

Process Costing and Management Accounting in Today's Business Environment

By Jennifer Dosch, CMA, and Joel Wilson, CPA

It's the classic "either/or" proposition in manufacturing settings, where assembly practices generally follow one of two tracks: job or process. The difference between the two is the ability to trace input costs to finished goods. A manufacturing process that requires specific amounts of raw materials and labor to complete a unit is the job method. With job costing, the amount of raw materials and labor placed into production can be traced or specifically identified to the finished good.

A process method, on the other hand, involves the manufacture of large or mass quantities of identical units and is more complex because specific amounts of raw materials and labor can't be traced to finished goods. In a process manufacturing environment, raw materials, labor, and overhead placed into production need to be allocated to inventory. Given the difference in the ability to trace input costs of these two methods, the valuations

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of work-in-process and finished goods inventories differ significantly.

The topic of process costing as often presented in textbooks is simplified and doesn't reflect industry practice. The primary difference is the textbook assumption that actual costs incurred each month are reflected in valuing inventory and cost of goods sold. In practice, predetermined standard costs—not actual ones—are used. Valuation and costing are important aspects when discussing standards. But potentially the most significant use for standards is as a strategic cost management tool, an approach that's either ignored or limited to a description in most textbooks. Thus, many management accountants are untrained or unaware of the many potential uses of standards as a management tool.

To clarify how process costing is done in industry and

how the use of standards can facilitate strategic cost management, we conducted interviews with managers at three consumer packaged goods manufacturers. The homogeneous nature of the packaged goods industry provides an ideal application of process costing. To provide a balanced perspective, we selected three companies varied in size and complexity: a large multibillion-dollar company, a \$500 million company, and a small company. All of them use process costing and standards—in a manner ranging from straightforward to complex—to help them manage their business profitably.

Theory of Process Costing

Process costing is defined as an accounting methodology that tracks the production of large quantities of identical units. At the end of the period, units in production (work-in-process) and completed units (finished goods) must be valued for the balance sheet and income statement as required for external reporting. A popular textbook approach includes a five-step method for allocating costs to inventory:

Step 1: Summarize the flow of units: in process at the beginning of the period and placed into production.

Step 2: Compute output: units completed and units in process at the end of the period.

Step 3: Summarize total manufacturing costs incurred during the period.

Step 4: Compute manufacturing costs per unit.

Step 5: Assign manufacturing costs to units completed and ending work-in-process.

The textbook focus is clearly on the "calculation." Exercises and problems focus on the mathematical completion of allocating manufacturing costs to ending work-in-process and finished goods using the five-step method. The discussion of process costing generally stops here. Little or no significant discussion is found in textbooks on how management uses process costing to manage the manufacturing operations. The emphasis is on providing values for work-in-process and finished inventory for external reporting.

The textbooks generally place the management accountant in a traditional cost accounting role, focusing on the calculation of results for financial statements. Little discussion is devoted to interpersonal and analytical/strategic management skills (see Figure 1). The role of the management accountant in a manufacturing firm that utilizes process costing is best leveraged when the accountant is fully engaged in all phases of the process. This requires skills well beyond the tra-

Figure 1: Implications for the Role of Today's Management Accountant



ditional cost accounting role.

In a process costing environment, the management accountant will be required to work cross-functionally to gather standard information, communicate results, and evaluate performance. In particular, interactions with the operations and sales departments will be critical to the development of accurate standards. Today's management accountant must have a solid understanding of the manufacturing, sales, and distribution process and a good handle on what information is relevant to support management decision making. In short, today's management accountant has evolved to that of a strategic partner in the organization.

What the Interviews Taught Us

Our interviews with three consumer packaged goods companies allowed us to gain insight into the actual method of valuation and costing used and, more importantly, how this information is employed from a strategic cost management perspective. Specifically, for each company the emphasis was on process costing methodology, inventory valuation, variance analysis, and strategic management application.

The common theme among the three companies was that each one's process costing practices are different from what's taught in management texts. All three com-

panies work with standard costs rather than actual costs. All three focus on the strategic use of standards, including the quick communication of results and the immediate investigation of significant variances. The textbook emphasis on inventory valuations takes a back seat to communicating necessary business changes and acting on them by examining standards and comparing them to the budget.

The interviews also provided insight as to why standards are preferred over actual results. For one, communicating results using predetermined standards is much faster than waiting to accumulate actual cost data. Moreover, standards provide consistency across reporting periods that may fluctuate month to month. Most importantly, standards allow departments to work together using the same performance measures across the company. As shown in Figure 2, regardless of a company's size, these characteristics are vital to organizations in today's business environment.

The Multibillion-Dollar Company

The large company's application of process costing is the most complex, driven by substantial revenues, the large number of product offerings, and the sophisticated use of process costing information in managing the business efficiently and profitably. This approach utilizes two perspectives: operations and product profitability.

