

## ACTIVITY-BASED COSTING

### SUMMARY

**Activity-based costing is a simple concept that is used to develop the accurate and relevant cost information needed to support business decisions. This concept links costs with the activities that make them necessary and the accumulated cost of activities with the products or services that make them necessary. By providing more accurate and relevant cost information to company owners and managers, activity-based costing leads to more profitable contracts, a more effective use of capital funds, better make/buy decisions, improved performance measures, and a more focused approach to continuous improvement efforts.**

### INTRODUCTION

A contract tooling or machining shop that relies on cost information which does not accurately reflect the cost behavior of its operations will seldom, if ever, reach its potential as an accumulator of wealth for its owner(s). Without accurate and relevant cost information, such a company will lose money when awarded those contracts that its costing practices cause it to inadvertently underprice, miss potential profits when not awarded those contracts that it inadvertently overprices, and make inappropriate capital investment decisions based on improperly calculated savings or inaccurate estimates of any new business' contribution. In the worst cases, repeated reliance on faulty cost information will cause the company to fail.

Traditional costing methods may have once paralleled the cost behavior of contract manufacturers, but the activities in today's modern shops are quite different than those that existed when traditional techniques were developed. A traditional direct labor-based system for applying costs to products assumes that all manufacturing costs follow direct labor. Is this assumption true in shops where some machines can run unattended? A traditional machine hour-based system for applying costs to products assumes that all manufacturing costs follow machine operating time. Is this assumption true in shops where crew sizes vary from machine to machine? Owners and managers that continue to use these traditional approaches will be relying on cost information that does not match the actual cost behavior of the shop.

Activity-based costing (ABC) is a concept that enables shop owners and managers to develop cost information that

accurately represents the costs of operating their business and producing its products. Its premise is simple. A shop's products and services require it to perform activities. The performance of those activities require it to incur costs. Activity-based costing begins by assigning all business costs to the activities that make them necessary. It then assigns the accumulated costs of those activities to the products or services that make the activities necessary.

By carefully developing a cost structure that follows this premise, ABC can enable a company to:

- Make more accurate and rational pricing decisions,
- Direct its marketing efforts toward those products and services on which it will earn the most profit,
- Stop attracting money-losing orders onto the production floor,
- Identify opportunities for reducing costs,
- Recognize the true "total cost" and relative benefits of subcontracted services,
- Use the cost system as an ally in total quality management - instead of as an impediment to change,
- Improve the reliability of forecasts with respect to costs and profits, and
- Develop more accurate measures of potential benefits available through new technologies.

The basis for these heroic claims is ABC's ability to provide cost information that accurately reflects the business' cost behavior.

Most of the ideas behind activity-based costing are not new. Some were the subject of extensive discussion among industrial engineers and accountants in the early days of the century. The major obstacle to the adoption of activity-based principles prior to the 1980's was their computational complexity. As long as manual calculations were required, simplicity was seen as more important than accuracy.

With the advent of the computer, particularly the personal computer, computational complexity is no longer an obstacle. Once the activity-based cost structure is developed, it can be turned into a computer-based model and computations automatically performed in seconds. Cost inaccuracies and the inappropriate actions they cause are no longer necessary. Accuracy need no longer take a back seat to simplicity.

## A MODEL OF ACTIVITIES AND COSTS

Activity-based costing provides a method of organizing, calculating, reporting, and analyzing a company's costs in relation to its activities. It is a cause-and-effect model, a carefully designed representation of what a company does, not simply a classification of costs.

In contrast, most costing systems in use today simply sort costs with department structures and then distribute departmental costs to products and services by means of a small number of volume-related factors, such as direct labor dollars or hours or machine running hours.

ABC recognizes that direct labor dollars/hours and machine hours are only a few of the many factors that drive costs. It takes into account the existence of other cost drivers. For example:

- Some materials require more procurement, handling, and storage activities than others. These activities drive costs that should be assigned to those materials. Many of these costs are required even when material is consigned.
- Some types of products require more technical support than others. Providing this technical support requires activities that should drive costs to those products.
- Some markets require more marketing or quotation effort than others. Providing this effort requires activities and should drive costs to those markets.
- Some customers generate more engineering change notices, change schedules more frequently, or otherwise interfere with the efficient administration of the business. These also require activities and should drive costs to those customers.
- Some activities are the result of an event taking place, such as the receipt of an order. In fact, the order processing and scheduling costs of some low-precision, short run products may actually exceed their set-up and running costs. These activities should drive costs to orders independent of the actual production activities being charged to orders.

