CHAPTER

5

Job Order Costing

LEARNING OBJECTIVES

After completing this chapter, you should be able to answer the following questions:

1. How do job order and process costing systems and how do actual, normal, and standard costing valuation methods differ?
2. In what production situations is a job order costing system appropriate and why?
3. What constitutes a "job" from an accounting standpoint?
4. What purposes are served by the primary documents used in a job order costing system?
5. What journal entries are used to accumulate costs in a job order costing system?
6. How do technological changes impact the gathering and use of information in job order costing systems?
7. How are standard costs used in a job order costing system?
8. How does information from a job order costing system support management decision making?

INTRODUCING

Aker Gulf Marine

http://www.akermaritime.no/

Aker Gulf Marine, AGM, is known throughout the Gulf Coast oil and gas industry as a small firm that executes big projects—very big projects. Situated on the shore of the Gulf of Mexico near the city of Corpus Christi, Texas, AGM builds offshore oil rigs, often in cooperative ventures with other firms.

AGM serves as a contractor to the major firms that extract oil and gas from the Gulf of Mexico and other offshore locations. At any particular time, the company will have several projects in progress. Like most contractors, AGM gets business from the oil producers only when it is the successful bidder on construction contracts. The reputation of the company as an innovative, high-quality producer is often a factor in the ability of the company to win contracts.

AGM's expertise is in engineering and converting various stock metal materials into mammoth integrated structures often weighing thousands of tons. For example, a recently completed project, nicknamed "Mars" and contracted by Shell Oil, required AGM to build a system to anchor a floating oil platform in 3,000 feet of water. The massive platform, is designed to accommodate 106 workers and 24 well slots. The anchoring system consists of 12 "tendons" each 28 inches in diameter and one-half mile in length. The system is engineered to withstand 140-mph winds and 70-foot waves. Combined, the platform and anchoring system weigh over 36,000 tons. The Mars platform connects to a pipeline that moves the oil 116 miles to shore in southern Louisiana.

As a builder of offshore oil production equipment, AGM has several significant constraints in its operations. For example, because completed projects must be floated to their permanent locations, AGM must have its production facilities located on a deep-water channel with access to the Gulf. Also, because the projects are physically very large, most production occurs in the open air, with little protection from the weather, including hurricanes and other adverse weather conditions. Finally, the completed projects must be assembled on location in the open ocean. The installation process exposes the various components to the risks of adverse weather and seas.

SOURCE: Anonymous, "Offshore Technology—Mars Shell Oil Field Project—Gulf of Mexico," http://www.offshore-technology.com/projects/mars/index.html.

At AGM and other custom manufacturers, most business is conducted through a process of competitive bidding. In this process, a company must accurately estimate the costs of making products associated with each contract. Competitive bidding is complicated by the nature of custom manufacturing—each bid may involve unique products. For example, at AGM the only common aspects of all products are the materials used and the conversion processes. Because each bid/order is substantially different from all others, contract pricing and cost control cannot be based on an accounting system that aggregates costs across contracts. Thus, AGM uses job order costing to accumulate the costs of each job (contract) separately from all other jobs.

A primary role for cost accounting is to determine the cost of an organization's products or services. Just as various methods (first-in, first-out; last-in, first-out; average; specific identification) exist to determine inventory valuation and cost of goods sold for a retailer, different methods are available to value inventory and calculate product cost in a manufacturing or service environment. The method chosen depends on the product or service and the company's conversion processes. A cost flow assumption is required for processes in which costs cannot be identified with and attached to specific units of production.

This chapter is the first of a sequence of chapters that will present methods of product costing. The chapter first distinguishes between two primary costing systems (job order and process) and then discusses three methods of valuation that can be used within these systems (actual, normal, and standard). The remainder of the chapter focuses on the job order costing system, such as that used by AGM.

METHODS OF PRODUCT COSTING

1

How do job order and process costing systems, and how do actual, normal, and standard costing valuation methods differ?

Before the cost of products can be computed, a determination must be made about (1) the product costing system and (2) the valuation method to be used. The product costing system defines the cost object and the method of assigning costs to production. The valuation method specifies how product costs will be measured. Companies must have both a cost system and a valuation method; six possible combinations exist as shown in Exhibit 5–1.[1]

Costing Systems

job order costing system

Job order and process costing are the two primary cost systems. A **job order costing system** is used by entities that make (perform) relatively small quantities or distinct batches of identifiable, unique products (services). For example, job order costing is appropriate for a publishing company that produces educational textbooks, an accountant who prepares tax returns, an architectural firm that designs commercial buildings, and a research firm that performs product development studies. In each instance, the organization produces tailor-made goods or services that conform to specifications designated by the purchaser of those goods or services. Services in general are typically user specific, so job order costing systems are commonly used in such businesses. In these various settings, the word "job" is synonymous with engagement, project, and contract.

process costing system

The other primary product costing system, a **process costing system**, is used by entities that produce large quantities of homogeneous goods. Process costing is appropriate for companies that mass manufacture products such as bricks, gasoline, detergent, and breakfast cereal. The output of a single process in a mass manufacturing situation is homogeneous; thus, within a given period, one unit of output cannot be readily identified with specific input costs. This characteristic of process

