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1964

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### Recommended Citation

Quarterly, Vol. 10, no. 3 (1964, September), p. 22-27

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# PROFITABILITY ACCOUNTING: A Useful Tool for the Defense Contractor

by James V. Mitchell

Defense contractors probably have more requirements and uses for efficient accounting systems than any other industry. The complexity of the organizations and products of the large contractors presents a real challenge for developing meaningful cost accumulation and internal financial reporting. Many companies have the latest in modern data processing equipment and techniques to create information, yet have a mass of separate systems for various purposes and an account structure and reporting system that is addressed to the requirements of outsiders. There is a lack of integration between systems and a subjugation of what should be the primary goal of an information system—developing data for management control.

The dependency of sales price on cost identification through cost reimbursement contracts has placed the emphasis of these companies' accounting systems on contract cost accumulation. Historically the accumulation of overhead, research, marketing, and other indirect costs has been pointed toward the method used to allocate or apportion these costs to contracts. Usually these categories of accumulation have no alignment with cost re-

sponsibility nor have these distribution pools lent much insight into the behavioral characteristics of the costs involved.

Typically the members of this industry have looked upon themselves as being in a unique situation, perhaps more so than in most industries. This is probably caused by the conditions that exist in dealing with a military customer, even though many large contractors also have a substantial portion of commercial business. Then too, a number of companies have tried over a period of years some of the widely used accounting techniques on a separate system basis, but have experienced difficulties in making them work under these conditions.

## *The influence of dealing with the government*

The long-standing habit of having the military customer look over your shoulder into your books has substantially influenced the approach of these companies to their accounting systems. Cost reimbursement contracts have always been subject to government audit. Also, subcontracts on prime cost reimbursement contracts are subject to audit by the prime contractor who has the responsi-



bility for the justification of the subcontract cost. As a practical matter, many fixed price contracts have also been subject to cost review. During the process of negotiation on follow-on contracts, the government is allowed to review the cost experience on the initial contract as a means of evaluating the contractor's bid on the follow-on contract. This subjects the contractor's mistakes to criticism and reduces the opportunity to repeat in capitalizing on advantageous conditions.

Another problem that stems from the continuing association with the military is the inconsistency between the cost breakdown required for purposes of contract negotiations or audit and the internal company assignment of cost responsibility to individuals. Whereas internal responsibilities and assignments change and take different forms over a period of time, the classifications of the customer remain virtually unchanged. Gradually the main accounting framework moves toward the classification system that is consistent, that is the customer's, and away from that which is most useful for cost control, the company's, which ultimately results in a company maintaining an accounting system for the benefit of its customer. In

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many cases this is true even to the extent of using the terminology or jargon of the customer in account titles and in reporting categories.

This characteristic is particularly true in the area of overhead costs. The problems of accumulating, assigning to products, and forecasting overhead costs into the classifications used for military pricing are substantial. A number of these problems are caused by the government having either ruled on the allowability of specific types of cost or on the allowable method of allocating specific costs. This puts the company in the position of having to show that it is complying with previous rulings.

At times the overhead rates of competing contractors have been a significant consideration of the customer in

choosing a source of supply. The trend of a company's allowable military overhead rate or the relationship between a company's overhead rate and that of its competitor is extremely important. Yet, in most cases, there is no integrated method of tying the responsibility for overhead spending via the budget with the expression of these same costs in an allowable military rate.

One obvious influence on a change in the overhead rate is a change in the base activity, usually manhours, over which the fixed costs are spread. Another influence is the shifting of the ratio of military to commercial work within the total workload, particularly where there is a substantial amount of fixed costs which are only partially allowable under military contracts.

Definition and segregation of fixed costs present problems in companies which gain or lose substantial volumes of work through large contracts. A definition of the level of fixed costs under current conditions may become completely useless when a large contract is terminated.

