

Calhoun: The NPS Institutional Archive
DSpace Repository

NPS Scholarship

Publications

2012-09-07

Unit Cost Handbook : a Financial Management Tool for Today & Tomorrow

Defense Economic Analysis Council

<https://hdl.handle.net/10945/13738>

Downloaded from NPS Archive: Calhoun



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>

Unit Cost

A Financial Management Tool For Today & Tomorrow

A handbook explaining the principles and benefits of unit cost . . . a focus on bringing Department of Defense financial management into the 21st century.

Executive Summary
Introducing Unit Cost
Understanding Costs and Outputs
Development of Unit Cost
Managing with Unit Cost
Challenges, Opportunities and Benefits
Summary
Glossary & Sample Documents
Reference Material

Every dollar saved in support is another dollar for the operating forces

Executive Summary

This handbook is intended to acquaint Department of Defense (DoD) executives and managers with the subject of unit cost. It provides an overall familiarization with unit cost and the management challenges, opportunities and benefits unit cost management offers.

Unit cost principles underlie a management methodology that is applicable to many organizations, whether operations are funded by direct appropriations or financed through a revolving fund. The aim of unit cost is to relate total cost to the work or output produced. To improve use of resources, decision makers must understand their mission and the work required to perform that mission. They must also have visibility of total cost, including costs that historically have been viewed as "free" such as military labor or capital equipment.

Unit cost focuses management attention on relating total cost with work accomplished (output produced). Outputs produced must be specifically identifiable and quantifiable. Costs are captured and categorized as: direct, indirect, and general and administrative costs. The unit cost (or average total cost) is the sum of these costs, divided by the number of units of outputs produced. Output and cost data are collected through financial and nonfinancial processes and systems. Unit Cost Reports provide data on the execution of a program in unit cost terms.

Working groups consisting of representatives from the Office of the Under Secretary of Defense (Comptroller) and components have implemented the unit cost methodology for a number of functional support areas. For these areas, a target, called the unit cost goal, is passed to each component headquarters organization. The unit cost goal serves as a financial benchmark. The Unit Cost Reports help executives and managers monitor performance against these unit cost goals.

Executives and managers who manage with unit cost principles will improve decision making capabilities by having better, more meaningful information. Unit cost management is a tool, not a substitute for sound management or leadership. The unit cost approach encourages all employees to look at all costs in terms of the outputs of the business. Properly used, unit cost also helps target areas needing management attention, promotes creative

UNIT COST relates resources consumed to outputs produced to help DoD leaders make better management and resource allocation decisions.

management, highlights efficiency, provides financial benchmarks and other information to measure organizational performance, and provides a common framework to evaluate support activities

Introducing Unit Cost

As the Department of Defense (DOD) looks toward the twenty-first century, the "budget management" mindset of managing fixed budgets must change. Fundamentally, we must alter the way we think and the way we work, and we must change the way we manage. We must connect outputs to outcomes with what it costs to achieve those outputs and recognize that future costs are a consequence of today's decisions. We must embrace a workforce culture with a vision focused on process management that connects costs with workloads. In this vision, employees are empowered to make changes, and business processes are reengineered to promote efficiency and increase effectiveness. Employees at all levels become partners in improving government. We are committed to providing increasing quality at decreasing cost - achieving better value for each defense dollar spent. These are difficult but defining goals for every member of the DoD workforce, civilian and military.

**FUTURE COST
are a consequence
of today's decisions**

This handbook is designed to help managers recast the way they manage DOD Support activities. It focuses on the ideas of unit cost and unit cost resourcing. These concepts are neither new nor complex, but they form the basis of sound management tools that DoD support activity managers can and should use to manage more effectively and better allocate scarce resources. The handbook, written for DoD executives and managers, provides the reader with a general familiarization of unit cost and an overview of the management challenges, opportunities and benefits of using unit cost. Executives and managers at every level should understand the principles outlined in this handbook. The handbook does not answer the many detailed questions that will naturally arise as organizations move toward using unit cost as a management tool.

Support organizations can and should provide low cost, high quality support. Historically, these activities operated without recognizing the true total cost of producing goods or services, and costs were not clearly related to the quantity of products produced. Some significant inputs to production were treated as free goods because producers did not acknowledge those costs, (e.g., equipment and military labor). The focus was on "executing the program," not on lowering the cost of doing business.

As will be discussed, the unit cost methodology identifies and

reports all costs as they relate to outputs. This provides management with a view of the total cost of operations and the resultant cost per unit of output. This view encourages a new and more meaningful understanding of production processes at all management levels. It also assists managers in determining more efficient uses of the resources available to them. The producers' focus shifts from managing fixed budgets to managing processes and their consequent costs. Using unit cost principles is consistent with the implementation of the Government Performance and Results Act, changes arising from the National Performance Review, and other initiatives designed to create a government that works better and costs less.

The handbook will introduce the unit cost principles by presenting chapters on the unit cost conceptual framework and integrate this with a description of unit cost in the context of DoD financial management. Next is a discussion of the unit cost resourcing methodology, which is followed by a description of the management opportunities and challenges and the benefits unit cost provides. Lastly, there are appendices with a glossary, a sample annual operating budget, sample unit cost reports and a list of reference materials.

Managers who are expected to manage with unit cost must have a firm grasp of unit cost theory and practice, and the benefits that can be expected from using unit cost principles. Properly motivating and educating the workforce is the first step toward the future vision where we focus on process management and resources required for desired outcomes.

UNIT COST BACKGROUND

There is nothing new about unit cost principles. Private industry has used ideas based on unit cost principles for decades. Government performance budgeting, an idea based on unit cost, was suggested in the late 1940's. In 1969, Project PRIME 69, focused on "full cost" with the aim of using resources to attain maximum output for resources consumed. It is interesting to note that many combat activities have been managing with cost per unit measures for many years. For example, Air Force units that fly aircraft manage in terms of the "cost per flying hour," Navy activities manage and budget using the "cost per steaming hour" and Army units measure the cost per tank mile." Whatever other names there might be for these measures, they are also unit costs.

What is new are the advances in technology. Current technology enables managers to receive more useful information in a more timely and understandable manner. But, use of new information requires a change in "mindset" throughout the workforce.