EXHIBIT 5–1

Costing Systems and Inventory Valuation

	METHOD OF VALUATION		
COST ACCUMULATION SYSTEM	**Actual**	**Normal**	**Standard**
JOB ORDER	Actual DM Actual DL Actual OH (assigned to job after end of period)	Actual DM Actual DL OH applied using predetermined rates at completion of job or end of period (predetermined rates times actual input)	Standard DM and/or Standard DL OH applied using predetermined rates when goods are completed or at end of period (predetermined rates times standard input)
PROCESS	Actual DM Actual DL Actual OH (assigned to job after end of period using FIFO or weighted average cost flow)	Actual DM Actual DL OH applied using predetermined rates (using FIFO or weighted average cost flow)	Standard DM Standard DL Standard OH using predetermined rates (will always be FIFO cost flow)

[1] A third and fourth dimension (cost accumulation and cost presentation) are also necessary in this model. These dimensions relate to the use of absorption or variable costing and are covered in Chapter 12.

costing systems makes a cost flow assumption necessary. Cost flow assumptions provide a means for accountants to assign costs to products without regard for the actual physical flow of units. Process costing systems (covered in Chapters 6 and 7) allow the use of either a weighted average or FIFO cost flow assumption.

The accompanying News Note discusses a small enterprise that manufactures custom golf clubs. This firm is different from most of the companies that mass manufacture clubs. Although the individual featured in the News Note would likely use a job order costing system, most firms in the industry would appropriately use process costing.

http://www.fortunebrands.com

Valuation Methods

The three valuation methods shown in Exhibit 5–1 are actual, normal, and standard costing. A company using the actual costs of direct materials, direct labor, and overhead to determine work in process inventory cost is employing an actual cost system. Service businesses that have few customers and/or low volume, such as some advertising agencies or consulting firms, may use an actual cost system. However, because of the reasons discussed in Chapter 3, many companies modify actual cost systems by using predetermined overhead rates rather than actual overhead costs. This combination of actual direct materials and direct labor costs with predetermined overhead rates is called a *normal cost system*. If the predetermined rate is substantially equivalent to what the actual rate would have been for an annual period, its use provides acceptable and useful costs.

Companies using either job order or process costing may employ standards (or predetermined benchmarks) for costs to be incurred and/or quantities to be used. In a standard cost system, unit norms or standards are developed for direct material and direct labor quantities and/or costs. Overhead is applied to production using a predetermined rate that is considered the standard. These standards can then be used to plan for future activities and cost incurrence and to value inventories. Both actual and standard costs are recorded in the accounting records to provide an essential element of cost control—having norms against which actual costs of operations can be compared. A standard cost system allows companies to quickly recognize deviations or variances from normal production costs and to correct problems resulting from excess usage and/or costs. Actual costing systems do not provide this benefit, and normal costing systems cannot provide it in relation to materials and labor.

GENERAL BUSINESS  **NEWS NOTE**

Puttering around Building Golf Clubs

It's the start of the Greater Greensboro Chrysler Classic, and the pros are practicing at the Forest Oaks Country Club driving range when Tim West arrives to hawk his wares.

Measured by money alone, Mr. West is a bit player in the burgeoning $6 billion golf equipment market. Most of his rivals deliver products for industry titans such as Fortune Brands Inc. Mr. West, in contrast, is an independent representing start-ups and other tiny companies that can't afford to pay endorsements. With no expense account he must rely on guile, persuasion, and his "Book of Love," a meticulously maintained notebook in which he records players' preferences, down to such details as the no-rib grip favored by John Daly or a club-shaft weight down to the gram.

On the road, he uses the book to build custom clubs from scratch, usually in one of the machine-shop trailers that follow the tour and are subsidized by big equipment makers. "I love machines," he says assembling a hybrid while hunched over a pot of smelly glue.

SOURCE: Adapted from Christopher Cooper, "Even Golf Pros Need Help, and Tim West Tries Hard to Give It—He Persuades Them to Test New Gear That May Offer That Always-Needed Edge," *The Wall Street Journal* (May 28, 1998), p. A1.

Because the use of predetermined overhead rates is more common than the use of actual overhead costs, this chapter addresses a job order/normal cost system and describes some job order/standard cost combinations.[2]

JOB ORDER COSTING SYSTEM

2

In what production situations is a job order costing system appropriate and why?

job

3

What constitutes a "job" from an accounting standpoint?

Product costing is concerned with (1) cost identification, (2) cost measurement, and (3) product cost assignment. In a job order costing system, costs are accumulated individually on a per-job basis. A **job** is a single unit or group of units identifiable as being produced to distinct customer specifications.[3] Each job is treated as a unique cost entity or cost object. Costs of different jobs are maintained in separate subsidiary ledger accounts and are not added together or commingled in those ledger accounts.

The logic of separating costs for individual jobs is shown by the example given in Exhibit 5–2. Assume Island Marine (a builder of offshore oil production equipment) produced three products in March: a production platform, a barge designed to deliver offshore products to their installation sites, and an assembly of components built by other firms into a completed oil rig. The quantity of resources used for each project is clearly unique. Each product required a different amount of material and different conversion operations. Because each contract is distinctive, the costs of those products cannot logically be averaged—a unique cost must be determined for each contract.

