

Logging Costs

Objectives for Today

- Review ownership and operating costs

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Recall

- Ownership costs are fixed and based on scheduled hours
- Operating costs are variable and based on productive hours

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Utilization Rate

- Normally, a machine's utilization is called its *utilization rate* and is usually expressed as a percentage of scheduled operating time:

$$U(\%) = \frac{\text{Productive Hours}}{\text{Scheduled Hours}} \times 100$$

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Utilization

- Many factors have an impact on utilization:
 - (1) weather
 - (2) system imbalance (diseconomies)
 - (3) scheduling difficulties (breakdowns of other machines)
 - (4) operator fatigue
 - (5) personnel delays -- unscheduled breaks
 - (6) reassignment (e.g., skidder used to pull trucks).
- Utilization varies with equipment type.

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Data Requirements for Machine Rate Calculations

- Equipment Specifications
 - Model
 - Horsepower
 - Crankcase capacity
 - Maintenance requirements

Model	3500	4500	5500
Wheelbase	1000	1200	1400
Track length	1000	1200	1400
Height	1000	1200	1400
Gross weight	3500	4500	5500
Operating weight	3500	4500	5500
Transport weight	3500	4500	5500

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Data Requirements

- Initial Investment
 - Defined as the actual equipment purchase cost
 - Equipment base price
 - Price of options
 - Sales taxes
 - Freight
 - FOB Factory
 - FOB Delivered

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Data Requirements

- Salvage Value
 - Defined as the amount that equipment can be sold for at the time of its disposal.
- Economic Life
 - Defined as the period over which the equipment can operate at an acceptable operating cost and productivity.
 - May be set by IRS
- Scheduled Operating Time
- Utilization

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Machine Rate Calculations

- Means of expressing equipment costs on an hourly basis
- “Average” cost per hour over the machine’s economic life
- Provides a quick and easy method for comparing costs for similar pieces of equipment
- Provides a logical method for combining the components of harvesting costs

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Machine Rate Calculation Form

DESCRIPTION:	
Type: _____	Model: _____
Shipping Weight: _____ lb	Horsepower: _____ hp
Oil Capacity: _____ gal	Oil Change Every: _____ hours
Estimated Life: _____ years	Utilization: _____ %
Scheduled Hours: _____ yr	Productive Hours: _____ yr
FIXED COSTS:	
Purchase Price: \$ _____	
Attachment/Miscellaneous: \$ _____	
Freight: \$ _____	
Less: Tire Cost: \$ _____	
Sales Tax: \$ _____	
Initial Investment: \$ _____	
Salvage: \$ _____	
Average Fixed Investment (AFI): \$ _____	
Depreciation (Straight Line): \$ _____/Yr	\$ _____/SH
Interest: \$ _____/Yr	\$ _____/SH
Insurance: \$ _____/Yr	\$ _____/SH
Taxes: \$ _____/Yr	\$ _____/SH
TOTAL FIXED COSTS: \$ _____/Yr	\$ _____/SH
OPERATING COSTS:	
Maint. & Repair: \$ _____/Yr	\$ _____/PH
Fuel: \$ _____/Yr	\$ _____/PH
Oil: \$ _____/Yr	\$ _____/PH
Other Lubricants: \$ _____/Yr	\$ _____/PH
Tires: \$ _____/Yr	\$ _____/PH
TOTAL OPERATING COSTS: \$ _____/Yr	\$ _____/PH
LABOR COSTS:	
Hourly Pay: \$ _____/Yr	\$ _____/SH
Fringe: \$ _____/Yr	\$ _____/SH
TOTAL LABOR COSTS: \$ _____/Yr	\$ _____/SH
TOTAL MACHINE COSTS:	
TOTAL COST PER SCHEDULED HOUR including labor: \$ _____/SH	
TOTAL COST PER SCHEDULED HOUR without labor: \$ _____/SH	
TOTAL COST PER PRODUCTIVE HOUR including labor: \$ _____/PH	
TOTAL COST PER PRODUCTIVE HOUR without labor: \$ _____/PH	
TOTAL COST PER NON-PRODUCTIVE HOUR including labor: \$ _____/SH	

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Example Machine Rate Calculation

MACHINE RATE EXAMPLE #1

GRAPPLE SKIDDER:
 MODEL: HUNYAN 650
 DIESEL, 115 HP, 10-GALLON CRANKCASE CAPACITY, 120 HOURS BETWEEN OIL CHANGES
 SHIPPING WEIGHT - 15,000 LB
 F.O.B. FACTORY PRICE, WITHOUT GRAPPLE - \$45,000
 GRAPPLE ATTACHMENT - \$6,000
 ECONOMIC LIFE - 3 YEARS
 SALVAGE VALUE - 20%
 SCHEDULED HOURS PER YEAR - 2000
 SALES TAX - 7%
 FREIGHT COST - \$0.05 PER LB
 TIRES - \$7,000 PER SET
 TIRE LIFE - 3000 HOURS
 MAINTENANCE & REPAIRS - 60%
 DIESEL FUEL - \$1.25 PER GAL.
 ENGINE OIL - \$3.25 PER GAL.
 INTEREST - 12%
 INSURANCE - 3%
 TAXES - 4%
 LABOR RATE - \$10.50 PER HR.
 FRINGE BENEFITS - 52%
 UTILIZATION - 65%

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Another Example

MACHINE RATE EXAMPLE #2

FELLER-BUNCHER:
 MODEL: STUMP-MAKER 3a
 DIESEL, 160 HP
 F.O.B. DELIVERED PRICE - \$75,000
 ECONOMIC LIFE - 4 YEARS
 SALVAGE VALUE - 25%
 SCHEDULED HOURS PER YEAR - 2000
 SALES TAX - 7%
 TIRES - \$6,500 PER SET
 TIRE LIFE - 4000 HOURS
 MAINTENANCE & REPAIRS - 50%
 DIESEL FUEL - \$1.20 PER GAL.
 ENGINE OIL - \$3.25 PER GAL.
 INTEREST - 12%
 INSURANCE - 3%
 TAXES - 4%
 LABOR RATE - \$10.50 PER HR.
 FRINGE BENEFITS - 48%
 UTILIZATION - 65%

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Apply Skidder and Feller-buncher Machine Costs to Timber Sale

- Timber sale with 225MBF
- Estimate 20 days to complete
- What are total costs per MBF?

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Apply Skidder and Feller-buncher Machine Costs to Timber Sale

	Daily Costs	
	<u>Grapple</u>	<u>Feller-Buncher</u>
• Fixed:	78	95
• Operating	77	88
• Labor	<u>128</u>	<u>124</u>
	\$283/day	\$307/day

\$590/day @ 20 days = \$11,800/225MBF = \$52/MBF

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Machine Rates—Problems

- Based on “Rules of Thumb”
- Depreciation based on 2 unknowns
 - Salvage value
 - Economic life
- AFI requires straight-line depreciation
- Artificial precision assumed in fuel and oil consumption
- Assumes fixed costs remain constant over life of machine

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Misapplications of Machine Rates

- Based on short time span—contractor is more concerned with weekly costs, not hourly costs
- Does not easily account for variability due to weather, timber, terrain, & labor
- User must know the difference between scheduled time and productive time
- User must know the difference between utilization and mechanical availability

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Cash Flow

- Flow of money through a business
- Need to manage to keep up with weekly and monthly costs
- Sometimes a problem when revenues fluctuate or are cyclical
 - Markets, weather, logging chances, competition
- Need to project future income and expenses

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