FERTILIZER EQUIPMENT ARITHMETIC MADE SIMPLE

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ABSTRACT: Assuming you are all pretty good shoppers and buyers, you all buy your equipment at about the same price for any given piece. However, once you take that equipment home and start to use it, your costs per unit of use vary significantly from one plant to the next. This presentation will demonstrate a quick method for estimating OWNERSHIP COSTS and OPERATING COSTS of fertilizer equipment. It will also demonstrate the importance of, and a method for, estimating cost per unit of product delivered and will show that that cost can and does vary significantly from one account to the next.

INTRODUCTION: There is a much greater variation in your operating costs than many of you realize. While you are understandably reluctant to pay any one supplier much over a $0 to $5.00 per ton premium for the same fertilizer, your own costs for delivering a spreader load of that fertilizer range from around $2.00 per ton on the low end to as much as $50 per ton on the high end.

To demonstrate this variation, we will lay out a series of steps for estimating the basic OWNERSHIP and OPERATING COSTS of a simple trailer spreader and then convert those basic costs to per trip and per ton costs.

While this format may not please all accountants and auditors, remember that they are statisticians: They only tell you that you need more hits. Think of this as learning how to hold the bat.

OWNERSHIP COSTS: QUICK AND D.I.R.T.I. COST ESTIMATES

Equipment costs can be fairly neatly divided into **OWNERSHIP COSTS** and **OPERATING COSTS**. There is a gray area between these two types of costs and my method here is not real pure in respecting the difference between the two, but I think the logic will be clear, and the method useful.

OWNERSHIP COSTS are the basic costs of having the equipment available to you on a year to year basis in a useful condition. The OWNERSHIP COSTS are sometimes referred to as the **DIRTI 5**, and they are:

DEPRECIATION which simply converts the purchase price into a year to year cost.

INTEREST which accounts for the fact that you either borrowed some money to purchase the equipment, or could have taken the same money and invested it to earn money from interest

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REPAIRS which technically speaking are an operating cost but are consistent enough that they are more useful and easier to estimate as an ownership cost

TAXES which are generally small in this case but make the Acronym DIRTI work a little better, plus show that we are awake

INSURANCE also generally small, but remind us of the existence of overheads

We are looking to fill in the blanks about like this:

SIMPLIFIED ANNUAL OWNERSHIP COSTS

DEPRECIATION	**$**_____
INTEREST	**$**_____
REPAIRS	**$**_____
TAXES	**$**_____
INSURANCE	**$**_____

Step by step, it goes like this:

STEP ONE**: DEPRECIATION**

Start with PURCHASE PRICE $_____
Estimate the USEFUL LIFE _____ YRS
Estimate the SALVAGE VALUE $_____

$$\frac{\text{PURCHASE PRICE} - \text{SALVAGE VALUE}}{\text{USEFUL LIFE}} = \text{ANNUAL DEPRECIATION}$$

$_____

If someone tells you to forget about DEPRECIATION because the equipment is already “depreciated out”, do this calculation anyway and call it a “replacement fund”. If you don’t plan on eventually replacing the spreader, why do you have it now?

STEP TWO**: INTEREST**

Find out the INTEREST RATE at which you can borrow money or, better yet, just use 10%. No need to quibble, and 10% is easy to calculate.

Estimate AVERAGE ANNUAL INVESTMENT by adding SALVAGE VALUE to PURCHASE PRICE and dividing the number by two.

Multiply the AVERAGE ANNUAL INVESTMENT by the INTEREST RATE. This is your annual INTEREST cost.

STEP THREE**: REPAIRS**

If you have a great bookkeeper, ask him or her to give you the total purchase price of all of your equipment and the total annual cost of equipment repairs. Divide the repairs number by the purchase price number. This gives you a simple index for estimating annual repair cost on any piece of equipment. If you disagree with the number from the bookkeeper, which you will, just pick your own number—after all, you're the one who has to live with the conclusions.

In the spirit of "quick and dirty" use 5% of purchase price for a starter and adjust up or down following your own instincts. With a little thought you will get close enough.

STEP FOUR: **TAXES**

This number often starts a big debate because few agronomists really know what items are on property tax, and a lot of bean counters forget that registration and licensing are essentially taxes. I avoid the issue by asking a few question about tax rates and registration fees and then using 0.5 % of purchase price unless I have found some really useful numbers.

STEP FIVE**: INSURANCE**

Try to get a reasonable answer from your bookkeeper or your insurance agent. Meantime, use about 1-2% of purchase price

EXAMPLE ASSUMPTIONS

To keep the numbers simple but somewhat realistic, lets use a dry spreader trailer and make these assumptions.

Items	**My Guess**	**Your Guess**
PURCHASE PRICE	**$10,000**	_____
USEFUL LIFE	**10 years**	_____
SALVAGE VALUE	**$ 2,000**	_____
INTEREST RATE	**10 %**	_____
REPAIRS	**5% of purchase price**	_____
TAXES	**.5% '' ''**	_____
INSURANCE	**1% '' ''**	_____

EXAMPLE WORKED OUT

DEPRECIATION	**$ 800**	**(10,000-2,000)/10**
INTEREST	**$ 600**	**(10,000+2000)/2*10%**
REPAIRS	**$ 500**	**(10,000 x 5%)**
TAXES	**$ 50**	**(10,000 x .5%)**
INSURANCE	**$ 100**	**(10,000 x 1%)**

TOTAL ANNUAL OWNERSHIP $2050

(You might notice that this comes out to about 20% of the purchase price and that is not a bad quick and dirty estimate for most steel and rubber.)