Exhibit 5–2 provides the Work in Process Inventory control and subsidiary ledger accounts for Island Marine's product costing system. The usual production costs of direct material, direct labor, and overhead are accumulated for each contract. Actual direct material and direct labor costs are combined with an overhead cost that is computed as a predetermined overhead rate multiplied by some actual cost driver (such as direct labor hours, cost or quantity of materials used, or number of material requisitions). Normal cost valuation is used because, although actual direct material and direct labor costs are fairly easy to identify and associate with a particular job, overhead costs are usually not traceable to specific jobs and must be allocated to production. For example, Island Marine's March utility costs are related to all jobs worked on during that month. Accurately determining which jobs created the need for a given amount of water, heat, or electricity would be almost impossible.

To ensure the proper recording of costs, the amounts appearing in the subsidiary ledger accounts are periodically compared with and reconciled to the Work in Process Inventory control account in the general ledger. This reconciliation is indicated by the equality of the assumed ending balances of the subsidiary ledger accounts with the WIP Inventory control account in Exhibit 5–2.

The output of any job can be a single unit or multiple similar or dissimilar units. With multiple outputs, a unit cost can be computed only if the units are similar or if costs are accumulated for each separate unit (such as through an identification number). For example, Seagate Technology produces compact disk drives to the specifications of a variety of companies including Compaq. Seagate can determine the cost per disk drive for each company by accumulating the costs per batch of homogeneous products in different production runs and treating each production run as a separate job. In such cases, production costs of each job batch can be commingled because the units within the batch are not distinguishable and the total cost can be averaged over the number of units produced in the batch to

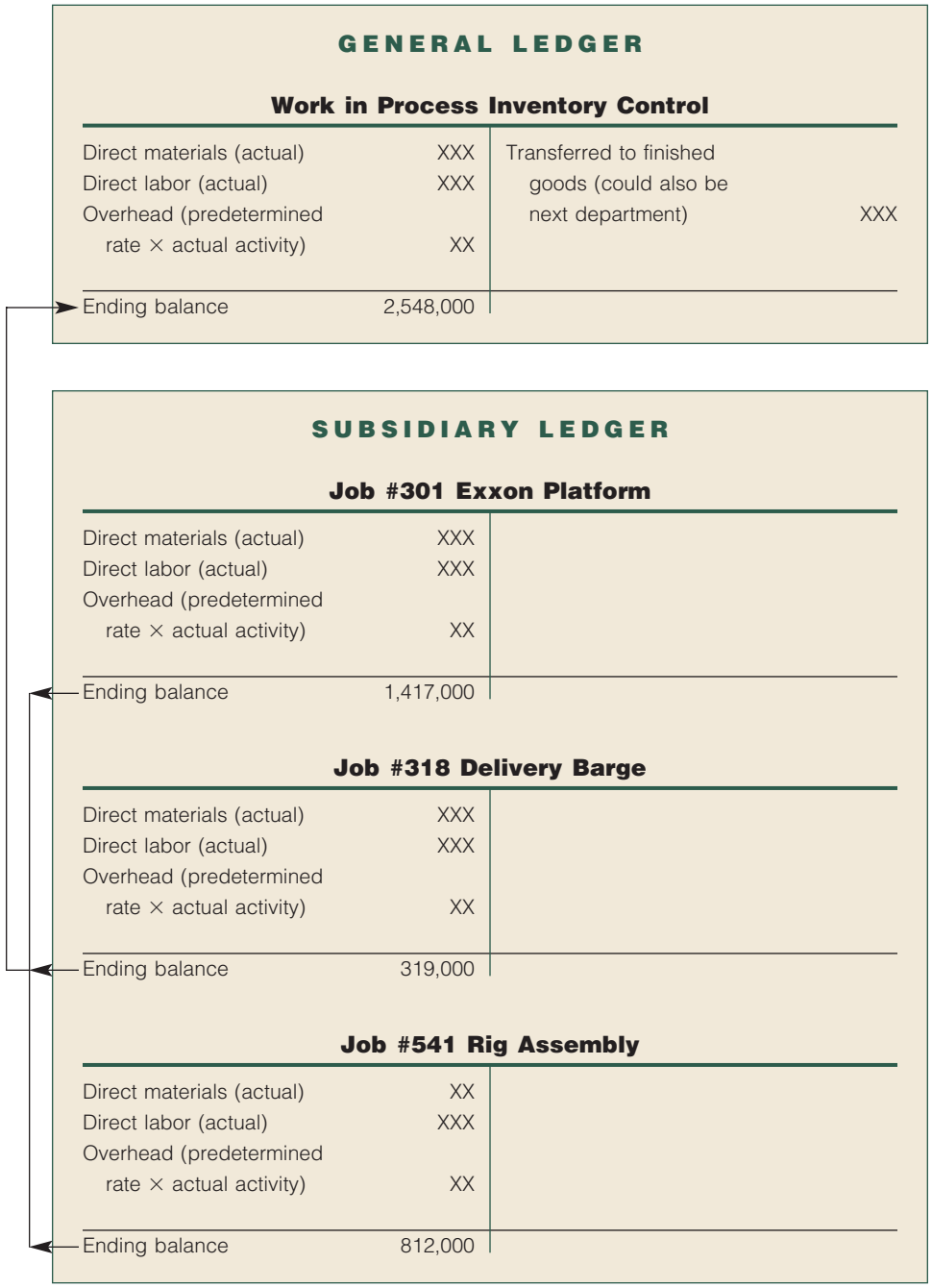
http://www.seagate.com
http://www.compaq.com

[2] Although actual overhead may be assigned to jobs, such an approach would be less customary because total overhead would not be known until the period was over, causing an unwarranted delay in overhead assignment. Activity-based costing can increase the validity of tracing overhead costs to specific products or jobs.

