Analysis & Probability/Numbers & Operations: Salesman
Sawtooth Lumber Sales
Job Description: Arranges for the transfer (sale) of manufactured lumber from the manufacturer(sawmill) to a user for a fee/commission.

Problem:

A lumberyard in Salt Lake City wants to buy a truckload of lumber to replenish their inventory. They need two different sizes of dimensional lumber in various lengths. The lumber is shipped from Coeur d'Alene, Idaho. Your problem is to give a quote to the lumberyard on the cost of the shipment.

Lumber is sold by a standard unit of measure called the board foot. A board foot is described as a piece of lumber 12 inches wide by 1 inch thick by 1 foot long. Various sizes of lumber are converted to this common unit of measure by use of a factor.

The factor is found by using the formula: thickness x width / 12 = the board footage in a 1-foot piece.

Therefore, a 2 x 4 x 1-foot piece would equal .6667 board foot (2 x 4 / 12.) For 2 x 10, the factor would be 1.6667. (2 x 10 / 12)

We work in quantities of 1,000 board feet. The mill is asking $380.00 per thousand board feet for the 2 x 4 boards and $440.000 per thousand for the 2 x 10 boards. This cost does not include the cost of transportation or the broker's profit. The broker's profit is determined at 4% of the delivered cost.

A standard semi can haul 48,000 lbs. of lumber. The lumber ordered weighs 2,000 lbs per thousand board feet. Thus, the customer is in effect asking for approximately 24,000 board feet.

The customer wants the order divided 50% of 2 x 10 boards and 50% of 2 x 4 boards, or approximately 12,000 board feet of each size.

The truck needs $1.25 per loaded mile to haul the load. It is 650 miles from Coeur d'Alene, Idaho to Salt Lake City.

The customer wants the following lengths:
2 x 4s 200/8' 200/10' 200/12' 400/14' 400/16'
2 x 10s 80/8' 80/10' 160/14' 160/16'

1. What is the total number of board feet being delivered?
2. What will the total cost be to haul the wood?
3. What is the total cost for the wood?
4. What will the brokers fee be?
5. What price should the broker quote that will also include her profit?

Foundation

Micron

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Solution: *(See problem page for details.)*
1. Shipment composition:
Knowing how many lengths the customer wants, it is necessary to do a running total of the lineal footage, then multiply the total by the factor for the board size to get the number of board feet.
2 x 4s:
(200 x 8) + (200 x 10) + (200 x 12) + (400 x 14) + (400 x 16) = 18,000
18,000 feet x .6667 (factor for 2x4s) ≈ 12,000 board feet
2 x 10s:
(80 x 8) + (80 x 10) + (160 x 14) + (160 x 16) = 6240
6,240 feet x 1.6667 (factor for 2x10s) = 10,500 board feet
Total board feet = 12,000 + 10,500 = 22,500
From this, it is determined that what the customer wants will fit on one truck.

2. Figuring the freight:
The truck needs $1.25 per loaded mile to haul the load. It is 650 miles.
650 miles x $1.25/loaded mile = $812.50
$812.50 / 22.5 (thousands of board feet) = $36.11 or ~ $36.00 per thousand board feet.

3. Cost of the wood:
The price is determined by the cost of the material at the source plus the freight plus the broker's profit.
2X4: 12,000/1,000 = 12 (Board feet in thousands) 12 X $380.00 = $4560.00
2X10: 10500/1,000= 10.5 (Board feet in thousands) 10.5 X $440.00 = $4620.00
Total Cost of Wood = $4,560 + 4,620 = $9180.00

4. Broker's Fee:
The broker's fee is 4% of the cost of the wood with freight charges added.
(812.50 + 9180.00) X .04 = (9992.50)(.04)= $399.70

5. Quoting a price:
The price is determined by the cost of the material at the source plus the freight plus the broker's profit.
812.50 + 9180.00 + 399.70 = $10,392.70

Verbal quotes are given over the phone 40 to 50 times a day. Once the price is agreed upon verbally, the deal is considered made. The ability to estimate accurately is very important. Quote too low and you lose money; too high and you're not competitive. The size of the broker profit leaves little room for error.