Transformation from the industrial age to the information age demands that we actually use this new information to manage and work more efficiently. Managers need to recognize that increased visibility of cost information can lead to better, more informed decision making. By relating total cost to outputs, producers and customers are made aware of the real cost of support. To this end, unit cost provides more meaningful information and assists managers and management teams in becoming more effective.

Unit cost was introduced DoD-wide in 1989. In fiscal year 1991, the supply management and distribution depots were the first functional areas to receive unit cost budgets. With the establishment of the Defense Business Operations Fund (DBOF) in fiscal year 1992, all DBOF businesses received unit cost budgets in fiscal year 1992. The DBOF, a revolving fund, uses unit cost principles to focus management attention on the total cost to produce a product and as the basis for full cost recovery. However, activities operating under unit cost may or may not be financed through the DBOF structure. Unit cost principles can be used as management techniques independent of an organization's funding source.

Currently, support organizations that produce identifiable and measurable units of output are considered to be best suited for operating under unit cost and unit cost resourcing. To be included under unit cost and unit cost resourcing, an organization must be able to identify and quantity its customer-driven outputs and have a system to align costs to these outputs. Support organizations tend to fit these criteria well.

Understanding Costs and Outputs

Unit Cost Defined

A unit cost is simply the "average total cost" of producing one unit of output. A unit cost is calculated by dividing the total cost of production by the total number of units of output produced.

$$\text{Unit Cost} = \frac{\text{Total Cost}}{\text{Total Output}}$$

Figure 1

Using source financial data from accounting systems (data from organizational financial transactions), all costs associated with an output are collected, summed (total cost) and then divided by the number of units of output produced (data from management information systems). The result is the cost per unit of that output, or unit cost. This is identical to the model presented in Figure 1. To properly understand unit cost in DoD, we must understand what is meant by "output" and what and how costs are included in "total cost." The following two sections explore these areas.

The Output Side

An "output" is something "put out" at the end of a production process. An output is the result of an organization's operations. An output can be a good or a service and must be measurable in some quantitative unit. The key to identifying output is to focus on what the organization does. For example, the output of a training school might be identified as a pilot who has completed a particular course. The output of a finance center might be an invoice paid.

An output must be a quantifiable measure, supported by a data tracking system and driven by a customer requirement.

In contrast to the more simple examples cited above, in general, DoD support activities produce more than one output, often complex in nature. That is, they are not producers of a homogenous output or single product. The training school trains navigators, bomber pilots, attack pilots, ground crews, etc., while the finance center pays bills, maintains account balances, produces internal and external reports, etc. Arguably, each of these is a different output calling for different mixes and types of labor skills, materials and capital (equipment, etc.), resulting in different total cost and unit costs.

Consider a distribution depot that handles millions of different items. Clearly large items require different resources to receive, store and issue than small items. Does this mean there are millions of different outputs at distribution depots? Some argue there are,

but as a practical matter it would be difficult to manage effectively so many discrete unit costs. Thus, DoD unit cost methodology uses output measures that are aggregated. This means that the various outputs of an organization are grouped together to form a single (or few) measure(s) of output which generally describe the output of the organization. This aggregation is considered only when those outputs share similar characteristics and costs. These output measures provide a quantified measure of the workload an organization has produced. Output measures differ for each support area and are designed uniquely for each area included in unit cost.

In a few instances, proxy output measures are used to represent outputs that may be impracticable to count individually. For example, the principle function of an inventory control point (ICP) is to provide supply items to customers upon receipt of a customer order. However, this supply function includes such supply management activities as procurement, cataloging, standardization, storage and distribution. Since millions of types of supply items are managed by each ICP and distributed to ICP customers, managing unit cost information for each item is not presently practical. Therefore, the dollar value of sales of all supply items managed by an ICP is used as a proxy measure of ICP output. This proxy measure consolidates the cost of a vast variety of individual inventory items and supply management functions into one single measure.

An output is characterized as a measure of work produced, supported by a data system capable of tracking it. An output must be quantifiable, auditable and produced in response to a customer requirement. That is, to qualify as an output, an activity cannot control the demand for an output. Defining an output requires identification and inclusion of all tasks related to producing the output. These characteristics enable us to use automated tracking systems, foster definitional consistency and eliminate ambiguity in reporting. Knowing the way outputs are defined for a business area is a critical element in understanding how to manage with unit cost information. It is essential that the output measure represents the inclusion of all tasks performed.

The Cost Side: Two Views of Unit Cost

There are many ways to classify costs. Costs can be grouped by function, timing and controllability, to name a few. Managers find grouping (viewing) cost by traceability and behavior as especially useful. As previously stated, the goal is to understand total cost and its relationship to workload. Total cost is the sum (total) of the

Identify cost as direct, indirect and G&A enables managers to understand the impact of each cost category on the

value of all resource consumed in producing output(s). It includes all types of costs regardless of how they are classified. The following sections develop the notion of total cost classified by traceability and behavior. ***Traceability: The accounting view***

overall cost to produce something.

Unit cost is a move to more businesslike accounting. Businesses rely on linking or tracing costs to outputs, and managerial or cost accounting provides managers this information. Management accountants strive to establish causal relationships between costs and cost objects to determine why costs were incurred. The process of tracing costs to cost objects forges a necessary link so that ultimately, we can relate costs to outputs, even if at an aggregated level. To enable treating costs in this manner, in DoD unit cost, we categorize costs as direct costs, indirect costs, and general and administrative costs (G&A). The sum of these categories yields total cost as shown in the model in Figure 2. These categories are briefly described below.

Direct Costs: Direct costs are those costs that can be traced exclusively to one output, such as hands on labor or material consumed directly in the production of an output. Direct costs tend to (but not always) change proportionally with the quantity of output.

$$TC = TDC + TIC + TGA$$

TC - Total Cost
TDC - Total Direct Costs
TIC - Total Indirect Costs
TGA - Total G&A Costs

Figure 2

Indirect Costs: Indirect costs are those costs which benefit two or more outputs but not all outputs. Indirect costs are often relatively insensitive to changes in quantity of output. An example of an indirect cost may be a second line supervisor who oversees some specific, but not all, production processes. Typically these costs are allocated among the various outputs which they benefit. It is important to note that while cost accounting attempts to establish causality, ultimately there is a certain amount of arbitrariness in any allocation scheme used. This is to say that no allocation scheme will be completely accurate, but a reasoned allocation scheme for these costs helps better identify the "true" total cost.