[3] To eliminate the need for repetition, *units* should be read to mean either products or services because job order costing is applicable to both manufacturing and service companies. For the same reason, *produced* can mean *manufactured* or *performed*.

EXHIBIT 5–2

Separate Subsidiary Ledger Accounts for Jobs



determine a cost per unit. If the output consists of dissimilar units for which individual cost information is not gathered, no cost per unit can be determined although it is still possible to know the total job cost.

JOB ORDER COSTING: DETAILS AND DOCUMENTS

A job can be categorized by the stage of its production cycle. There are three stages of production: (1) contracted for but not yet started, (2) in process, and (3) completed.[4]

4

What purposes are served by the primary documents used in a job order costing system?

[4] In concept, there could be four categories. The third and fourth categories would distinguish between products completed but not sold and products completed and sold. However, the usual case is that firms using a job order costing system produce only products for which there is a current demand. Consequently, there is usually no inventory of finished products that await sale.

Because a company using job order costing is making products according to user specifications, jobs might occasionally require unique raw material. Thus, some raw material may not be acquired until a job is under contract and it is known that production will occur. The raw material acquired, although often separately distinguishable and related to specific jobs, is accounted for in a single general ledger control account (Raw Material Inventory) with subsidiary ledger backup. The material may, however, be designated in the storeroom and possibly in the subsidiary records as being "held for use in Job XX." Such designations should keep the material from being used on a job other than the one for which it was acquired.

5

What journal entries are used to accumulate costs in a job order costing system?

Material Requisitions

material requisition form

When material is needed to begin a job, a **material requisition form** (shown in Exhibit 5–3) is prepared so that the material can be released from the warehouse and sent to the production area. This source document indicates the types and quantities of materials to be placed into production or used to perform a service job. Such documents are usually prenumbered and come in multiple-copy sets so that completed copies can be maintained in the warehouse, in the department, and with each job. Completed material requisition forms are important for a company's audit trail because they provide the ability to trace responsibility for material cost and to verify the flow of material from the warehouse to the department for the job receiving the material. These forms release warehouse personnel from further responsibility for issued materials and assign responsibility to the requisitioning department. Although hardcopy material requisition forms may still be used, it is increasingly common for this document to exist only electronically.

When material is issued, its cost is released from Raw Material Inventory, and if direct to the job, is sent to Work in Process Inventory. If the Raw Material Inventory account also contains indirect material, the costs of these issuances are assigned to Manufacturing Overhead. Thus, the journal entry will be as follows:

Work in Process Inventory (if direct)	XXX	
Manufacturing Overhead (if indirect)	XXX	
Raw Material Inventory		XXX

EXHIBIT 5–3

Material Requisition Form

Date _____ No. 341

Job Number _____ Department _____

Authorized by _____ Issued by _____

Received by _____ Inspected by _____

Item No.	Part No.	Description	Unit of Measure	Quantity Required	Quantity Issued	Unit Cost	Total Cost

When the first direct material associated with a job is issued to production, that job moves to the second stage of its production cycle—being in process. When a job enters this stage, cost accumulation must begin using the primary accounting document in a job order system—the job order cost sheet (or job cost record).

Job Order Cost Sheet

The source document that provides virtually all financial information about a particular job is the **job order cost sheet**. The set of job order cost sheets for all uncompleted jobs comprises the Work in Process Inventory subsidiary ledger. Total costs contained on the job order cost sheets for all uncompleted jobs should reconcile to the Work in Process Inventory control account balance in the general ledger as shown in Exhibit 5–2.

job order cost sheet

The top portion of a job order cost sheet includes a job number, a description of the task, customer identification, various scheduling information, delivery instructions, and contract price. The remainder of the form details actual costs for material, labor, and applied overhead. The form also might include budgeted cost information, especially if such information is used to estimate the job's selling price or support a bid price. In bid pricing, budgeted and actual costs should be compared at the end of a job to determine any deviations from estimates. Like the material requisition form, the job cost sheet exists only electronically in many companies today.

Exhibit 5–4 illustrates a job order cost sheet for Island Marine. The company has contracted to produce a floating hull that will serve as a platform for an offshore oil rig. All of Island Marine's job order cost sheets include a section for budgeted data so that budget-to-actual comparisons can be made for planning and control purposes. Direct material and direct labor costs are assigned and posted to jobs as work on the job is performed. Direct material information is gathered from the material requisition forms, and direct labor information is found on employee time sheets or employee labor tickets. (Employee time sheets are discussed in the next section.)

Overhead is applied to production at Island Marine based on departmental rates. Each department may have more than one rate. For example, in the Cutting & Forming Department, the overhead rates for 2000 are as follows:

Labor-related costs: $25 per direct labor hour
Machine-related costs: $45 per machine hour

Employee Time Sheets

An **employee time sheet** (Exhibit 5–5, page 181) indicates for each employee the jobs worked on and the direct labor time consumed. These time sheets are most reliable if the employees fill them in as the day progresses. Work arriving at an employee station is accompanied by a tag or bar code specifying its job order number. The time work is started and stopped are noted on the time sheet.[5] These time sheets should be collected and reviewed by supervisors to ensure that the information is as accurate as possible.

employee time sheet

The time sheet shown in Exhibit 5–5 is appropriate only if employees are asked to record their time and work manually. The time sheet information is the same as that which would be recorded if a computer were used to track employee tasks, as is the norm in larger businesses. In fact, larger businesses today use electronic time-keeping software. Employees simply swipe an employee ID card and a job

[5] Alternatives to daily time sheets are job time tickets that supervisors give to employees as they are assigned new jobs and supervisors' records of which employees worked on what jobs for what period of time. The latter alternative is extremely difficult if a supervisor is overseeing a large number of employees or if employees are dispersed through a large section of the plant.