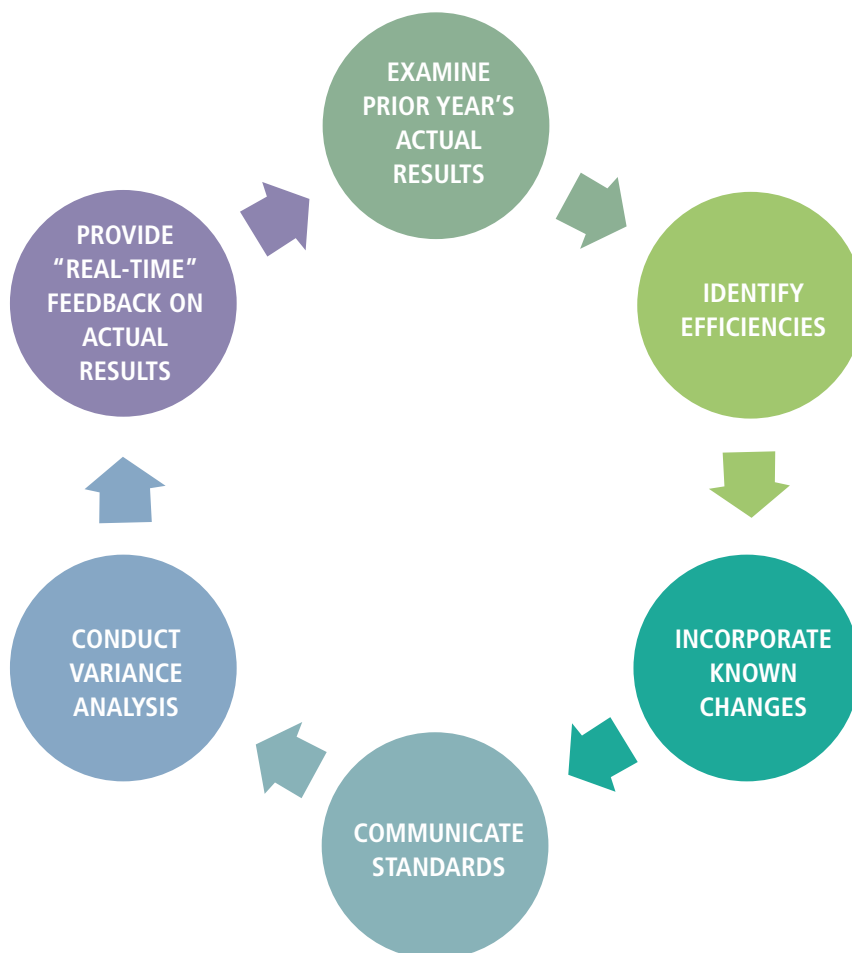
As the following discussions will show, the steps necessary to complete standard costing in a process costing environment aren't really new. The key is the vital role the management accountant plays in today's business environment to work cross-functionally to gather information, perform analyses, and communicate results. This allows the organization to react to marketplace or cus-

Figure 2: The Benefits of Standard Costing

HOW IS STANDARD COSTING MOST ADVANTAGEOUS TODAY?		
FACILITATES CROSS-FUNCTIONAL COMMUNICATION	ENSURES CONSISTENCY IN MEASURING, REPORTING, AND MANAGING COSTS ACROSS THE ORGANIZATION	PROVIDES "REAL-TIME" FEEDBACK OF RESULTS

Figure 3: An Unbroken Cycle

The process for developing process costing standards reflects the planning process. Standards, however, provide real-time feedback to managers rather than having to wait for the close of the accounting cycle.



tomers changes more rapidly, to recognize cost overruns sooner, and, ultimately, to align the company's strategic objectives closer to its day-to-day activities (Figure 3).

Applying Standard Costs in a Global Firm

In the multibillion-dollar company, the operations group is responsible for setting the standard manufacturing input costs per unit, and the product profitability group is charged with establishing standard volumes that are used in conjunction with the input costs. Let's examine this process in more detail.

In operations, the standard input costs are based on a set of assumptions that are updated each year during the company's annual budgeting cycle. To make the input costs as accurate as possible, several divisions within the

operations group are involved in developing standards. Updating standard costs begins with analyzing the prior year's actual costs for each input: direct materials, direct labor, and overhead. Not surprisingly, analyzing input costs becomes highly complex given the large and diverse nature of the company. The analysis includes reviewing dozens of direct material inputs, several levels of labor tied to thousands of employees with various benefit cost combinations, and many manufacturing locations, which involve multiple facility types and configurations. All of these inputs are examined closely for cost efficiency and are applied consistently across the company. When the analysis of last year's input costs is complete, these amounts are adjusted based on known changes related to the current year.