#### *Government involvement increasing*

The involvement of the government in the specific costs of the contractor appears to be increasing. The latest government regulations on contract negotiation and pricing specifically state that the contractor should emphasize and be responsible for cost control. Toward this end the allowable profit percentage varies between different types of activities within the contract. These differences are supposed to compensate the contractor for differences in risk, schedule, quality performance, cost experience, and the degree of accuracy with which costs can be predicted. Thus the contractor's requirement for internal cost control, use of improved budget techniques, and analysis of costs will undoubtedly be increased.

#### *The influence of changing products*

During the past few years government contractors have changed from producing relatively large quantity orders, involving substantial fabrication and assembly effort, to much smaller quantities of highly complex end products. The volume of developmental, research and experimental activity performed for the government has also increased tremendously. This means increasing lead times, a high proportion of engineering changes, and use of material and production techniques which are untried. All these things increase the problems of estimating or budgeting the costs with any degree of precision. The number of items which have to be predicted increases and complicates the problem of keeping up to date on the changes to the original estimates. The definition of the pieces of

work that need to be accomplished, as they are known at any one time, becomes much more difficult.

Contractors are getting away from types of work which are readily applicable to use of standard cost techniques and into work where the use of standards has not been very extensive, such as tooling, production planning, engineering, testing, etc. The variety of these activities requires that a variety of estimating, budgeting, and forecasting techniques be used in order to develop planned costs to be used in controlling status. In contrast to many industries where these activities are considered to be overhead and therefore subjected to such techniques as variable budgeting, here costs are usually considered to be direct contract costs. It is usually necessary to break each cost area into specific packages of work, the packages of work being further broken down to individual responsibility for segments of the package. The result is an ever-increasing number of items to be budgeted and reported, which has an effect upon the problem of reflecting changes in conditions or plans in individual budgets.

#### *Planning product line costs*

The key to successful integration of the needs for cost accumulation is to relate costs by individual responsibility, and then to the contracts on which they apply, and finally to the product line of which the contract is part. This must be accomplished not only for the current fiscal period but for the life of the product line. The special-purpose characteristic of the product and the rapid technological change of the industry require that current period figures be referenced to the history and probable future of the product line in order to evaluate status or profitability. This starts with the budgeting and performance reporting on the research and development activities connected with the product line; continues through the engineering, production planning, and tooling that takes place prior to fabrication; through development of production standards, to performance reporting for the fabrication and assembly effort; and finally to budgets and performance reporting for product testing, delivery, and customer service costs in the latter stages of contracts.

With so many different direct costs in each product line, analysis of changes in planned costs is rather complex. Cost characteristics or relationships which were originally forecast in very general terms must continually be redefined and developed in more detail without losing completely the expression of the costs which were used in the original planning and decision making.

For example, at the time of the development of a product line, it may be necessary to predict cost relationships

over the seven or eight years which are estimated to be the life time of the line. Not only must the original research, development, engineering, planning, tooling, etc. be estimated, but also the probable requirements of the sustaining costs of these various activities during the production cycle. It is also necessary to predict the probable phasing of the retooling, continuing product development, or major production scheduling activities involved in recurring start-up peaks caused by additional contract or technological improvement of the original product that are likely to occur during these seven or eight years. The exact design of the product may not be known and thus standard material and labor costs cannot be computed with any precision.

At the outset of the product line the important thing is really the systematic presentation of all the anticipated costs to the degree of detail known at the time. As the product is designed and unit material and labor standards are developed, it is as important to relate these standards to the original estimate of unit costs as it is to report performance against the standards. The same is true for tooling and engineering budgets. Too often lack of profitability of the product line can be attributed to the difference between what management thought the cost would be at the outset of the program and the costs which are currently obtainable and are being used as targets by the operating managers. The profit variance caused by wishful thinking or inadequate planning is surely one of the most significant factors to report in this industry.

