Summary

Volume Adjusted Costing is a simple, understandable modification of standard costing systems to reflect more accurate product-by-product cost. It overcomes the difficulties of complex ABC systems while retaining most of their accuracy. Not least among the benefits is the effect it has on individual behaviors and decisions within the organization.

Volume Adjusted Costing

A Quick and Implementable Solution

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When the watchwords of competitiveness, profit erosion, and pricing decisions are pondered in the boardrooms, great attention is paid to the internally generated cost numbers of the organization's cost system. Invariably, the cost system bears the brunt of the criticism because costs-of goods-sold are completely under the control and scrutiny of the company.

ABC - Too Many Cost Drivers

During the late 1980's, academics, practitioners, and consultants tried to react by proposing a better measurement of fixed costs using Activity Based Costing (ABC). Theoretically, this system would enable a business to manage better by allocating costs to the activity generating this cost. This met with great initial acceptance fathering a whole industry of Activity Based Cost systems.

In the resulting exuberance over ABC however, "paralysis by analysis" was encountered. Cost managers started creating hundreds of associated cost drivers; escalating the cost to administer the ABC system and compounding the "fog factor" of the average user who was attempting to use this system to make everyday decisions. Many people became fed up with the cost and effort required to keep up the level of detail information required to maintain the credibility of ABC, which, in the opinion of many, became the biggest non-value added activity.

VAC - A New Solution

In this article, a compromise solution is proposed. It avoids the mistake of using the old "peanut butter" approach of allocating all indirect fixed costs by a single cost driver (e.g., direct labor). Moreover, it avoids the mistake of identifying hundreds of cost drivers and activities, which becomes too costly, complex, and difficult to maintain.

This approach is called Volume Adjusted Costing (VAC), which has only two components:

1) a well maintained standard cost system

2) a mathematical adjustment to each part's standard overhead cost on an operation by operation; process by process basis (e.g., machining, assembly, painting) by comparing the annual volume of the individual part to the average volume of all parts going through each process. This adjustment results in the overhead cost of a high volume part being decreased and the overhead cost of a low volume part being increased.

VAC is easy to understand and implement, inexpensive to maintain, and yet provides a powerful tool for strategic business decisions.

More ABC Cost Drivers Must Result in More Accurate Costs – Right?

The biggest problem with ABC costing is its complexity. Most of the cost drivers used in ABC costing are based on opinion, and there are wildly divergent opinions on how almost every cost driver is calculated and allocated. (What is the cost of a part number? How about a purchase order?)

There is only one cost driver that does not generate an argument: annual volume. That is because annual volume is not an opinion – it is a fact.

The 'more-must-be-better' logic behind proliferating cost drivers in ABC cost systems ignores two critical issues: believability and understandability.

VAC believability - Most people intuitively believe high volume parts should cost less per part to produce than similar low volume parts so they are quick to agree with the VAC concept. Any production supervisor will tell you that most of their resources are spent on the low-volume short-run parts – the high volume parts generally 'run themselves' – unless they must interrupt production to tear down the line for a short run service part.

VAC understandability - The cost adjustment calculation used in VAC is logical and easy to explain. A user may not like the result, but at least the cost calculation is understandable and predictable, and therefore, affords the user the understanding of 'how' to change the results next time (e.g., use more current high volume parts in the design or design new universal parts that can used in multiple applications and become high volume.)

The problem with most cost drivers other than volume is they really do depend on circumstances, but engineers do not want to hear how 'hard' it is for the accountants to allocate costs. They want to know why their project is over budget. After listening to a long, complex explanation about the effect of ABC cost drivers on the cost of their parts, most designers simply say "bean counters – whatever!" and do whatever they believe is correct despite what the cost system is reporting.

Why? Are they just stubborn? Not really - they simply do not understand how to win at this ABC cost game because the rules seem to keep changing. They don't even know how to change their future design decisions because they do not believe or understand how the costs are calculated in an ABC cost system.

People do not 'buy-in' to anything unless they believe it is right and understand how it works. This buy-in by designers and project managers is the biggest benefit of VAC.

Steps to Volume Adjusted Costs

As discussed earlier, VAC differs from traditional standard costing by an additional calculation that credits high volume parts and charges low volume parts in such a way that the total budgeted overhead to be absorbed remains the same. The heart of the volume adjusting calculation is adjusting the standard overhead cost of each part on an operation by operation; process by process basis (machining, assembly, painting, etc.) by comparing the annual volume of the individual part to the average volume of all parts going through each process.

Following are the steps required in the VAC calculation:

Step One – Develop the traditional Standard Overhead Cost
The standard cost calculation remains the same. The budgeting and the standard overhead rate calculations are unchanged. The standard cost per part is calculated using the normal overhead allocation methods. (See Column 4 Exhibit 1 next page)

Step Two – Determine the Experience Curve %
An experience curve must be determined for each process. A 90% experience curve is suggested for an average manufacturing process (e.g., assembly). This will result in a 10% decrease in overhead cost for any part that has an annual volume that is double the average volume for that process.

A different experience curve can be chosen for each different process; perhaps a 75% or 80% for a process requiring long, expensive setups (e.g., machining) or perhaps only 95% for a process requiring little extra setup (e.g., cleaning or painting).

