Exercise -- MACHINE RATES

PURPOSE:

Assess student understanding of machine rate calculations.

PROCEDURE:

A logging contractor must replace an aging grapple skidder currently used in her harvesting operation. She is considering the purchase of either a John Deere model JD-640 or a Timberjack model TJ-380.

She expects the productivity for both machines to be approximately the same with 26 turns per day averaging 0.80 cords per turn. Regardless of which machine is selected, the skidder is expected to work 240 days per year. Scheduled operating time is 10 hours per day. Data of interest for each machine is as follows:

JD-640:

110 HP, diesel, 4 W-D, shipping weight 24,500 lbs.
Purchase Price (without grapple): $92,000 F.O.B. delivered
Extra attachments (grapple): $15,700
Sales Tax: 7%
Repair & Maintenance: 65% of depreciation
Insurance: 6% of AFI
Taxes: 3% of AFI
Interest: 12% of AFI
Diesel: $1.15/gallon
Fuel consumption: 3.80 gallons/hour
Engine oil: $1.70/quart
Oil consumption: 0.33 quarts/hour
Hydraulic oil: $19.50/gallon
Hydraulic oil consumption: 0.05 gallons/hour
Lubricating grease: $3.75/pound
Grease consumption: 0.5 pounds/8-hours
Salvage Value: 20%
Mechanical Availability: 75%
Utilization: 68%
Economic Life: 5 years
Labor: $8.00/hour and 81% fringes (SS, WC, etc.)
Tire replacement cost: $1500 per tire
Tire life: 5000 hours
TJ-380:

136 HP, diesel, 4 W-D, shipping weight 18,000 lbs., 10 gallon crankcase capacity, 120 hrs between oil changes

Purchase Price (without grapple): $85,000 F.O.B. factory
Extra attachments (grapple): $14,500
Sales Tax: 7%
Freight Cost: $0.07/pound
Repair & Maintenance: 60% of depreciation
Insurance: 6% of AFI
Taxes: 3% of AFI
Interest: 12% of AFI
Diesel: $1.15/gallon
Engine oil: $6.80/gallon
Salvage Value: 20%
Mechanical Availability: 80%
Utilization: 68%
Economic Life: 5 years
Labor: $8.00/hour and 81% fringes (SS, WC, etc.)
Tire replacement cost: $1500 per tire
Tire life: 5000 hours

1. Based on the assumptions stated for each machine, use the machine rate method to derive the following for each grapple skidder:

   (a) Total cost per scheduled hour
   (b) Total cost per productive hour
   (c) Total cost per cord

2. Compare the cost estimates and determine which skidder the logging contractor should purchase on the basis of your machine rate calculations.