General and Administrative Costs: General and administrative (G&A) costs are those costs that cannot be reasonably associated with any particular product or service produced. Commonly referred to as overhead, these costs are allocated over all outputs produced. Again, any allocation scheme will be somewhat arbitrary in nature, but will help better reveal the "true" total cost of an output. However, every attempt is made to choose an

allocation methodology that best suits each functional area. As with indirect costs, G&A costs tend to be relatively insensitive to small changes in output. Examples of G&A costs include functions such as local comptroller, security, facilities engineering, fire protection, custodial services, snow removal and similar types of base support functions.

Cost behavior: The economic view

As with the cost accounting view, cost behavior is generally viewed as either fixed or variable. In this view of cost, total cost is the sum of all fixed costs and all variable costs. Fixed costs are those costs that, over some specific time period, do not vary with quantity of output. These are costs that we must pay no matter how much we produce. For example, an annual lease that requires monthly rent payments whether or not we produce anything is a fixed cost.

Variable costs are those costs that vary directly with quantity of output. If we produce nothing, variable costs are zero. Consider the cost of materials used to repair radios. Each radio repaired requires one unit of material at some cost. The more radios repaired, the greater the total material cost. If we repair no radios, we use no materials and incur no cost for materials.

There is also a cost category called mixed costs. Mixed costs behave as fixed costs up to some minimum quantity of output, then, like variable costs, increase as the number of units of output increases. Only fixed and variable costs will be discussed in this section on unit cost.

It is important for managers to recognize how costs behave in order to plan and manage properly. In the short run, changes can normally be effected only by making decisions about variable costs. For example, reducing the amount of packing material used for shipments could reduce the unit cost of issues at a distribution point. Changes to fixed cost tend to be long run oriented. The buy versus rent decision is one example.

Managers should not use the notion that all (or most) of their costs are fixed costs and therefore management is unable to control costs. In today's environment of increasingly scarce resources, creative, cost conscious managers should want to drive production cost down. To do so enables them to "do more with less." This challenge to managers means reengineering the process in which work (output) is produced. In this pursuit, it is necessary to

It is important for managers to recognize how costs behave to plan and manage costs and processes better.

recognize which costs can be affected quickly by management action and which will take more planning and management attention to influence. More will be said about these challenges later.

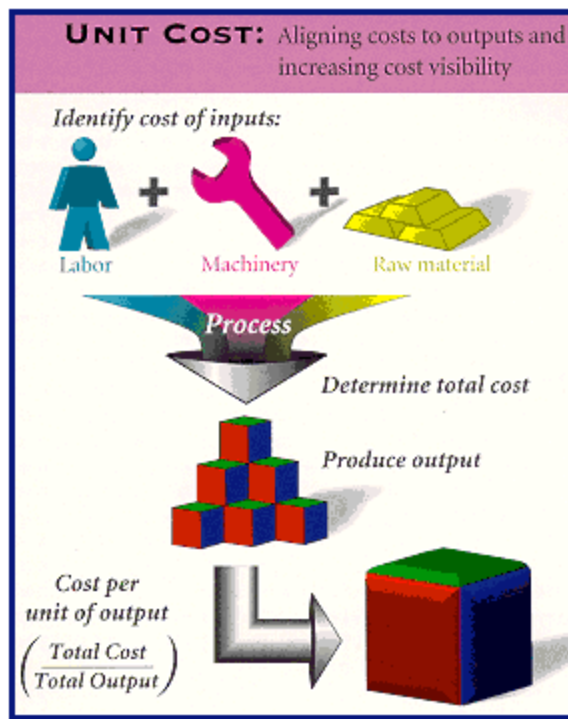
Within DoD financial management, there is no clear consensus or generally accepted definitions as to which costs are fixed and which costs are variable. But regardless of cost behavior, fixed or variable, all the costs of a business must be addressed. Managers are responsible for their decisions, and using unit cost helps focus attention on and communicate information about the total cost of production. The unit cost process reinforces responsibility and accountability for decisions.

Total Cost Visibility and Cost Awareness

Wise resource allocation decisions are possible only when all costs are explicit and visible. To ensure the total cost is captured, all constituent parts of a type of cost must be included. For example, direct labor costs consist of wages, fringe benefits, and

other entitlements.

All these costs should be included so that the total labor cost used in producing an output is known.



Historically, there have been some production inputs that were treated as "free goods" because the performing activity did not actually pay for them. But DoD has always paid the full cost. Unit cost simply identifies costs with the outputs produced.

For example, military personnel, paid from a separate military pay appropriation account, were considered "free" assets. If military labor is required in a production process, the cost of military labor should be captured as part of total labor to know the total cost associated with that production process. Using unit cost facilitates

cost visibility by making clearer connections between costs and outputs.

Effectively implementing unit cost principles and improving the financial management of support activities requires managers to understand the types and behavior of the costs incurred in the production process. Increasing the level of cost awareness should be encouraged by organizations. This can be done by actively researching production processes, investigating how costs behave and seeking means to reduce costs and improve value to customers.

Development of Unit Cost

Aligning Costs and Outputs

Unit cost should help managers at all levels to make more informed resource allocation decisions. To provide this capability, it is necessary to understand the output definitions and cost collection methodologies used in the process of developing unit cost.

Figure 3 provides an overview of the data flow and mapping process resulting in unit cost reports.

DoD-wide task forces first began developing output measures for the various business areas in 1989. The task forces were comprised of financial and nonfinancial representatives from the components and various Under Secretary of Defense (USD) offices. They determined organizational outputs for selected functional areas, identified sources of data and workload information and developed the mapping, a methodology of aligning costs to individual outputs.

The mapping process brings workload, financial and manpower data together to assign direct costs, allocate indirect costs and spread G&A costs to specific outputs. In unit cost development, costs and outputs are related or aligned by using this "mapping" process. In this process, cost data collected from the official accounting systems are grouped together by cost account codes. The costs are linked or mapped to particular outputs. This process results in cost-output relationships that provide management visibility of the total cost for a given output. The mapping for an activity should be continuously reviewed and updated in order to reflect accurately changes occurring. This process is graphically described in Figure 3.