Standard costs are then calculated on a per-unit basis,

dividing the total budgeted input costs by the budgeted number of production units, which are provided by the product profitability group. Once complete, these budgeted standards are agreed upon by the operations division managers, the product profitability managers, and the company's top management as the basis for comparison throughout the budget period.

A Highly Sophisticated Reporting System

Standard costs are applied to production volume each month to determine inventory values. The large company's reporting system has the capability to calculate actual production volume based on inputs used during the period. Additionally, each plant completes a physical inventory monthly to verify that the reporting system has calculated an accurate production volume. Cost of goods sold is based on actual units sold multiplied by the unit standard cost developed during the budget cycle. Finished goods on hand at the end of the period are also calculated using the actual production volume multiplied by standard unit cost. The company's reporting system can also determine stages of production in process. Units are calculated at each stage and multiplied by standard unit costs to value ending work-in-process.

The responsibility for developing cost estimates for raw materials, labor, and overhead rests with the operations group, which is typical of most companies this size. Thus, operations is responsible for cost efficiency. This group performs a monthly variance analysis to evaluate actual resource consumption vs. standard expectations. These variances are then communicated throughout the organization.

In addition, operations managers review the variances between actual and standard results in four categories: raw materials price, raw materials used in production, direct labor, and manufacturing overhead. If the managers determine that the variance is significant, an adjustment is made to the income statement that month. If the variance is related to production volume as compared to budget expectations, the variance is reviewed with product profitability management to determine whether it's explained by timing or if it's real. If it's real, adjustments are made to that month's income statement.

As discussed, operations is responsible for all variance adjustments because its divisions control the amount of direct materials and labor used in production. Overhead such as facilities and equipment can't be impacted in the

current reporting period. Direct materials are purchased at the overall company level to take advantage of large-volume, contractual price discounts. Therefore, the variance adjustments are recorded at the point of control: operations and purchasing.

In each of the areas described, the size of the variance will dictate if adjustments are necessary monthly, quarterly, or annually. The standard input cost or raw material amount, however, will be adjusted only annually as part of the yearly budget cycle to maintain consistency and accountability.

Product Profitability Management

The large company—a giant in the packaged food industry—has a broad array of product offerings. Each product line is separated into a division for reporting purposes. Naturally, management believes the focus on individual product profitability will lead to greater overall company performance.

The standard manufacturing input costs generated by the operations divisions are the same standards the product profitability group uses. The divisions are expected to manage the product line based on the standard costs developed by the operations group and the standard volumes developed by the product profitability group. Operations, product profitability, and top management must all agree on these standards.

Each product division completes a monthly variance analysis comparing standards to actual results. Volume variances that are significant require input from product division management to determine if they're expected to continue or are due to timing. Sizable volume variances that aren't expected to change would have an immediate impact on cost of goods sold.

Moreover, the cost standards developed by the operations group are used company-wide for performance evaluation. In operations, for example, performance evaluation is measured by manufacturing efficiency—both the amount of inputs used and the cost incurred to produce units. Likewise, the group responsible for developing volume standards is evaluated on the volume and profitability of its respective product lines.

In pulling everything together, top management evaluates each division using the same standards for different purposes. Operations is evaluated on cost control. The product profitability group is evaluated on the profitability of each product line to ensure proper pricing, the achievement of sales goals, market presence, and overall company profitability.

The \$500 Million Company

Process costing at the \$500 million company is significantly less complex than at the large company, although there's some overlap in methodology. Nevertheless, some characteristics are unique to the large company, such as proper costing for efficiency and effective volume estimates by product.

Developing standard costs and standard production volumes is similar between the large company and the \$500 million company. In the latter, the operations group has the primary responsibility for developing standard manufacturing input costs. The variances between actual and standard results are reviewed in four categories: raw materials price, raw materials used in production, direct labor, and manufacturing overhead. Budget amounts for each cost category are developed based on an analysis of the prior year's actual costs, and adjustments are made for known changes to input cost categories. These budget amounts then become the basis for the standard costs used in process costing.

As with the large company, the sales group in the medium-sized firm is responsible for developing the volume standard. Operations then uses this volume estimate to create the cost standard. Standard costs per unit are utilized for allocating costs to inventory and managing the operations division.

For inventory valuation, units sold in the current period are tracked on an actual physical count basis. Manufacturing costs are allocated to these finished units by multiplying standard input costs per unit by the number of units sold.

Unsold finished units are also tracked by physical counts. Manufacturing costs are allocated to these finished goods by multiplying the standard costs per unit by the number of finished units on hand. Production that's in process at the end of the period is estimated based on materials and labor used during the period. Operations management then estimates the percentage complete for those units in production at the end of the period. Based on the estimated volume and percentage, costs are allocated to these units by multiplying the standard costs per unit by the number of estimated units.