Traditional costing methods "bury" these costs in either manufacturing overhead, which is assigned to jobs and products using volume-related factors, or general and administrative expenses, which are "spread like peanut butter" as a percentage of total cost over all jobs. ABC, on the other hand, assigns all costs to jobs and products in direct relation to the activities required to complete those jobs or manufacture those products.

The actual costs revealed by ABC almost always show that clearly profitable products are subsidizing a number of consistent money losers. The overall net profit percentages for the company may be respectable, but almost every organization with a traditional cost system is unknowingly spending money to compete for certain orders that are guaranteed to erode the "bottom line."

Although a primary objective of ABC is to attach all costs to jobs based on the activities those jobs require, job costing is only one of the many uses of activity-based cost information. An effective ABC model does not simply follow costs through activities to jobs, it can also start with the company's jobs (or projected jobs), determine the activities required to complete those jobs, and project the costs that will be incurred by the company to perform all of the activities needed. It is this "jobs to activities to costs" direction of ABC that makes it a powerful management tool.

By using this cost accumulation capability of an effective ABC model, management can perform valuable "what if" analyses that provide the relevant and accurate incremental cost information needed to answer questions such as:

- Will the company benefit financially by taking on a special order that appears to lose money using normal job costing mechanics?
- Would the company be better off increasing overtime or hiring additional employees to cover an increase in volume?
- What cash savings will result if the company invests in new equipment that will reduce required operating time by 20%? What will be the impact on profits if the company reduces prices by 5% to fill up the additional capacity generated by the productivity improvement?
- What steps must the company take to survive the loss of a major customer?
- Would the company be better off outsourcing an operation that is currently being performed in-house?

Activity-based costing will not ordinarily replace an existing cost accounting system used for financial reporting - at least not in the near term. Particularly for small and mid-sized companies, a stand-alone activity-based costing model on a personal computer will provide all of the information and analytical power needed for accurate product costing and other management purposes. In a single business unit, 80% or more of the decision-making value of ABC can often be obtained for less than 20% of the cost of an integrated, real-time system. Of course, the drive for continuous improve-

ment is likely to lead to implementation of an integrated ABC system at some future date.

### **ABC REVEALS A NEED FOR ACTION**

When historical cost are recast in ABC form, the “bottom line” number for the total organization will remain the same, but management conclusions about the company’s operation-by-operation performance are likely to change radically. The resulting actions with respect to pricing and marketing strategy will almost certainly have a major impact on net profit in future periods.

ABC does not, in itself, reduce costs, but it does highlight the costs of processes and activities that used to lie buried in the generalized “blobs” of cost known as overhead, burden, or selling, general and administration. Once the costs of these processes and activities are measured, they can provide the focus for cost reduction or continuous improvement activities. At one company, for example, the cost of preparing quotations that was revealed by ABC resulted in a streamlined quotation process that not only reduced the cost of preparing quotations, but reduced the process cycle time and improved quotation accuracy. At another company, the cost of processing an order, from entering the order into the system to collecting the receivable, highlighted by ABC caused management to simplify the process which not only reduced costs but made smaller jobs more profitable.

Activity-based costing is not only a tool for top management, but for the entire organization. To be effective, it must be updated regularly to incorporate changes in the company’s structure, strategy, or the environment in which it operates. These updates should be done with the active involvement of sales, marketing, estimating, engineering, production, quality assurance, production support, human resources, and administrative personnel as well as cost accounting and finance. In a small company, all of these functions may be represented by two or three individuals.

Depending on the comprehensiveness of and detail of the ABC model, the routine data updating and analysis of ABC information should require only a small amount of time from a single management employee. Despite this efficiency, the true value of ABC will only be realized if all key areas of the company are directly and continually involved in analysis and improvement.

### **PRECISION CUSTOM MANUFACTURING FIRMS - HAVE A HEAD START**

Not surprisingly, owners and managers of most precision custom manufacturing companies have much better knowledge of the critical connection between individual job orders and actual shop floor activities than do most decision makers in manufacturing plants operated by Fortune 1000 corporations. For example, in mega-facilities that produce the brand-name products we see everyday, set-up time is often charged to factory overhead and then allocated to products on the basis of operator or machine hours. Precision custom manufacturers, on the other hand, recognize the importance of tracking

both set-up and operator time to each job order. Similarly, precision custom manufacturing companies frequently assign such costs as engineering, programming, tooling, and inspection (which are often considered factory overhead in large manufacturing organizations) directly to each job, either through a formal costing system or through informal adjustments.