Job Number 323

Customer Name and Address:

Dolphin Petroleum Co.
9901 La. Freeway
New Orleans, LA

Description of Job:

Hull for floating rig
Per specifications in bid agreement #913
dated 2/01/00

Contract Agreement Date: *3/25/00*
Scheduled Starting Date: *6/5/00*
Agreed Completion Date: *7/01/01*
Actual Completion Date:
Delivery Instructions: *Floating: ICW at New Orleans*

Contract Price *$21,000,000*

CUTTING & FORMING

DIRECT MATERIALS (EST. $6,140,000)			DIRECT LABOR (EST. $1,100,000)			OVERHEAD BASED ON # OF LABOR HOURS (EST. $500,000)			OVERHEAD BASED ON # OF MACHINE HOURS (EST. $750,000)		
Date	Source	Amount	Date	Source	Amount	Date	Source	Amount	Date	Source	Amount

WELDING & ASSEMBLY
(SAME FORMAT AS ABOVE BUT WITH DIFFERENT OH RATES)

PAINTING & FINISHING
(SAME FORMAT AS ABOVE BUT WITH DIFFERENT OH RATES)

SUMMARY (THOUSANDS OF DOLLARS)

	CUTTING & FORMING		WELDING & ASSEMBLY		PAINTING & FINISHING	
	Actual	Budget	Actual	Budget	Actual	Budget
Direct materials	_____	*$6,140*	_____	*$1,200*	_____	*$ 400*
Direct labor	_____	*1,100*	_____	*2,100*	_____	*700*
Overhead (labor)	_____	*500*	_____	*400*	_____	*450*
Overhead (machine)	_____	*750*	_____	*520*	_____	*370*
Totals	_____	*$8,490*	_____	*$4,220*	_____	*$1,920*

	Actual	Budget
Final Costs: Cutting & Forming	_____	*$ 8,490*
Welding & Assembly	_____	*4,220*
Painting & Finishing	_____	*1,920*
Totals	_____	*$14,630*

EXHIBIT 5–4

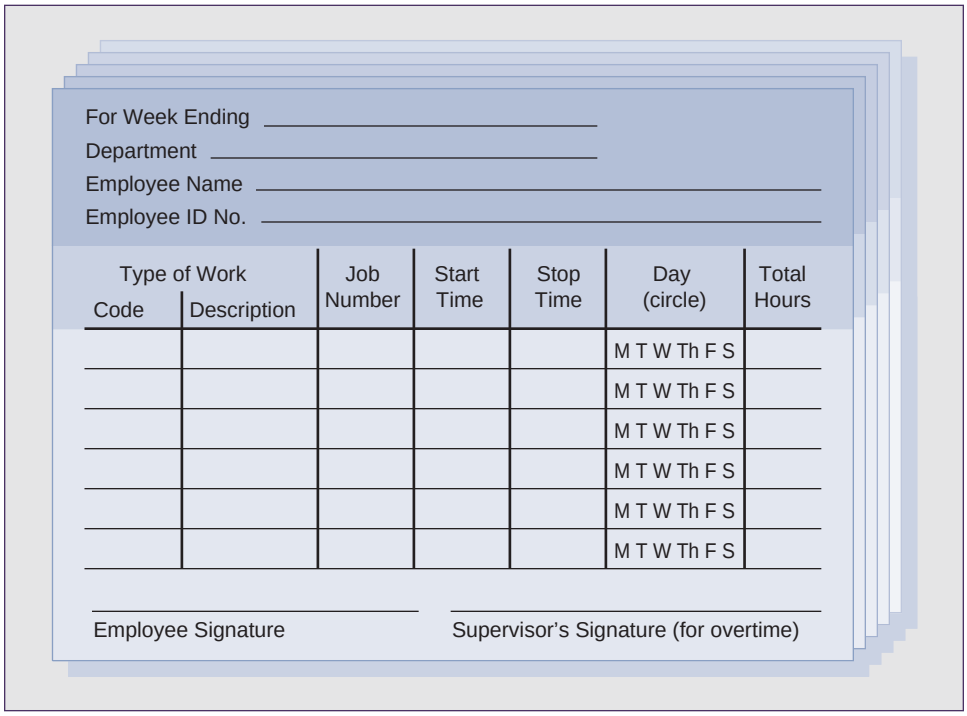
Island Marine's Job Order Cost Sheet

card through a reader when they switch from one job to another. This software allows labor costs to be accumulated by job and department.