I have taken a few short cuts and made some modifications. Technically repairs are probably an operating cost but in this model they work a lot better as an ownership cost. Don't get hung up on exact numbers. Pick a range and take some number near the middle that is easy to use.

OPERATING COSTS

Putting REPAIRS in with OWNERSHIP cost lets us simplify estimating OPERATING COSTS.

In this trailer example, operating cost boil down to:

LABOR $12 per hour (Somewhere between $8.00 and $16.00)

TRUCK $ 1 per mile (This can be all over the board depending on age of truck, miles per year, etc. To really find out, run the DIRTI 5 for a truck and then add in gas and oil.)

At this point we have made three estimates:

OWNERSHIP COST	**$2000 PER YEAR**
OPERATING COST	**$12 PER HOUR plus**
	$ 1 PER MILE

ESTIMATING COST PER TURN AND COST PER TON

The real VARIATION in Agronomy Equipment costs from one account to the next is not in the basic cost of the equipment itself. It is in the cost per ton, or the cost per acre, or the cost per hour. That is to say, the variation is in the EFFICIENCY OF USE.

In terms of spreader trailers this efficiency will come down to two numbers.

1. **Turns Per Spreader Per Year**
2. **Average Tons Per Turn**

Let's say for now that in a good year, there are about 30 days when you can be turning spreaders. You can turn a spreader about twice in a good day and you probably average 5 tons per turn.

So, hypothetically, you could be spreading about 300 ton (30 x 2 x 5) of fertilizer per spreader, and you should turn each spreader about 60 times.

You'll probably have to go home to check your own numbers, but the next two tables probably show you why you should care.

Table 1: COST PER TURN AT VARIOUS TURNS/YEAR

ASSUME: OWNERSHIP COST = $2000 PER YEAR
OPERATING COST = 1 HOUR OF LABOR $12.00
13 MILE ROUND TRIP $13.00

TURNS PER YEAR	OWNERSHIP COST/TURN	OPERATING COST/TURN	TOTAL COST $/TURN
20	$100	$25	$125
40	50	$25	$75
60	33	$25	$58
80	25	$25	$50

Table 2: COST PER TON AT VARIOUS TONS PER TURN

$/TURN		2 TON/TURN	4 TON/ TURN	6TON/TURN	8 TON/ TURN
$125		$62.50	$31.25	$20.83	$15.62
$75		$37.50	$18.75	$12.50	$ 9.37
$58		$29.00	$14.50	$ 9.66	$ 7.25
$50		$25.00	$12.50	$ 8.33	$ 6.25

REAL LIFE

You might be wondering if there is any similarity between these tables and real life. Last year we ran an exercise with two different groups for a total of about 20 accounts. We brought them through the OWNERSHIP COST EXERCISE and each estimated tons spread in trailers.

After throwing out the highest and lowest cost per ton, the range was from $2.5 to $25.00 per ton. This exercise did not include operating costs—just the ownership costs. The operating cost would add anywhere from a low of $3.00 per ton to a high of $12.50 per ton.

In the first group we didn't think to collect the actual tons per spreader per year. In the second group we found a range of 57 to 370 tons per spreader per year. We would guess we would have found about the same range in the first group.

Above all, we found, a much wider range in tons per spreader, turns per spreader, and tons per turn than we would have guessed. We were not sharp enough at the time to really compare the relationships between tons and turns in any way that we could really present conclusive data, but we gathered enough information to be pretty certain that close attention has to be paid to both—as is demonstrated in the table.

SUMMARY

In a market where wholesale and retail business is won and lost on price differences of as little as $2.00 per ton, hypothetical and real handling costs, even in as simple an enterprise as hauling spreader trailers, vary 10 fold from somewhere around $5.00 per ton to as much as $50.00 per ton. This range in handling cost from neighbor to neighbor is clearly much greater than the range in price sensitivity. To survive in this business, we will have to know our costs of operation, confirm that these costs are in line with our competitors, and learn the art of estimating a hypothetical ideal cost and work hard to reach it.

I leave you to your own imagination on how to get more turns per spreader or more tons per turn. If you like working with spreadsheets, or want to learn how, this makes a great exercise and usually gets a pretty good conversation going. The system is flexible and can be expanded to about any enterprise or piece of equipment. Attached is a collection of a simple formulas for calculating turns and tons etc. Records would be better than a guess, but some guess is better than no guess.

A BUNCH OF LITTLE FORMULAS

	TOTAL BULK TONS	_____
-	**BULK STARTER**	_____
-	**TONS CUSTOM SPREAD**	_____
=	**TONS TRAILER SPREAD**	_____
/	**NUMBER OF TRAILERS**	_____
=	**TONS SPREAD PER TRAILER**	_____
/	**TYPICAL TRAILER LOAD**	_____
=	**TURNS PER TRAILER**	_____

ANNUAL OWNERSHIP COST PER TRAILER **=** **OWNERSHIP COST**
TONS PER TRAILER **PER TON**

ANNUAL OWNERSHIP COST PER TRAILER **=** **OWNERSHIP COST**
TURNS PER TRAILER **PER TURN**

(MILES PER TURN x $/PER MILE)
+ (HOURS PER TURN + $/HOUR)
= OPERATING COST PER TURN

OPERATING COST PER TURN / TONS PER TURN = OPERATING COST PER TON

OPERATING PER TURN	**OPERATING COST PER TON**
+ OWNERSHIP COST PER TURN	**+ OWNERSHIP COST PER TON**
= TOTAL COST PER TURN	**= TOTAL COST PER TON**

With a little imagination you can run these for either one spreader or for your whole fleet.

With a little more imagination, this system will tell you a lot about any enterprise you choose to investigate.