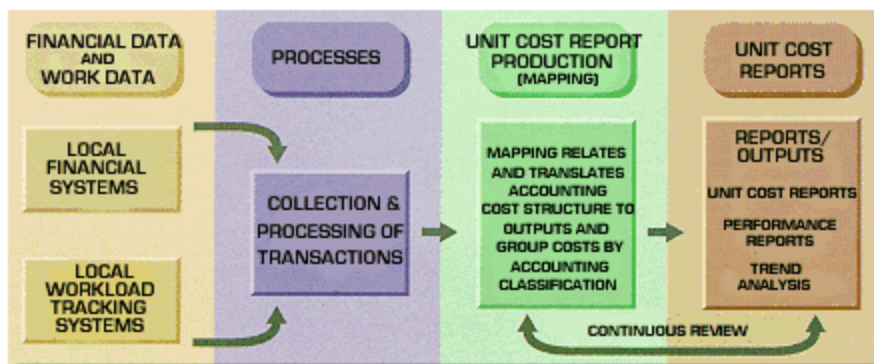


Figure 3

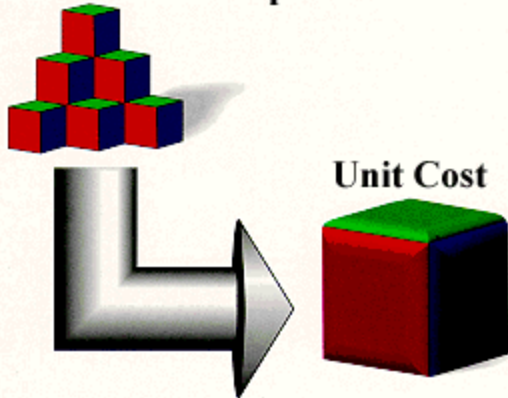
Unit Cost Working Groups

Responsibility for developing unit cost in support areas resides with the Office of the Under Secretary of Defense (Comptroller). Development of unit cost for each support area is done by a Unit Cost Working Group, chartered to do the following:

To continuously develop and apply unit cost principles and practices to identified business [support] areas. Improve financial management information for managers of support functions that will facilitate cost conscious decisions. Perform special studies in support of improved financial operations of support functions related to this unit cost business area.

Working Groups help improve financial management information by developing and applying unit cost principles and practices.

Total Cost of Output



Each Group consists of appropriate subject matter experts from the DoD components that perform support functions in each defined business area. In

accomplishing its mission, the Group identifies the output(s) of the business area and identifies the appropriate costs applicable to that business area. Other considerations such as standard report development and production and customer identification are also part of the Group's purview. Further, the Group is responsible for carefully documenting the results of their work. This includes documenting the appropriate costs and workloads residing in the various systems that will be used to create the unit cost reports and measure outputs.

The Group is the primary body responsible for continuously reviewing cost-output mappings and ensuring currency and accuracy. However, local activity managers should recommend changes when appropriate. The appropriate Unit Cost Working Group reviews all recommended changes prior to changes being implemented.

Managing with Unit Cost

The Unit Cost Goal

Calculating and knowing the actual unit cost per output is an essential element of managing under unit cost. But, by itself, the unit cost of an output cannot answer the question "how well are we doing?" To address this question, we use a financial benchmark, the unit cost goal.

The unit cost goal represents the corporate expectation of "should cost." It is the maximum average total cost to be incurred in the production of an output. To derive the goal, all projected costs (direct, indirect, and G&A) associated with an output are divided by the expected number of units of output (workload). The USD (Comptroller) develops and issues unit cost goals at the DoD component level for each support area. The component is then responsible for subsequently passing specific unit cost goals to subordinate component activities.

The unit cost goal is based on historical data, adjusted for known and anticipated changes in the budget year. Some of these anticipated changes may be based on expected increases for the cost of inputs, increased productivity based on improved processes (including new technology), and so forth. The expected quantity of output is based on anticipated demand. Actions such as weapon systems retirements, base closures and changes in force structure should be included in demand projections.

Distributing the Unit Cost Goal

A unit cost goal is established by the USD (Comptroller) and determined at the component or agency level for each business area. The component should then distribute those goals to the activities involved in performing the function. The intent is to gain visibility of costs and manage those costs at the lowest possible level. However, it is not necessary, desirable nor appropriate to give each activity the same goal. Understanding cost classification and behavior is critical in this process. For example, if a component has several activities in the same functional support area which have similar workloads, capabilities, and cost structures, we might expect the unit cost goal for each activity to be about the same. However, if one activity was in a high cost geographic area and another in a low cost geographic area, it would be reasonable to expect a significant difference in the unit

The Unit Cost Goal is a financial benchmark or the corporate expectation of "should" cost.

cost goals between the two activities. The unit cost goal established at the component level would have been developed with these considerations in mind.

The Annual Operating Budget

The annual operating budget (AOB) is the funding document which provides the basis for earning budgetary authority. The AOB includes an operating and a capital budget. The operating budget identifies every unit cost Output and its associated unit cost goal. The capital budget provides obligational authority for investments. The AOB is released from the USD (Comptroller) to the Military Services and Defense Agencies. The Services and Defense Agencies are responsible to further disseminate budget authority by releasing AOBs with approved unit cost goals to their subordinate activities. An example of an AOB is provided in Appendix B.

The AOB provides authority to incur cost.

Unit cost resourcing is the process of using the AOB to make funding allocations based on cost per output and directly tie budgetary authority to the number of outputs produced. It is "business-type" accounting that supports measuring productivity and management decision making by focusing on the relationship of cost to output produced.

Unit cost authority is the approval to incur costs. Cost authority "earned" by an activity is determined by multiplying the actual number of outputs produced by the unit cost goal. This is commonly referred to as "earned authority." For example, if the unit cost goal is \$100, then for every output actually produced, the producer earns \$100 of cost authority; for two units produced, the producer earns \$200; for ten units, \$1,000 and so forth. This authority becomes the budget within which the activity manages. Unit cost resourcing is a process in which the level of budgetary authority is not fixed. Because it fluctuates with the amount of workload produced, the right amount of resources should be available at the right time. This allows management to focus on production process management as well as overall budget management.