In highly automated factories, employee time sheets may not be extremely useful or necessary documents because of the low proportion of direct labor cost to total cost. However, machine time can be tracked through the use of machine clocks or counters in the same way as human labor. As jobs are transferred from one machine to another, the clock or counter can be reset to mark the start and

EXHIBIT 5–5

Employee Time Sheet



For Week Ending _____
Department _____
Employee Name _____
Employee ID No. _____

Type of Work		Job Number	Start Time	Stop Time	Day (circle)	Total Hours
Code	Description					
					M T W Th F S	
					M T W Th F S	
					M T W Th F S	
					M T W Th F S	
					M T W Th F S	
					M T W Th F S	

Employee Signature _____ Supervisor's Signature (for overtime) _____

stop times. Machine times can then be equated to employee-operator time. Another convenient way to track employee time is through bar codes that can be scanned as products pass through individual workstations. At one large Midwest plumbing manufacturer, for example, a bar coding system was implemented for time-and-attendance and shop-floor control systems. "In less than two years, the company eliminated eleven different forms that were used when time and inspection data were recorded manually. Inspector efficiency improved by 10 to 12 percent, in part because the inspector never touched a piece of paper other than a bar code label."[6]

Transferring employee time sheet (or alternative source document) information to the job order cost sheet requires a knowledge of employee labor rates. Wage rates are found in employee personnel files. Time spent on the job is multiplied by the employee's wage rate, and the amounts are summed to find total direct labor cost for the period. The summation is recorded on the job order cost sheet. Time sheet information is also used for payroll preparation; the journal entry to record the information is

Work in Process Inventory (if direct)	XXX	
Manufacturing Overhead (if indirect)	XXX	
Salaries and Wages Payable		XXX

After these uses, time sheets are filed and retained so they can be referenced if necessary for any future information needs. If total actual labor costs for the job differ significantly from the original estimate, the manager responsible for labor cost control may be asked to clarify the reasons underlying the situation. In addition, if a job is to be billed at cost plus a specified profit margin (a **cost-plus contract**), the number of hours worked may be audited by the buyer. This situation is quite common and especially important when dealing with government contracts. Therefore,

cost-plus contract

[6] Thomas Tyson, "The Use of Bar Coding in Activity-Based Costing, *Journal of Cost Management* (Winter 1991), pp. 52–53.

hours not worked directly on the contracted job cannot be arbitrarily or incorrectly charged to the cost-plus job without the potential for detection. Last, time sheets provide information on overtime hours. Under the Fair Labor Standards Act, overtime must generally be paid at a time-and-a-half rate to all nonmanagement employees when they work more than 40 hours in a week.

Overhead

Overhead costs can be substantial in manufacturing and service organizations. As indicated in the following News Note, the ability to estimate and correctly apply overhead is a major factor in the relative success of custom producers. As suggested by the News Note, activity-based costing, presented in Chapter 4, can be effectively used in a custom job production environment.

Actual overhead incurred during production is included in the Manufacturing Overhead control account. If actual overhead is applied to jobs, the cost accountant will wait until the end of the period and divide the actual overhead incurred in each designated cost pool by a related measure of activity or cost driver. Actual overhead would be applied to jobs by multiplying the actual overhead rate by the actual measure of activity associated with each job.

More commonly, overhead is applied to jobs using one or more annualized predetermined overhead application rates. Overhead is assigned to jobs by multiplying the predetermined rate by the actual measure of the activity base that was incurred during the period for each job. This method is normal costing.

NEWS NOTE GENERAL BUSINESS

High Tech Is High Overhead

A few years ago, an aerospace manufacturer of high-precision aircraft components was approached by one of its customers who was looking for additional machine capacity to support an overload situation in the customer's site. What an opportunity to sell excess machine hours and reap a great reward! The sales and manufacturing managers were all set to bid a rate to the customer, when the new controller stepped in and said, "Wait, before you bid, let me review the numbers." A little surprised, the managers gave the controller a couple of days to look at the bid.

The manufacturer was a large job shop with a variety of machine-shop-type equipment, ranging from simple drill presses to extremely complex high-precision finishing machines. Job costing used direct labor dollars as the overhead allocation base, and although the manufacturing overhead rate for the plant was now almost 300 percent of direct labor, nobody had questioned how jobs had been priced in the past. Pricing was, simply, the number of direct labor hours, times the direct labor rate, plus overhead at the 300 percent rate, plus 20 percent for administrative expense, plus a further fee representing expected profit, normally 12 percent of cost. Therefore, in this case, direct labor of $21.25 per hour was grossed up to provide a manufacturing rate including overhead of $85 per direct labor hour.

The reality of the situation was, however, that the customer was not buying the average shop. The customer wanted to buy specific, high-precision finishing machines to complete work started in its own facility. What the controller sensed in the situation was that the normal pricing model might not work in this case. His approach to analyzing the opportunity was to take each machine and trace to it as best he could the actual resources consumed by the equipment including supplies, electricity, maintenance, setup, tools and fixtures, space, quality control, scheduling, material handling, etc. He still had to add some cost for management and shared facilities. Much to his horror, he discovered that the real cost of the machines ranged from $225 to as much as $350 per operating hour. Astonishingly, not one machine had an hourly cost lower than the proposed selling price.

Prices based on the revised higher level rates per machine were quoted to the customer, and most were accepted.

SOURCE: Reprinted from an article appearing in CMA Management Magazine (formerly CMA Magazine) by Murray A. Best, CMA, with permission of CMA Canada.

When predetermined rates are used, overhead is applied at the end of the period or at completion of production, whichever is earlier. Overhead is applied at the end of each period so that the Work in Process Inventory account contains costs for all three product elements (direct material, direct labor, and overhead). Overhead is applied to Work in Process Inventory at completion so that a proper product cost can be transferred to Finished Goods Inventory. The journal entry to apply overhead follows.