A monthly variance analysis examines each of the four input categories for significant differences between the standard costs allocated and actual results. When variances are significant, the amounts are applied to the work-in-process inventory account. The rationale is the unit sales generally occur one month after production is complete.

Volume variances are isolated and reviewed by the sales group. As mentioned earlier, as with the large company, the sales force in the \$500 million firm is primarily responsible for the volume estimates. Large volume variances that require adjustment are made to work-in-process on the balance sheet. Again, this is due to a one-month lag of sales after production.

The medium-sized company utilizes standard costs primarily to manage operations for efficiency. The main objective is to keep costs low, without the detailed emphasis on product profitability. Given the highly competitive nature of the consumer packaged foods industry, the medium-sized company is less likely to drive market prices and is more apt to react to prices the market can bear. Therefore, the medium-sized company must keep its costs low to be profitable.

A Closer Look at the Small Company

The small company generates and utilizes standard costs and volumes for process costing in a method that's very similar to that of the large- and medium-sized companies. Developing standard manufacturing input costs begins with the annual budget cycle. Standard costs for each cost category, raw materials, direct labor, and manufacturing overhead are developed based on an analysis of the prior year's actual costs, and adjustments are made for known changes for each input cost category. These budget amounts then form the basis for the standard costs that operations and management will analyze.

Standard production volumes are also based on budget amounts. Much of the standard cost and production amounts are developed by the management accounting staff rather than operations and sales. With less complexity at this small company, the management accountants have a good understanding of the manufacturing process and sales estimates, allowing them to provide accurate standards.

As with the two previous companies, standard input costs are used to determine inventory values at the end of the period. Cost of goods sold is calculated by multiplying the actual number of units sold by the standard input cost amounts. Finished goods that exist at the end of the period are counted by hand and multiplied by the standard input costs to determine the value of finished goods inventory.

Production volume that's in process at the end of the reporting period is estimated based on the standard cost per unit multiplied by a percentage-complete standard. A study is conducted periodically that analyzes the level of

work-in-process over time. Results indicate that work-in-process tends to be, on average, 75% complete. The company uses this percentage (75%) of the inputs placed into production for the period as the volume standard to apply to work-in-process inventory for reporting purposes.

Variance analysis of actual and standard costs is completed monthly. Variances for finished goods are recorded to cost of goods sold on the income statement. Variances for work-in-process result in adjustments to this inventory account on the balance sheet. Adjustments are made to standards semiannually if top management deems variances to be significant.

As with the medium-sized company, the small company is more likely to be a price taker, not a price setter in the market. This is true for product sales and for raw material input costs. Recent expansion of the manufacturing facility has provided excess capacity, positioning the firm for future expansion and long-term growth. This small company is also highly focused on managing costs to ensure efficient production as the expected growth occurs.

What We've Learned

Textbook theory of process costing focuses on valuing work-in-process and finished goods inventory at the end of the period. A primary reason for this focus is to support external reporting of the financial statements. Based on our analysis of three companies that differ significantly in size, the industry practice of process costing focuses considerable effort on developing accurate standard input costs and volumes to help manage business operations efficiently and effectively.

Additionally, the use of standard input costs allows management to determine if the company is making the most of raw materials and other resources deployed for production. When the sales divisions develop the volumes to be used as standards based on expected sales, top management can better evaluate product profitability, product mix, and market penetration.

In practice, valuing inventory is fairly straightforward and doesn't require significant amounts of management's attention. For each of the three companies, standard manufacturing costs were used to assign values to units completed and estimated units in process at the end of the period. Textbooks, meanwhile, still tend to focus on actual costs and may mention standard costs only in passing.

Another key attribute of standard costing is how quick-

ly it allows management—as well as divisions—to get current financial information on business performance and to adjust near-term and long-term strategy, if necessary. By applying standard costs to production volume, clear and accurate reports can be generated right away without having to wait for actual cost data or having decisions improperly affected by normal peaks and valleys due to timing, seasonality, or customer order patterns.

Companies need to be nimble in their ability to react to the current business environment. Standards help management of both large and small companies stay focused on effectively running the business for long-term viability.

Finally, let's not forget *you*, the management accountant, a vital link to the successful implementation of standard costs in a process costing environment. Good interpersonal skills are critical in today's business environment to facilitate cross-functional communication when developing and reporting standard cost results. Managers need to ask, "Are we getting the most out of our standard costing system?" The answer may lie in another question, "Are we getting the most out of our management accountants?" **SF**

Jennifer Dosch, CMA, is associate professor of accounting at Metropolitan State University in Minneapolis, Minn., and is a member of IMA's Minneapolis Chapter. You can reach her at (612) 659-7249 or jennifer.dosch@metrostate.edu.

Joel Wilson, CPA, is associate professor of accounting at Metropolitan State University. You can reach Joel at (612) 659-7307 or joel.wilson@metrostate.edu.

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