The Monthly Unit Cost Report

A monthly unit cost report, the result of the process represented in Figure 3, provides monthly information on execution, by business area. The report, entitled "Costs and Workload Analysis Report", provides costs broken down by labor and non-labor. Costs are further broken down by direct, indirect and G&A categories. Workload data by output is also provided. Appendix C is a sample

Unit cost reports provide performance information to managers at various levels.

monthly unit cost report.

The information in the report provides the basis for management to analyze the operations of the organization. Comparisons of the monthly information with the annual unit cost goal provides an indicator of "where we are." Uses of unit cost information will be further discussed in the next section.

Challenges, Opportunities and Benefits

How and Why Unit Cost Change

Unit cost will change as a result of changes in any one or a combination of three factors: changes in quantity of output, changes in productivity of inputs (including technology, employee education, etc.), and changes in the cost of inputs. The following discusses each of these changes in unit cost separately.

Three factors will change unit cost:

1. Changes in quantity of output.
2. Changes in productivity of inputs.
3. Changes in cost of inputs.

Changes in quantity of output

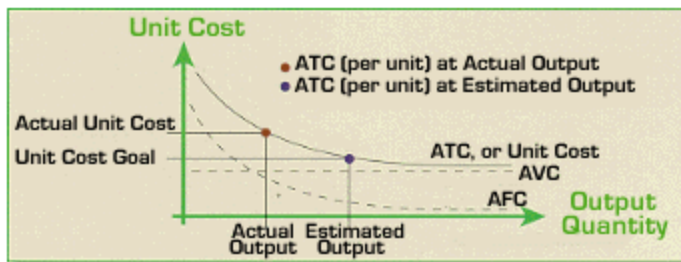


Figure 4

The unit cost goal, the planning target, is based on the estimated volume of

Figure 4 displays the relationship between quantity and unit cost as they relate to fixed, variable and total costs.

output or workload expected. If actual output is different from expected output, actual unit cost may be different from the unit cost goal. A change in unit cost as a result of changes in output (workload) can be seen in Figure 4. In Figure 4, the actual output is less than the estimated output and the resultant unit cost is higher than the unit cost goal. The actual unit cost can be higher or lower than the unit cost goal, depending on where on the average total cost curve the unit cost goal is located.

Managers should be concerned with how sensitive their unit cost goal is to changes in production volume. When the current level of production is low compared to production capacity, increases in output tend to reduce unit cost. This can be seen in Figure 5, where, as output increases from output point A to output point B, unit cost falls. When production levels are high, as represented at the output level at point C, increases in output may increase unit cost as a result of taking costly measures such as paying overtime premiums or renting additional facilities.

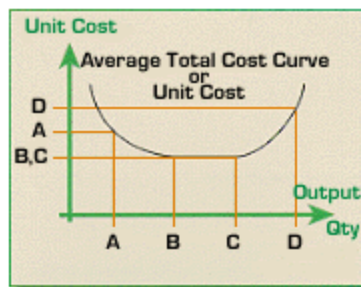


Figure 5

Figure 5 demonstrates the unit cost sensitivity to changes in output levels.

Movement from output point C to D illustrates this change. For many processes, there is a range of output over which the unit cost is relatively insensitive to changes in output. This is depicted in Figure 5 as the flat area of the curve, between output points B and G which, for illustration purposes, also have the same unit cost.

Changes in productivity

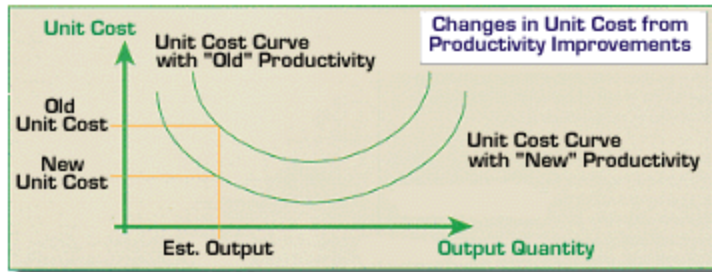


Figure 6

Productivity can change for a variety of reasons. These include changes

Figure 6 compares the effect of a change in productivity which lowers unit cost at every level.

in the basic production process (e.g., substituting machines for labor), specialized education or training for employees and changing the technology employed in the production process (e.g., using newer computers).

When productivity improves, we can produce the same output with less resources, and thus less cost. When this occurs, we are changing our cost function and lowering costs at all levels of production or output as illustrated in Figure 6. Changing technology to produce output should be done with the goal of improving productivity and lowering total cost.

Changes in input costs

Inputs to the production process are goods and services producers purchase to create output. A change in the purchase price of one or more inputs can also change the unit cost. Situations such as material quantity discounts could lower variable costs while paying overtime for labor costs could raise unit costs. Any change in total cost when workload remains constant will clearly cause a change in unit cost. Changes in the cost of inputs can lead managers to substitute lower-cost inputs for higher-cost inputs. For example, if an industrial activity has a variety of material technically acceptable for a certain job, managers choose the lowest-cost material, assuming all are equally available.

Management Accounting Analysis

Using the unit cost goal as a benchmark or measure against actual

unit cost enables managers to perform variance analysis. Variance analysis is a managerial accounting method used to determine the difference or variance between actual operating results (actual unit cost) and expected results (unit cost goal). This analysis helps management understand where and why differences occurred. In conducting variance analysis, different aspects of actual unit cost (input costs, quantity of output and productivity) are compared with the unit cost goal (the "should cost" target - expected input costs, planned output and planned productivity). The variances between the actual unit cost and unit cost goal may be the result of any or all of the factors described in the previous section.

In any case, properly executed, variance analysis provides management the information necessary to target production processes in need of management attention. If, for example, less output is produced and the actual unit cost exceeds the unit cost goal, management will need to evaluate the following: why workload is not materializing; whether or not workload will increase later in the year; how costs can be contained in order to meet the goal; or if an adjustment to the unit cost goal can be supported and is necessary.

Using Unit Cost at Various Levels

Because unit cost requires that we identify outputs and assign all costs to those outputs, it is a useful management tool at all levels of the DoD. At each level, the focus on total cost provides useful information for comparisons of alternatives. It helps us to make the decisions necessary at each level to ensure that we use our resources efficiently and effectively.