#### *Identifying costs to individuals*

The detailed buildup of planned costs by level of responsibility for some of the giant companies in this industry is a monumental undertaking. Yet, it is a task which is almost unavoidable if effective cost control is to be attained. The problem is really in the structure and mechanics of accumulation. Typically there is no shortage of technical people and cost estimators within the operating departments. The continuing requirement for preparing bid data and keeping up with the technological changes of the products makes this a necessity. In spite of the great mass of detail which supports estimate, forecast or budgeted figures on the detail level, it is frequently impossible to relate the final negotiated cost target (or even the current performance targets being reported in the financial and control reports) to the targets or standards being used in the operating departments. This occurs for a number of reasons. One is the relatively long review and negotiating process, both within the company before submitting the bid, and with the customer in arriving at

the terms of the contract. Another is the age-old problem of the finance department's converting the submitted figures into either accounting or contractual jargon which is not useful to the line people in controlling costs.

In some cases whole plants or organizations may be committed to only one contract or one product line. In other cases several contracts or product lines may be worked on by one organization. These product-organization relationships will change periodically. The accounting system, therefore, must be flexible enough to facilitate a broad range of such combinations.

One of the most important requirements for control information by the line manager is that he see the distribution of actual work performed by the organization for which he is responsible between the contracts or product lines. This is particularly true in shops or departments that work on a variety of things. Too much emphasis on contract reporting tends to overshadow the problem of department or organization management. The individual manager is left with the task of digging out and accumulating data essential to production, scheduling, shoploading, and determining manpower requirements.

Budgeting by responsibility has also been a problem because of the constant changes in organization structure by the large contractors. The changing of organizations particularly affects companies with a large number of service organizations. Apportioning the costs to the organizations served after initial collection by spending responsibility requires constant surveillance under changing conditions.

#### *Variances as period costs*

To date most of the literature on profitability accounting cites examples in which variances from planned or standard costs can appropriately be treated as period costs as they occur. However, in the case of industries with a prevalence of cost reimbursement for incentive contracts with the government, overrunning planned costs does not necessarily result in a reduction of profit. In such cases it seems appropriate to inventory such variations and to recognize the reduction in profit only when the work on the contract has proceeded far enough to evaluate the possible total over or underrun and the accompanying effect upon fee. This is particularly true when the sharing of gain or loss is computed on the basis of performance on the whole contract rather than on specific items within the contract. In most cases, this treatment is consistent with current accounting practices within the industry, whereas the immediate writoff of variances is not. However, it is important to give visibility to the reasons for

variations from planned profit, i.e., segregating the effect of overrunning from the effect of cost sharing.

Therefore, if the concepts of profitability accounting are to be retained, provision must be made for the reporting of the variance in inventory as an expression of the probable effects on profit. This must be done by responsibility and by the behavioral classifications of costs used under these concepts. In many cases these variances can also be appropriately identified to a specific product line which, again, is in contrast to most of the literature published so far.

A significant problem in this area is that expressions of variance or efficiency build up in the inventory accounts because of the long lead time between the fabrication of parts (and the creation of variances) and the actual delivery of the end item. At the time the item is delivered, it is appropriate to use an assignment of variance that is typical of the product line experience up to that point in time.

#### *Fixed overhead as period costs*

Likewise, the formal identification on the books of standby and programmed overhead cost apportionment to product lines is consistent with existing industry accounting practices. Many contracts will extend over two or three fiscal periods of a company. Therefore, fixed costs of two or three different years must be assigned to such contracts. Variations in total production volume or in the work mix between military and commercial during the life of the contract may well make the apportionment of these fixed costs substantially different in these years. Keeping track of all the assignments of the standby and programmed expenses and efficiency variances on a memorandum basis seems to strike at the heart of an objective of profitability accounting... to provide an integrated system which essentially eliminates the need for memorandum systems.

Therefore, it would seem more desirable to make formal allocations of these costs on the books and place increased emphasis on analysis of cost status as they are assigned to inventory. This necessitates developing methods of expressing efficiency as costs are incurred, and must be linked with the same type of expression of efficiency that will result when costs are transferred from inventory to cost of sales as billings are made. The linking device would be similar to a budget variance.

