine. Also input the age of the tractor and machine to be used.

Tractor and Implement Option

Screen #2t – Tractor and Implement Selection

This screen allows the user to select either a 2 or 4 wheel drive tractor, the type of fuel used, and the implement that will be used in conjunction with the tractor. If a specific implement is not listed, select the implement that it is most similar to. Also input the age of both the machine and implement in years.

Screen #3t – Tractor Data

Purchase Price – This is the price that the owner paid for the tractor. The purchase price should include the value of trade-ins.

Price When New – This is the price of the machine when it was new. If the user bought the machine new then this price and the purchase price will be the same.

Annual Use – The estimated annual use of the tractor in hours.

Salvage Value Factor at End of Life – This is the percent of the original purchase price that the tractor will be worth at the end if its life. Default values are included in the input box if the user is unsure of the salvage value factor. The default values are based on the original purchase price of the tractor. The user can change the default value to any value they wish. The input value should be in the form of a percentage (i.e. 32% = 32).

Machine Life – The age of the machine when it will become obsolete or unusable. The machine life age should not be confused with how long the current owner plans to own it. The machine life is the age when the tractor becomes obsolete or unusable regardless of who owns it at that time.

Accumulated use of Machine – Total number of hours the tractor has been used.

PTO horsepower – The horsepower that the tractor is rated for. This factor is used to determine fuel usage.

Price of Fuel – The price of fuel that the owner pays for fuel entered as $/gal.

Interest Rate – Interest rate that the owner currently gets on other investments. This factor is used to determine ownership costs of the tractor. Input should be entered as a percentage (i.e. 10% = 10)

Housing/Insurance Factor – The cost of housing and insurance for the tractor as a percentage of the purchase price. This factor is usually 1-2% but can vary greatly from one owner to another. This input is entered as a percent.

Screen #4t – Implement

Purchase Price – This is the price that the owner paid for the implement. The purchase price should include the value of trade-ins.

Price When New – This is the price of the machine when it was new. If the user bought the machine new then this price and the purchase price will be the same.

Annual Use – The estimated annual use of the implement in hours.

Salvage Value Factor at End of Life – This is the percent of the original purchase price that the implement will be worth at the end if its life. Default values are included in the input box if the user is unsure of the salvage value factor. The default values are based on the original purchase price of the implement. The user can change the default value to any value they wish. The input value should be in the form of a percentage (i.e. 32% = 32).

Machine Life – The age of the machine when it will become obsolete or unusable. The machine life age should not be confused with how long the current owner plans to own it. The machine life is the age when the tractor becomes obsolete or unusable regardless of who owns it at that time.

Accumulated use of Machine – Total number of hours the implement has been used.

Speed of Operation – The typical speed of operation of the implement in mph. A default value is included for each implement but may be changed by the user.

Field Efficiency – This is the percentage of time the implement will spend actually performing operation once in the field. A machine that is always in operating once in

the field would have a field efficiency of 100%. However, since implements must turn at the end of rows, require adjustments, require materials, etc… the field efficiency will always be less than 100%. Default values are included for field efficiency for each implement but may be changed by the user. Inputs should be entered as percentages (i.e. 25% = 25).

Width of Implement – The width of the operating area of the implement in feet.

Number of Workers – Number of workers required to perform the operation. This input will always be one or greater. A worker includes anyone operating the machines regardless of whether they are actually hired labor or not.

Labor Rate – The labor rate for the worker. This should be the rate paid to hired workers or the value of the time of unpaid labor. This input is entered as $/hr.

Screen #5t – Tractor and Implement Cost Summary

The costs summary list four categories of costs associated with owning and operating machinery.

Fixed Costs – This cost is the depreciation, interest, housing, and insurance costs of owning the machines. Both and annual and a per acre cost is included for both the tractor and implement. The following formula from the American Society of Agricultural Engineers (ASAE) is used to calculate fixed costs:

$$\text{Annual Fixed Costs} = Purchase\,Price \times \left[\frac{1-Sv}{L} \pm \frac{1+Sv}{2} I \pm K \right]$$

Where:
  Sv= Salvage Value Factor
  L = Life of Machine
  I = Interest Rate
  K = Insurance and Housing Factor

Repairs – This cost is the repairs and maintenance that can be expected as a result of operating the machines. The repair costs is a function of purchase price and accumulated use. Therefore, the higher the purchase price the higher the repair costs will be. Conversely, the newer the machine the lower the repair cost will be. Brand new equipment will tend to have very small repair costs associated with it. Repair costs are included for both the tractor and implent on an annual and per acre basis. The following formula from ASAE is used to calculate repair costs:

Accumulated Repair Costs = $RF1 \times P \times \left[\dfrac{H}{1000}\right]^{RF2}$

Where:

RF1 and RF2 = Repair Factors available from ASAE
P = Price of Machine When New
H = accumulated use of machine (hours)

Fuel/Lubricant– The fuel cost is calculated for the tractor only since the implement uses no fuel and typically an insignificant amount of lubricant. The fuel cost is calculated using the formula below. Lubricant cost is assumed to be 15% of the fuel costs.

Fuel/Lubricant Use (gal/hr) = $P \times Q$

Where:

P = PTO Horsepower of Tractor
Q = Fuel Use Factor – 0.0504 for diesel and 0.069 for gasoline.

The above formula is only one means of calculating fuel costs. Fuel costs will vary greatly with the type of machines, size of machines, soil types, and how much load is on the tractor. The user should not hesitate to use their own fuel costs instead of fuel costs calculated by this program.

Labor – The labor costs per hour is simply the number of workers times the labor rate. The labor per hour is then adjusted to annual and per acre costs. Although the labor cost is only listed under the tractor is for both the tractor and implement.

Acres per Hour – This factor is used to calculate the costs on a per acre basis. The following formula is used to determine acres per hour:

Acres per Hour = $\dfrac{W \times F \times S}{8.25}$

Where:

W = Width of Implement (ft.)
F = Field Efficiency of Implement (%)
S = Speed of Implement (mph)

Total Annual Costs – This is the annual cost of owning and operating both the tractor an implement.

Total Costs per Acre – this is the cost of owing and operating the tractor and implement on a per acre basis.

Combine Option

Most of the costs are calculated for the combine in the same way as the tractor and implement. The following are the exceptions.

Fuel Use per Acre – The fuel cost for the combine is calculated by using a fuel consumption rate. A default value of 1.6 gallons/acre is used unless changed by the user.