USD (Comptroller) and Component Level

Unit cost provides a consistent managerial framework for comparing dissimilar operations. It allows senior leaders to assess, on one dimension, how well an organization has met corporate expectations. Unit cost also enables senior leaders and analysts to determine the total cost of each of the various outputs produced. It helps managers consider whether resources should be shifted from production of one output to the production of another.

Unit cost also provides an indicator of performance among producers of similar output. It is not, however, the only measure of performance. Other measures of performance, such as quality and timeliness, are equally important.

Management headquarters level

Variance analysis is an investigation of the differences between the actual unit cost and the unit cost goal. Variance analysis helps managers understand "what happened."

At the management headquarters level, unit cost provides those responsible for overall management of a support function the ability to view total cost as it relates to total work accomplished, across individual activities. The distributed unit cost goal provides a financial benchmark for a support area manager to evaluate subordinate activities' performance. The unit cost methodology provides a consistent method of analyzing activity performance over time and among producers of similar output.

Provider/Producer or activity level

At the producer level, unit cost encourages managers to focus on both the total cost of producing the activity's output and the production process. This focus on cost and process encourages consideration of alternate methods of production and provides consistently defined benchmarks for the local activity over time. Unit cost provides activity level managers with better cost visibility by helping to identify costs and cost drivers as they relate to output. Once an activity is aware of what an output costs, managers will be able to make more informed decisions and can better determine how to reduce and eliminate costs and cost drivers.

Cost drivers are factors that cause changes in the cost of an output. To the extent management can control cost drivers, they should be evaluated to determine whether or not they add value to an output or result in improved customer support. With the ability to identify cost drivers through unit cost, an organization can minimize or eliminate costs and ultimately reduce the total cost and cost per unit of output. For example, one of an organization's outputs may be employees paid. In reviewing the cost per employee paid, management may identify significant labor and postal costs associated with mailing checks. Action could be taken to reduce these costs by electronically transferring the funds directly to an employee's personal financial institution in lieu of mailing checks to employees. In this case, one cost driver is the postage for checks mailed. Moving to electronic transfer of funds might result in reducing the cost per employee paid, by reducing the cost driver, postage.

Cost drivers are factors that cause changes in the cost of an output.

Unit cost also provides managers the flexibility to make cost trade-off decisions between elements of operations cost. Managers are freed from compartmentalized funding (e.g., set amounts for travel or supplies) and are allowed to make trade-offs between these types of costs as work requirements demand. For instance, if

Unit cost gives managers the flexibility to make trade-off decisions.

the purchase of one personal computer would improve work methods and would reduce personnel requirements, a manager operating under unit cost may have the authority and flexibility to make that trade-off decision.

Managers actively and routinely compare actual results with the unit cost goal (i.e., conduct variance analysis) and use other nonfinancial benchmarks to help target areas needing management attention. Proper use of the unit cost methodology provides additional information for managers to evaluate operating results and reward performance. Monthly comparisons between actual unit costs and unit cost goals enable managers to understand the results of monthly operations and trends over time. End-of-year results indicate if the activity's management completed the mission within financial expectations and provide a measure of organization and management performance.

A powerful local management approach in using unit cost goal information is to make each subordinate part of an activity (e.g., branches, departments or divisions) responsible for its share of the unit cost for each output. To do this, activity managers must implement a local process to break the unit cost goal to the lowest level (e.g., work centers) that incur costs producing an output. If unit cost information is provided and used in this manner, work center supervisors and employees have a better understanding of their contribution to the actual unit cost and can actively review their processes with the goal of controlling their costs while improving performance. This is the essence of dynamic interactive management and employee empowerment. This approach requires active management support and the resources to develop and use local information systems capable of accomplishing this task. True benefits come about only from long term usage.

Local Management can make each subordinate part of an organization responsible and accountable for its share of the unit cost for each output.

Tools that can help process examination include business process reengineering and activity-based cost management. These tools help managers better understand the production process of a support organization, and in particular help management better manage processes.

The use of unit cost to manage can highlight possible inefficient use of scarce resources and motivate the search for alternative methods of production. For example, contracting out a part of the production process that organically is classified as a fixed cost, but as a contracted function becomes variable, might be one solution that adds managerial flexibility.

The Benefits of Unit Cost Management

Executives and managers who integrate unit cost principles into their workplace culture will improve decision making capabilities by having better, more meaningful information available. The unit cost approach has the advantage of encouraging employees at all levels to look at all costs in terms of the output of the business. Using unit cost principles will not solve the problems of managing an organization or function nor is it a substitute for sound management or leadership. Rather, unit cost is a powerful tool useful in the management process.

Employing unit cost principles moves DoD toward modern business practices, better meeting today's work place challenges. This means encouraging employees to reengineer business practices and production processes, thus giving employees a stake in the success of the "corporation." Engaged employees take responsibility and ownership of their actions and become more aware of the long term consequences of today's decisions.

Benefits

Provides a capability to determine total production costs traced to outputs.

Assists in targeting areas needing management attention.

Encourages the consideration of alternative methods of production.

Highlights operational efficiency.

Provides financial benchmarks for activity performance.

Provides more information to measure and reward performance.

Provides a common managerial framework among support activities.

Summary

Does Using Unit Cost make Sense?

Unit cost and unit cost resourcing embody sound managerial principles consistent with modern, proven business practices. As a financial management tool, unit cost focuses the attention of managers and employees on the process of producing outputs and the total cost to produce those outputs. This is a necessary and fundamental shift in focus from managing inputs to managing the production process and increasing cost awareness.

Managing with unit cost information empowers managers, but does not make management decisions. Using unit cost is not a substitute for informed management; however, enlightened managers will see the usefulness of using unit cost information. Providing unit cost information to every level of an activity enables employees to participate actively in process improvement. Unit cost encourages, complements and reinforces use of other modern management and accounting tools such as activity-based costing and process reengineering.

