FARM BUSINESS MANAGEMENT

Machinery Cost Estimates: Tractors

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MACHINERY COST ESTIMATES: TRACTORS

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Table 1. List Prices and Estimated Costs Per Hour for Tractors of Different Sizes.

Tractor[1]	List Price[2]	Costs				Fuel Use
		Total	= Overhead	+ Fuel	+ Labor	Per Hour
	$/tractor	$ per hour				gal.
85 PTO Hp Tractor	196,739	**96.30**	58.90	14.30	23.10	3.7
95 PTO Hp Tractor	205,451	**100.60**	61.50	16.00	23.10	4.2
110 PTO Hp Tractor	250,231	**116.60**	75.00	18.50	23.10	4.8
120 PTO Hp Tractor	257,854	**120.50**	77.20	20.20	23.10	5.2
140 PTO Hp Tractor	282,644	**131.40**	84.70	23.60	23.10	6.1
155 PTO Hp Tractor	297,566	**138.30**	89.10	26.10	23.10	6.8
175 PTO Hp Tractor	312,432	**146.20**	93.60	29.50	23.10	7.7
205 PTO Hp Tractor	386,456	**173.50**	115.80	34.60	23.10	9.0
225 PTO Hp Tractor	401,654	**181.30**	120.30	37.90	23.10	9.8
240 PTO Hp Tractor	416,853	**188.50**	124.90	40.50	23.10	10.5
260 PTO Hp Tractor	528,259	**225.20**	158.30	43.80	23.10	11.4
285 PTO Hp Tractor	548,201	**235.40**	164.20	48.10	23.10	12.5
310 PTO Hp Tractor	579,945	**249.10**	173.70	52.30	23.10	13.6
390 Engine Hp Tractor	520,995	**245.00**	156.10	65.80	23.10	17.1
440 Engine Hp Tractor	559,017	**264.80**	167.50	74.20	23.10	19.3
490 Engine Hp Tractor	602,796	**286.30**	180.60	82.60	23.10	21.5
590 Engine Hp Tractor	675,931	**325.10**	202.50	99.50	23.10	25.8
640 Engine Hp Tractor	726,306	**348.60**	217.60	107.90	23.10	28.0

[1] List price includes either MFWD or 4WD for all tractors.

[2] List prices for 2023. Purchase price is assumed to be 85% of the list price.

[3] Sum of overhead, fuel, and labor costs.

[4] Includes depreciation, interest, insurance, housing, and repair costs. These per hour charges are appropriate for calculating rental costs when the person renting the tractor provides fuel and labor.

[5] Fuel costs are based on a price of $3.50 per gallon for diesel fuel. Fuel costs vary depending on fuel use. Use varies with load on the tractor.

[6] Labor costs are based on a $21.00 per hour labor charge. Labor time is assumed to be ten percent higher than tractor hours.

Table 1 shows estimated costs for different sized tractors. These estimates are useful for determining machinery costs on farms, rental rates for machinery, and custom rates for machinery operations. Costs include charges for depreciation, interest, insurance, housing, repairs, fuel and labor. Not included are allowances for profit. Charging custom rates at estimated costs should cover costs, but will not generate profits. Adding 5 to 15 percent to estimated costs may be appropriate when determining custom rates.

Methods of Calculating Costs

Formulas developed by the American Society of Agricultural Engineers (ASAE) are used to calculate costs. All costs are based on buying a new tractor, owning the tractor for 10 years, and using the tractor 300 hours per year. A more detailed description of how each cost is calculated is given below.

Depreciation: Depreciation covers the decline in the tractor's value over its life. Depreciation is calculated as: (purchase price – salvage value) / years of ownership. The purchase price equals the list price of the tractor (Table 1) times 85 percent. The salvage value gives the price of the tractor when sold. Given a 10 year life, ASAE Standards suggest a salvage value equal to 36 percent of a tractor's list price.

Table 2. Factors Used in Calculating Costs.

Purchase price	85%	of list price
Interest rate	5.5%	of remaining value
Insurance and housing	1.0%	of remaining value
Diesel fuel	$3.50	per gallon
Lubrication cost	10%	of fuel costs
Tractor hours	300	per year
Years of life	10	years
Labor charge	$21.00	per hour
Labor time	1.10	times tractor hours

Interest: Interest covers the cost of having funds invested in the machine. Interest is calculated by multiplying the remaining value of the machine at the beginning of each year by a 5.5 percent interest rate. The remaining value is calculated using ASAE standards. The 5.5 percent interest rate represents a charge for equity and debt capital invested in the machine. The yearly interest charges are totaled and then divided by the total hours of use.

Insurance and Housing: Insurance and housing costs are calculated in a manner similar to interest costs using a one percent charge on the tractor's remaining value.

Repairs: Repairs cover repair parts, installation charges, and general maintenance. These costs are calculated using ASAE formulas. For 300 hours of use per year and 10 years of life, per hour repair charges equal 0.05546 times the list price of the machine.

Fuel and Lubrication: Fuel charges are based on diesel fuel priced at $3.50 per gallon. Lubrication costs are figured at 10 percent of fuel cost.

Labor: Labor charges are based on a $21.00 per hour labor charge. Labor time is assumed to be 10 percent more than the operating time of the tractor.

Composition of Costs

Use of a tractor has a large impact on costs, with higher hour of use reducing per hour costs. For the 175 HP tractor listed in Table 1, overhead costs of $93.60 per hour include charges for depreciation ($50.95 per hour), interest ($30.54), insurance and housing ($5.55), and repairs ($6.56). Annually, depreciation and interest costs total $24,447 ($50.95 per hour depreciation + $30.54 per hour

interest) x 300 hours). These $24,447 of costs are incurred by owning the tractor and do not change with annual use. On a per hour basis, depreciation and interest costs increase as hours of use decrease. At 150 hours of use, for example, depreciation and interest costs equal $162.98 per hour ($24,447 / 150 hours). At a 450 hour use level, depreciation and interest costs equal $54.33. Hence, per hour overhead costs vary with annual hours of use.

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