Step Three – Primary Volume Adjustment to traditional overhead
The standard overhead cost by operation for each part is adjusted based on a comparison of the individual part's annual volume to the "average" annual volume in each manufacturing process. This is the primary volume adjusting calculation. (See Column 7 – Exhibit 1)

For example, using a 90% experience curve, if Part A's annual volume is double the average for that cost center, VAC will subtract 10% from Part A's standard overhead cost for that operation. For each additional doubling of volume, an additional 10% of overhead will be subtracted.

If Part X's annual volume is half the average for that cost center, VAC will add 10% to the part's standard overhead cost for that operation. An additional 10% will be added for each additional halving of the volume.

Step Four - Total Overhead Proration Adjustment.
However, the total overhead absorbed after the primary volume adjusting (Total col 7) will usually not be the same as the overhead absorbed before volume adjusting. (Total col 4) In fact, using only the basic VAC formula described in Step 3 above, it would be mathematically impossible, if you have only a few part numbers with volume extremes, to have the same overhead absorption; so you must do one more calculation – the Proration Adjustment.

See Exhibit 1. The total of the Vol Adj overhead absorbed (col 7) compared to the original overhead absorbed (col 8) results in the Proration Adj Factor of 104%. The prorated adjusted OH cost (col 8) times the annual volume (col 2) assures complete overhead absorption. (compare col 4 to col 9)

Exhibit 1

Col 1	Col 2	BEFORE	Col 4	90% Exp Curve	Col 6	Col 7	AFTER VOL ADJ	Col 9
Parts in the Same Cost Center	**Annual Volume**	**Std OH Piece**	**Annual Std OH Absorbed / part**	**Vol Adj % (choose from table)**	**Primary Volume Adjusted OH / piece**	**Primary Vol Adj Annual Total OH Absorption**	**Final Volume Adj OH / piece**	**Final Vol Adj Annual Total OH Absorption**
A	5,000	$ 1.00	$ 5,000.00	-10.0%	$ 0.90	$ 4,500.00	$ 0.94	$ 4,677.80
B	3,750	$ 1.00	$ 3,750.00	-5.0%	$ 0.95	$ 3,562.50	$ 0.99	$ 3,703.26
C	2,000	$ 1.00	$ 2,000.00	4.0%	$ 1.04	$ 2,080.00	$ 1.08	$ 2,162.18
D	1,725	$ 1.00	$ 1,725.00	6.7%	$ 1.07	$ 1,840.58	$ 1.11	$ 1,913.30
E	25	$ 1.00	$ 25.00	67.2%	$ 1.67	$ 41.80	$ 1.74	$ 43.45
Total	12,500		$ 12,500.00			$ 12,024.88		$ 12,500.00
Avg Annual Vol	2,500					**Proration Adj Factor =**	**104.0%**	

Commentary on the Exhibit 1 Results of Volume Adjusting

High volume part "A" was rewarded with a 6% OH cost decrease. This will result in a better profitability report which may support more R&D on this product line or a price decrease which should result in more sales – resulting in higher volume resulting in lower VAC per part.

Regarding low volume part "E" - before VAC, Purchasing could not find an outside shop to do this work because no one could beat the old Standard Cost of $1.00. But now, after VAC, they should have no problem finding an outside supplier at $1.74. And after "E" gets farmed out, manufacturing will avoid all the hidden costs that go with low volume parts in a high volume environment.

Cautionary Notes

However, there are a few cautionary notes to be made regarding volume adjusting. Because volume adjusting is simply a mathematical formula, it can result in certain illogical excesses. These can be avoided by choosing some limitations in advance.

For example, to avoid the problem of very low volume service parts being Volume Adjusted beyond a believable cost amount, a low-end annual volume limit may be chosen (which is a good business decision in itself), or maybe labor standards need to be revised to isolate the common parts from the unique parts so that the assembly of common parts can enjoy the reward of high volume and only the unique parts are penalized for low volume. These are the kind of common sense decisions that must be made to avoid illogical VAC extremes.

VAC as part of your Business Strategy

Volume adjusting is not magic. VAC can only be an enhancement to a well-maintained cost system. There is no substitute for well-documented bills of material, accurate material costs, and realistic industrial engineering labor standards. VAC cannot make a bad cost system into a good cost system.

However, VAC can change a cost system from being passive to active; from being reactive to proactive; from looking backward to a powerful tool used to help chart the forward course of the company. Average cost systems can only tell you what kind of company you were yesterday. A volume adjusted cost system can help determine the future of the company by rewarding good decisions and penalizing decisions that do not support the overall high volume business strategy.

What is your business strategy? Low-cost high-volume production or low-volume custom work? Is your strategy to design new products with existing parts or create new unique parts? Does your cost system support your strategy?

The purpose of volume adjusting is not just to provide more accurate costs. It is to provide a tool for decision-making. It is an integral part of the entire business strategy. If management intuitively believes high volume parts cost less than similar low volume parts, they need a cost system that pushes their everyday decision makers in that direction.

Questions? - contact Glen Navis at: gnavis1@att.net

Notes

1. Artemis March and R.S. Kaplan, John Deere Component Works (A) and (B). (Boston, Mass.: Harvard Business School, 1987).

2. Id. In John Deere (A), they had three drivers, and then moved to eight drivers, and Keith Williams mentioned they later moved to sixty-four drivers.