Using unit cost principles challenges the entire workforce as we recast the way we do business and make decisions. Success at improving government will happen only with active participation from all levels. Support activity employees at all levels, committed to instilling unit cost principles in their workplace culture, will provide more value for each defense dollar spent. **Yes, managing with and using unit cost makes sense.**

***Tomorrow's costs are a consequence
of today's decisions.***

Appendices: Glossary and Sample Documents

Glossary

AFC -- Average Fixed Cost. Total fixed cost divided by the total output of the activity or process

ATC -- Average Total Cost. Total cost divided by the total output of the activity or process

AVC -- Average Variable Cost. Total variable cost divided by the total output of the activity or process

COST ALLOCATION -- A method of assigning indirect and general and administrative costs to activities, functions, or outputs.

CAPITAL ASSETS -- Depreciable property, plant, equipment, and software developed, manufactured, transferred or acquired at a specific point in time for a determined cost of \$50,000 or more; are used over some period (useful life), the length of which to be two years or greater; and generally, become economically worthless (except for residual value) at the end of their estimated useful lives.

COST -- A monetary measure of the amount of resources applied to a cost object. Within the DoD, "costs" are identified following General Accounting Office accounting principles and standards as implemented through the DoD Financial Management Regulation.

COST DRIVER -- Any factor that causes a change in the cost of a function or output.

CUSTOMER -- Organizations, either operational or support, who receive support goods or services from another activity. The customer is the originator of requirements, and hence, external to the organization that actually provides the support.

CUSTOMER DRIVEN DEMAND -- The requirement (demand) for production of goods or services (output) that originates from customers, not from the producing activity.

DEFENSE BUSINESS OPERATIONS FUND (DBOF) -- The Defense Business Operations Fund is a financial structure that was established by merging the former stock and industrial funds and several activities previously funded by operation and maintenance appropriations into a single revolving fund. The DBOF has multiple divisions identified by component and by business area. The DBOF operates with principles that provide improved cost visibility and accountability to ensure business management and improve the decision making process. The DBOF builds on revolving fund principles previously used for industrial and commercial-type activities.

DEPRECIATION -- Depreciation recognizes the allocation of cost of depreciable physical plant, property, or equipment as an operating expense over the periods in which the assets are expected to provide benefit.

DIRECT COSTS -- Costs that are specifically identified with a single cost object (output). The cost of resources directly consumed by producing an output. Direct costs are assigned to activities by direct tracing of resources consumed by individual outputs.

FIXED COST -- A cost or expense that does not vary in the short run with the quantity of output produced.

GENERAL & ADMINISTRATIVE (G&A) COSTS -- Labor and non-labor costs that cannot be reasonably associated with any single output or group of outputs and are therefore allocated over all outputs.

INDIRECT COSTS -- Costs that are related to two or more outputs, but not all outputs.

OPERATING COSTS -- Expenses incurred in connection with the production of outputs of an activity. Operating costs include direct, indirect and general and administrative costs.

OUTPUTS -- In general, any product or service generated from the consumption of resources. An output must be a quantifiable measure and generated as the result of customer requirements (customer driven demand).

PERFORMANCE MEASUREMENT -- The use of objective, quantifiable indicators of program effectiveness and efficiency to assess progress against stated goals and objectives. A balance of financial and nonfinancial indicators should be used to measure performance such as cost per output, cost per outcome, customer-oriented indicators of quality timeliness and customer satisfaction. Program accomplishments in terms of outputs and outcomes are integral elements of performance measurement.

PROCESS -- The organized method of converting inputs (people, equipment, methods, materials, and environments) to outputs (products or services). The natural aggregation of work activities and tasks performed for program delivery.

PRODUCER OR PROVIDER -- An activity that provides products or services to other activities.

REVOLVING FUND ACCOUNTS (REVOLVING FUNDS) -- Accounts authorized by specific provisions of law in which all income is derived from its operations and is available to finance a continuing cycle of business-type operations. These accounts are authorized to incur obligations and expenditures that generate receipts.

UNIT COST -- The relationship of resources consumed to outputs produced. A unit cost is the cost of producing one unit of output or providing one unit of service. Unit costs are

determined by dividing the total cost (the sum of direct, indirect and G&A costs) of inputs used to produce outputs by the total quantity of units of output produced.

UNIT COST AUTHORITY -- The amount of resources an activity is authorized to use in the production of its output.

UNIT COST GOAL -- A unit cost target that is expected to be achievable for production of an output. The unit cost goal is based on historical data (cost and output) adjusted for future known or expected changes.

VARIABLE COST -- A cost that varies with changes in the quantity of output produced when other factors are held constant. The cost of material handling to an activity, for example, varies according to the number of material deliveries and pickups to and from that activity.

VARIANCE -- The amount, rate, extent, or degree of change, or the divergence from a desired characteristic or state.

Unit Cost Sample Documents

[Sample Unit Cost Annual Operating Budget \(Page 1\)](#)

[Sample Unit Cost Annual Operating Budget \(Page 2\)](#)

[Sample Unit Cost Report Summary](#)

[Unit Cost Report](#)

LIMITATIONS AND GUIDANCE:

1. Cost authority equals the actual cost incurred up to the limit of obligation authority received on funded customer orders for Direct Reimbursable outputs.
2. For all Supply Management Business Areas, costs include all obligations recorded as reported on the DD 1176, plus all approved costs for depreciation and actual credit returns. For all other Business Area costs include those reported on Line 2 of the DD 1307 Accounting Report. Operating costs are not to be incurred beyond the total approved amount shown for the Operating Budget without the specific prior approval of this office.
3. Major Maintenance and Repair. Business Area obligations for major maintenance and repair will be treated as a direct expense within the operating budget authority.
4. The Capital Obligation Authority amounts represent a limitation subject to the provisions of Section 1517 of 31 U.S.C., the Ant-Deficiency Act. Obligations are not to be incurred beyond the total approved amount shown for each year for the Capital Budget (as modified by reprogramming per authority provided in DoD(C) memorandum of September 27, 1991, DBOF Financial Policy) without the specific prior approval of this office. Except as provided in this document, no other funds are available for Capital Budget obligations.
5. NOR: The NOR provides the overall net operating result expected to be achieved in the Business by year end. The NOR provides a primary financial management goal and will be used in conjunction with other performance measures to assess the overall operational effectiveness of the Business, as identified and reported monthly on the DID 1307 Report. For each Business Area, the Component is responsible for preparing a monthly Revenue and Cost plan. Joint execution reviews of this plan will be conducted by this office and DLA on February 10, May 10, and August 10, 199K
6. CASH MANAGEMENT: The Component is responsible for compliance with monthly execution of collections and disbursements in accordance with the monthly approved plan, based on the funding profiles established by this document. An explanation of the causes for monthly variances of \$50 million or more between the sum of collections and disbursements and the monthly approved plan must be provided to the Director for Revolving Funds, within 10 days after accounting reports are available. The end of year net outlay goal specified above is established in accordance with the approved collections and disbursements plan for this Business Area.
7. UNIT COST, The total cost for these outputs identified by a unit cost is predicated on a projected level of work load. Components may request increases in Cost Authority based on an increase in the number or value of orders accepted. Conversely, if actual work load declines below levels anticipated appropriate reductions will be made to the total costs shown in this document.
8. PERFORMANCE GOALS: Descriptions of performance effectiveness measures are contained in the DBOF Milestone 11 report submitted to Congress on March 1, 1993.