#### *Product line cost accumulation*

The accompanying statements exemplify the type of reporting classifications which meet some of the require-

ments of these companies. Statement A is an over-all summary of total product line costs over the total lifetime of the product line. It shows past cost experience, including performance to date, and the original estimates at the time the primary decision was made to commit the company facilities and effort to the product line. It might be necessary, in certain cases, to also include information as to total estimates of cost at other significant decision making times (current plan) in the history of the product line. It is most important to establish consistency in expression between planned costs made at different points in time so that management does not lose sight of basic reference points and assumptions. It is also important that the same kind of expression be given to all product lines, particularly to insure consistency as long range business plans are pulled together for the whole company.

Statement B is a summary of the product line costs that relate to the current fiscal year. Quite often these costs relate to several contracts with end product deliveries spanning a three or four year period. As contrasted to industries where a large portion of the current year's production is for putting end products "on the shelf" (ultimate sales order unknown), the majority of these costs will relate to specific contracts. It is noted that these are classified according to whether they are variable (with end product production activity), programmed or standby. The latter two classifications include costs which do not bear a direct volume of spending relationship with production volume. It might be said that these are the presently committed costs of carrying on the product line. Note that the traditional classification of direct vs. indirect for government contract costing has been subjugated to the classification of cost behavior.

Statement C is typical of the further breakdown of cost (for any major category) required to get down to useful classifications at the working level. Variable costs, in this case, are related to either of two major activity bases—standard labor cost of fabrication and assembly time represented by end products or standard material cost required for the end products. Manufacturers generally consider that supporting costs should bear a direct relationship with fabrication efforts. There may be a lead-lag relationship between the incurring of fabrication and rework or scrap which should be given consideration in the anticipated timing of incurring cost month by month, but over a longer period these costs should bear a fairly consistent relationship to the activity base. The variation from planned cost is termed merely *over* or *under* to avoid confusion with the term *variance* which

is applied to the activities which have approved engineered standards.

Statement D depicts the rearrangement of data necessary to consolidate the total direct labor performance for any particular manager. Each of the columns in this report might be further broken down on supporting reports showing performance on each major package of work within the product line pertaining to that department.

*Research and development cost accumulation*

Research and development work often take on the characteristics of a product line and can be reported as such. Usually these are relatively large projects that may

stretch over a two or three year period. They could be financed either by the government, by the company, or by a combination of both. The lifetime of a research product line would probably last until the first production contract is obtained. Generally the projects affect almost all departments of the company and are subject to the same requirements for cost and status control as are production product lines. In fact, due to incentive and cost sharing provisions of production contracts, underruns and overruns on research and development can have a more important effect on company profits than production work. Although research is often included in allowable costs in making overhead allocations to contracts, it is often the

**A. PRODUCT LINE SUMMARY ALL YEARS**

	TOTAL COSTS		VARIABLE						PROGRAMMED						STANDBY OVERHEAD ALLOCATED	
			DIRECT LABOR		MATERIAL		VARIABLE OVERHEAD		DIRECT LABOR		VARIABLE OVERHEAD ON DIRECT LABOR		PROGRAMMED OVERHEAD ALLOCATED			
	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*
1963																
1964																

**B. PRODUCT LINE SUMMARY YEAR 1964**

	TOTAL COSTS		VARIABLE						PROGRAMMED						STANDBY OVERHEAD ALLOCATED	
			DIRECT LABOR		MATERIAL		VARIABLE OVERHEAD		DIRECT LABOR		VARIABLE OVERHEAD ON DIRECT LABOR		PROGRAMMED OVERHEAD ALLOCATED			
	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*
PRIOR TO 1964 .. 1964																
JAN																

**C. SUMMARY OF VARIABLE COSTS INCURRED YEAR 1964**

	TOTAL COSTS		STANDARD FACTORY COSTS						NON-STANDARD COSTS								NON-STANDARD RATES COST	
			LABOR		MATERIAL		ENGINEERING LABOR		TOOLING LABOR		TOOL MATERIAL		QUALITY CONTROL LABOR		CUSTOMER SERVICE & TEST LABOR			
	Over (Under)	Actual Forecast*	Variance	Earned Forecast*	Variance	Earned Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Per Standard Labor \$	Per Standard Mat'l \$
PRIOR TO 1964 .. 1964																		
JAN.																		
FEB.																		
MAR.																		