Working knowledge of the connection between shop floor activities and specific job orders is an extremely helpful element in the costing process, but it does not automatically translate into an accurate costing system. Unless a company’s activities are 1) correctly identified and organized, 2) charged with the appropriate amount of cost, and 3) attached to individual products or jobs using the appropriate “cost driver,” the total cost assigned to a specific job may be terribly distorted, even though management is aware of every single operation performed. Differences in wage rates between set-up personnel and operators, differences in the number of operators required to operate equipment in different work centers, differences in the consumption of supplies and perishable tools between different work centers or between different types of material when worked on in the same work center, or differences between accounting or tax basis depreciation and a realistic provision for future capital expenditures from one work center to another are just a few of the many factors that can cause distortion in the manufacturing area.

In addition, selling and administration costs, which are usually lumped into a single overhead cost pool, may vary greatly from one customer (or type of customer) to another or from one product (or product line) to another. Some of these costs may actually be related to the procurement, handling, and storage of materials and be neither manufacturing or selling and administration costs. Others may be the administrative equivalent of a set-up; a fixed set of costs that are related to the order entry, scheduling, processing, shipping, billing, and cash collection cycle of each individual order. As a result of the generalized handling of these types of costs, some products (or job orders) that are actually big money losers receive subsidies from those that are true winners.

On the other hand, activity-based costing enables decision makers to assign all significant costs, in all areas of the company, to the activities - and then to the jobs or products - that actually cause them. Through more accurate costing and pricing, each job bears its appropriate costs, leading to more competitive bids and higher profits on the work obtained. When actual costs are properly related to a company’s individual pattern of operation, certain types of job orders will almost always be revealed as severely underpriced - once the length of run time, routing through the shop, material handling requirements, customer service, and other key factors have been taken into account in a systematic manner.

Although the improvement in product and job costing is usually justification enough to adopt an “activity-based” view of an organization’s costs, the benefits do not stop there. ABC’s cause-and-effect model also provides the kind of accurate and relevant cost information a company needs for “macro” or incremental decisions - decisions for which the

costing rates that are so critical for “micro” decisions (such as costing individual jobs or products) are not appropriate.

### **CONDITIONS INDICATING THE NEED FOR ACTIVITY-BASED COSTING**

A company with almost no variability in the jobs it performs, the processes it uses, or the customers it serves, can probably survive with a traditional cost system. Once variability is added, however, the assumptions behind traditional costing approaches begin to unravel. Generally, any manufacturer that continues to apply all overhead costs to job orders on the basis of direct labor hours, direct labor dollars, or machine hours needs to seriously question whether the resulting job costs reflect reality. This is especially true at company’s that use a single, company-wide rate.

The following conditions often exist at companies whose costing practices no longer reflect the reality of their business.

- Significant direct labor operations have been altered or largely eliminated by the acquisition of automated, tape, or computer-controlled equipment (and/or CAD/CAM capabilities) since job costing practices were last revised.
- All overhead is applied to individual job orders on the basis of either direct labor hours, direct labor dollars, or machine hours.
- Overhead is charged to jobs by means of a single, company-wide rate.
- After set-up and first piece inspection, many operations can be run with little human intervention.
- Certain machines, work centers, or cells have different personnel requirements (operators, material handlers, etc.) from one job order to another.

- The special scheduling, selling, or service requirements of certain markets, customers, products, or product lines are not reflected in the way costs are charged to job orders.
- Pricing is much more competitive for certain products or job characteristics than for others (e.g., short runs vs. long runs, complex items vs. simple items, items with fabrications vs. items without it, or small pieces vs. large pieces).
- Profit margins decline as volumes increase.
- Doubts about the accuracy of costs have been expressed by top management, marketing, estimating, or shop floor personnel. Special-purpose costing systems or “windage” adjustments have appeared in some areas.
- Data from the cost accounting system is in conflict with efforts to improve quality, redirect product emphasis, or eliminate unprofitable facilities.

### **TOWARD IMPLEMENTATION**

Before attempting to implement activity-based costing (or to engage a consultant for assisting in the process) company decision-makers need to acquire a basic conceptual framework in order to proceed in the most cost-effective manner. The Costing, Pricing, and Financial Management Manual published by NTMA provides an overview of activity-based costing in relation to a traditional cost system and provides insight into implementing activity-based costing at contract tooling or machining shops.

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