Work in Process Inventory	XXX	
Manufacturing Overhead		XXX

Completion of Production

When a job is completed, its total cost is transferred to Finished Goods Inventory.

Finished Goods Inventory	XXX	
Work in Process Inventory		XXX

Job order cost sheets for completed jobs are removed from the WIP subsidiary ledger and become the subsidiary ledger for the Finished Goods Inventory control account. When a job is sold, the cost contained in Finished Goods Inventory for that job is transferred to Cost of Goods Sold.

Cost of Goods Sold	XXX	
Finished Goods Inventory		XXX

Such a cost transfer presumes the use of a perpetual inventory system, which is common in a job order costing environment because goods are generally easily identified and tracked.

Job order cost sheets for completed jobs are kept in a company's permanent files. A completed job order cost sheet provides management with a historical summary about total costs and, if appropriate, the cost per finished unit for a given job. The cost per unit may be helpful for planning and control purposes as well as for bidding on future contracts. If a job was exceptionally profitable, management might decide to pursue additional similar jobs. If a job was unprofitable, the job order cost sheet may provide indications of areas in which cost control was lax. Such areas are more readily identifiable if the job order cost sheet presents the original, budgeted cost information.

Unlike the case of a retailer or wholesaler, most businesses that use job order costing have little finished goods inventory. Because they build custom products, only when a specific customer contracts for a particular service or product does production occur. Then, on completion, the costs of the product or service may flow immediately to Cost of Goods Sold.

JOB ORDER COSTING AND TECHNOLOGY

6

How do technological changes impact the gathering and use of information in job order costing systems?

The trend in job order costing is to automate the data collection and data entry functions required to support the accounting system. By automating recordkeeping functions, not only are production employees relieved of that burden, but the electronically stored data can be accessed to serve many purposes. For example, the data from a completed job can be used as inputs for projecting the costs that are the bases for setting bid prices on future jobs. Regardless of whether the data entry process is automated, virtually all product costing software contains a job costing module, even very inexpensive off-the-shelf programs. And as indicated in the accompanying News Note, there is a significant role for public accountants in vending software to smaller manufacturing firms.

NEWS NOTE  GENERAL BUSINESS

Middle Market Manufacturing Going "Soft" for CPAs

The market for selling technology products and consulting services to middle-market manufacturers is as abundant as Mike Meyers's chest hair in the latest Austin Powers movie, but some observers of this niche industry doubt that many practitioners will capitalize on it.

Major middle-market accounting software vendors—Great Plains, Sage, SBT, Solomon and Epicor—are rapidly adding manufacturing capabilities to their core accounting technologies. And they are looking to their reseller channels, whose makeup is often as much as 30 percent CPAs, for help in reaching that market.

The move is both fueling and being fueled by middle-market manufacturers' expanding technology appetite. "Five years ago, a manufacturer had to be $20 million a year [in revenues] to automate, now the $5 million-a-year companies are automating and doing so rapidly with the right partners," said Jim Kent of the Kent Group, an Andover-based reseller of Macola, an established manufacturing software specialist.

"There's a huge opportunity for CPAs to work with manufacturers who want their manufacturing and accounting systems to work together," said David Lahey, president of Lahey Financial Systems, which expects to expand dramatically by virtue of now being sold exclusively by SBT and its reseller channel.

Lahey, whose company has been developing manufacturing software since 1984, claims that most mid-market manufacturers have not in the past focused on accounting software and now they're being forced to take on integrated, multiple-application programs. "They're being forced to play catch-up and CPAs are a logical party to help them deal with systems that directly integrate accounting and manufacturing solutions," he explained.

Brian Sittley, president of Productivity Management, a South Bend, Ind., reseller of SBT, said the manufacturing industry technology consulting opportunity is particularly keen for CPAs well versed in cost accounting.

SOURCE: John Covaleski, "Manufacturing Niche May Be Too Hairy for CPAs," *Accounting Today* (July 26–August 8, 1999), pp. 22, 28. © Faulkner & Gray, republished with permission.

intranet

http://www.greatplains.com
http://www.us.sage.com
http://www.sbt.com
http://www.solomon.com
http://www.macola.com
http://www.lfscorp.com

Within many companies, intranets are being created to manage the information pertaining to jobs. An **intranet** is a mechanism for sharing information and delivering data from corporate databases to the local-area network (LAN) desktops. Intranets use Web technology and are restricted networks that can enhance communication and distribute information.[7] Exhibit 5–6 provides an illustration of the types of information that can be accessed on an intranet.

As shown in Exhibit 5–6, much information relevant to managing the production of a particular job is available on-line to managers. From contract information and technical specifications to cost budgets, actual costs incurred, and stage of production measurements, data are instantly available to managers. As data input functions are automated, the data available on the Intranet become more and more up to the minute, or real time. Chapter 17 addresses more fully the automation and integration of information systems.

In any job order costing system, the individual job is the focal point. The next section presents a comprehensive job order costing situation using information from Island Marine, the company introduced earlier.

JOB ORDER COSTING ILLUSTRATION

Island Marine sets bid prices based on its costs. Over the long term, the company has a goal of realizing a gross profit equal to 25 percent of the bid price. This level of gross profit is sufficient to generate a reasonable profit after covering selling and administrative costs. In more competitive circumstances, such as when the company has too much unused capacity, bid prices may be set lower to increase the likelihood

[7] Lawrence Barkowski, "Intranets for Projects and Cost Management in Manufacturing," *Cost Engineering* (June 1999), p. 33.