**D. TOOLING DEPARTMENT LABOR YEAR 1964**

	TOTAL COSTS		PRODUCT LINE 1		PRODUCT LINE 2		PRODUCT LINE 3		RESEARCH PROJECT A		RESEARCH PROJECT B		DEVELOPMENT PROJECT A	
	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*	Over (Under)	Actual Forecast*
JAN.														
FEB.														
MAR.														
APR.														
MAY														

policy of the government to place an upper limit on the amount of research which can be included.

Much of a company's investment in a product line consists of these company-sponsored research and development costs. Research benefits might accrue to more than one product line and these relationships should be considered in making the return on investment analysis and reporting typical of a profitability accounting system.

It is important to emphasize again that these companies need two separate analyses of costs — one on the basis of planned costs as they are incurred and another on the basis of cost and sales relationship as deliveries or billings are made. It is also important to emphasize that these two stages of reporting must be tied together in order that the effects of cost performance on reported earnings be given visibility.

#### *Earnings statement*

The earnings statement should follow the general format suggested in Robert Beyer's book "Profitability Accounting for Planning and Control." This statement sets out variations from planned profit caused by variations from planned sales volume and profit contribution. It also emphasizes the impact of programmed and standby cost allocation on the profitability of the product line.

The heart of the earnings statement lies in the "variance" column, because here should be the expression of the dollar effect on profits of all of the variations from planned costs. This becomes a substantial list because of the complexity of the companies and the variety of activities involved in the typical contract. There are, of course, the usual performance variances on fabrication and assembly work arising from comparison with labor and material standards. Spending variances on budgeted overhead by responsibility are also applicable. The budget variance (arising from the conversion of the spending budgets into product cost absorption rates) requires segregation because of the variety of factors involved in that conversion. These factors are changes from the planned mix of military and commercial hours, changes from the anticipated volume of interdivisional work (where separate divisional military rates are used), changes from the planned mix of manufacturing and engineering hours (if separate military rates are used), and a number of others.

The above are not complications created by a profitability accounting system, but merely a systematic method of isolating the reasons costs and profits vary from that which was planned. Present systems in this industry often bury these very significant factors, thus leaving a gap

between departmental overhead budgets and unexplained changes in contract overhead rates.

The overrun on activities not subjected to engineered standard costs are also included with the variances. Even though budgets on some packages of work or activities might be developed in a very informal manner, they are incorporated into departmental and product line targets. Generally the degree of precision with which budgets are prepared will depend upon the economics and practicability of the various alternative techniques which could be used in each circumstance.

Through this type of presentation management is able to see the impact of variances from planned cost on both deliveries to date and future deliveries (those represented by inventory costs). Merely bringing planned costs into the earnings statement along with a "lump sum variance" or "overrun" won't answer the important questions of management. A substantial detailing of specific variances should be available and, as emphasized earlier, should include isolation of the effects of overspending, of the sharing with the government of over and underruns, and of the averaging effect caused by inventorying variances.

This kind of information, coupled with segregation of costs into variable, programmed and standby categories, results in a useful and meaningful structure in which to report actual experience as well as to build up the variety of planned costs which typify this complex industry.

#### *Summary*

The government contractor has to deal with a considerable number of problems in attempting to develop a truly integrated accounting and reporting system, particularly those contractors in highly technical and rapidly changing fields. Few, if any, have ever succeeded in developing such a system. The concepts of profitability accounting offer a real opportunity to these companies if clerical and mechanical techniques can be developed which recognize the complexity of the companies and their products. A great deal of the complexity is caused by historical patterns built up over years of dealing with the government. In a profitability accounting system it is necessary to include and recognize these patterns. Specifically, the formal allocation of fixed overhead to contracts stands as a major deviation from most of the literature to date. Another deviation is the flow of variances through the inventory accounts and all variances not necessarily being treated as period costs. It appears that these and other considerations can be resolved without changing the fundamental concepts and objectives of an integrated management accounting and control system.