Measure	Goal
On Time Shipments - High Pri	1 Day
On Time Shipments - Routine	8 Days
Material Denials	< .8%
Locator Accuracy	> 99%

9. OTHER:
 - a. This document provides initial cost authority for fiscal year 199X
 - b. This document reflects a revised capital program threshold of \$50,000

**UNIT COST REPORT SUMMARY
for JULY FY9X**

as of: **31-Jul-9x**
map date: **31-May-9x**

YEAR TO DATE VALUES CATEGORIES OF COST	AOB GOAL	AOB EARNING S	ACTUAL UNIT COST	DIFFERENC E EARNINGS - COST	COSTS					WORK UNITS
					LABOR			NON LABOR	TOTAL	
					CIV	MIL	TOTAL			
"A" GOAL OUTPUTS										
1. BIN RECEIPTS	31.76	13,519	32.31	(236)	7,545	455	8,000	5,755	13,755	425,675
2. TON MILES	0.86	394	.79	33	198	12	210	151	361	457,603
3. REPORTS PRODUCED	38.95	1,232	43.66	(149)	659	145	803	578	1,381	31,632
4. BIN ISSUES	14.54	13,928	13.84	668	7,109	603	7,712	5,548	13,259	957,890
5. INVOICES PAID	45.48	2,185	59.02	(651)	1,433	7	1,440	1,396	2,836	48,048
6. AUDITS PERFORMED	5,431.00	4,296	4,888.72	429	1,267	982	2,249	1,618	3,867	791
TOTAL "A" GOAL UNITS		35,554		95	18,210	2,203	20,413	15,046	35,459	

Note: "Earnings" and "Costs" are in thousands of dollars.

**UNIT COST PERFORMANCE REPORT
for JULY FY9X**

as of: **31-Jul-9x**
map date: **31-May-9x**

YEAR TO DATE VALUES CATEGORIES OF COST	AOB GOAL	ACTUAL UNIT COST	UNIT COST VARIANCE		EARNED COST AUTHORITY	ACTUAL COST	EARNED AUTHORITY VARIANCE		WORKLOAD
			UNIT COST	%			TOTAL COST	%	
			"A" GOAL OUTPUTS						
1. BIN RECEIPTS	31.76	32.31	(.55)	-1.74%	13,519	13,755	(236)	-1.74%	425,675
2. TON MILES	0.86	.79	.07	8.36%	394	361	33	8.36%	457,603
3. REPORTS PRODUCED	38.95	43.66	(4.71)	-12.09%	1,232	1,381	(149)	-12.09%	31,632
4. BIN ISSUES	14.54	13.84	.70	4.80%	13,928	13,259	668	4.80%	957,890
5. INVOICES PAID	45.48	59.02	(13.54)	-29.77%	2,185	2,836	(651)	-29.77%	48,048
6. AUDITS PERFORMED	5,431.00	4,888.72	542.28	9.98%	4,296	3,867	429	9.98%	791
TOTAL "A" GOAL UNITS									
TOTAL OPERATING BUDGET					35,554	35,459	95	0.27%	

Note: "Costs" are in thousands of dollars.

UNIT COST REPORT for JULY FY9X

as of: **31-Jul-9X**
map date: **31-May-9X**

YEAR TO DATE VALUES CATEGORIES OF COST	COST ACCOUNTING CODE MAPPING	ALLOCATION RATE	COST					WORK UNITS
			LABOR			NON LABOR		
			CIV	MIL	TOTAL	LABOR	TOTAL	
"A" GOAL OUTPUTS								
1. BIN RECEIPTS			7,545	455	8,000	5,755	13,755	425,675
Direct								
Indirect			BDT	BDT	BDT	BDT	BDT	BDT
General and Administrative								
2. TON MILES			198	12	210	151	361	457,603
Direct								
Indirect			BDT	BDT	BDT	BDT	BDT	BDT
General and Administrative								
3. REPORTS PRODUCED			659	145	803	578	1,381	31,632
Direct								
Indirect			BDT	BDT	BDT	BDT	BDT	BDT
General and Administrative								
4. BIN ISSUES			7,109	603	7,712	5,548	13,259	957,890
Direct								
Indirect			BDT	BDT	BDT	BDT	BDT	BDT
General and Administrative								
5. INVOICES PAID			1,433	7	1,440	1,396	2,836	48,048
Direct								
Indirect			BDT	BDT	BDT	BDT	BDT	BDT
General and Administrative								
6. AUDITS PERFORMED			1,267	982	2,249	1,618	3,867	791
Direct								
Indirect			BDT	BDT	BDT	BDT	BDT	BDT
General and Administrative								
TOTAL			18,210	2,203	20,413	15,046	35,459	
Direct								
Indirect			BDT	BDT	BDT	BDT	BDT	
General and Administrative								

Note: "Earnings" and "Costs" are in thousands of dollars. BDT = Breackdown of Total into Direcct, Indirect, and General and Administrative



Reference Material

Comptroller of the Department of Defense,
Unit Cost Resourcing Guidance, 15 October 1990.

**Department of Defense Financial Management
Regulation, DoD 7000.14-R, Volume 1,**
*General Financial Management Information,
Systems, and Requirements*, May 1993.

**Department of Defense Financial Management
Regulation, DoD 7000.14-R, Volume 11B,**
*Reimbursable Operations, Policy and Procedures -
Defense Business Operations Fund (DBOF)*, December 1994.