EXHIBIT 5–6

Project Management Site Content

Project Management Library
- ❑ Instructions on how to use the project intranet site
- ❑ Project manager manuals
- ❑ Policy and procedure manuals
- ❑ Templates and forms
- ❑ Project management training exercises

General Project Information
- ❑ Project descriptions
- ❑ Photos of project progress
- ❑ Contract information
- ❑ Phone and e-mail directories
- ❑ Project team rosters
- ❑ Document control logs
- ❑ Scope documents
- ❑ Closure documents
- ❑ Links to project control tools
- ❑ Links to electronic document retrieval systems

Technical Information
- ❑ Drawing logs
- ❑ Detailed budgets and physical estimates
- ❑ Specifications
- ❑ Bill of materials by department
- ❑ Punch lists
- ❑ Links to drawing databases

Management Information
- ❑ Meeting minutes
- ❑ Daily logs
- ❑ Project schedules
- ❑ Task and resource checklists
- ❑ Shutdown and look-ahead reports
- ❑ Work-hour estimates
- ❑ Change notices
- ❑ Labor hours worked
- ❑ Earned value

Financial Information
- ❑ Project cost sheet
- ❑ Funding requests for each cost account
- ❑ Cash flow projections and budgets
- ❑ Original cost budgets and adjustments
- ❑ Contract status reports
- ❑ Departmental budget reports
- ❑ Links to mainframe sessions for requisitions and purchase order tracking
- ❑ Companywide financial statements

SOURCE: Lawrence Barkowski, "Intranets for Project and Cost Management in Manufacturing," *Cost Engineering* (June 1999), p. 36. Reprinted with permission of AACE International, 209 Prairie Ave., Suite 100, Morgantown, WV 25601 USA. Internet: http://www.aacei.org. E-mail: info@aacei.org.

of successful bids. If the company has little unused capacity, it may set bid prices somewhat higher so that the likelihood of successfully bidding on too many contracts is reduced.

To help in establishing the bid price on the hull for the floating platform, Island Marine's cost accountant provided the vice president of sales with the budgeted cost information shown earlier in Exhibit 5–4. The vice president of sales believed that a bid price slightly above normal levels was possible because of the noncompetitive nature of this particular market. Accordingly, the vice president set the sales price to yield a gross margin of roughly 30.3 percent [($21,000,000 − $14,630,000) ÷ $21,000,000]. This sales price was agreed to by the customer in a contract dated March 25, 2000. Island Marine's managers scheduled the job to begin on June 5, 2000, and to be completed by July 1, 2001. The job is assigned the number 323 for identification purposes.

The following journal entries illustrate the flow of costs for the Cutting & Forming Department of Island Marine during June 2000. Work on several contracts including Job #323 was performed in Cutting & Forming during that month. In entries 1, 2, and 4 that follow, separate WIP inventory accounting is shown for costs related to Job #323 and to other jobs. In practice, the Work in Process control account for a given department would be debited only once for all costs assigned to it. The details for posting to the individual job cost records would be presented in the journal entry explanations. *All amounts are shown in thousands of dollars.*

1. During June 2000, material requisition forms #340–355 indicated that $2,925 of raw materials were issued from the warehouse to the Cutting & Forming Department. This amount included $1,982 of direct materials used on Job #323 and $723 of direct materials used on other jobs. The remaining $120 of raw materials issued during June were indirect materials.

Work in Process Inventory—Cutting & Forming (Job #323)	1,982	
Work in Process Inventory—Cutting & Forming (other jobs)	723	
Manufacturing Overhead—Cutting & Forming (indirect materials)	120	
Raw Material Inventory		2,825
To record direct and indirect materials issued per requisitions during June.		

2. The June time sheets and payroll summaries for the Cutting & Forming Department nonsalaried workers were used to trace direct and indirect labor to that department. Total labor cost for the Cutting & Forming Department for June was $417. Job #323 required $310 of direct labor cost combining the two biweekly pay periods in June. The remaining jobs in process required $45 of direct labor cost, and indirect labor cost for the month totaled $32.

Work in Process Inventory—Cutting & Forming (Job #323)	310	
Work in Process Inventory—Cutting & Forming (other jobs)	45	
Manufacturing Overhead—Cutting & Forming (indirect labor)	32	
Wages Payable		387
To record wages associated with Cutting & Forming during June.		

3. The Cutting & Forming Department incurred overhead costs in addition to indirect materials and indirect labor during June. Factory building and equipment depreciation of $65 was recorded for April. Insurance on the factory building ($12) for the month had been prepaid and had expired. The $88 bill for June factory utility costs was received and would be paid in July. Repairs and maintenance costs of $63 were paid in cash. Overhead costs of $27 for items such as supplies used, supervisors' salaries, and so forth were incurred; these costs are credited to "Various accounts" for illustrative purposes. The following entry summarizes the accumulation of these other actual overhead costs for June.

Manufacturing Overhead—Cutting & Forming	255	
Accumulated Depreciation		65
Prepaid Insurance		12
Utilities Payable		88
Cash		63
Various accounts		27
To record actual overhead costs of the Cutting & Forming Department during June exclusive of indirect materials and indirect nonsalaried labor.		

4. Island Marine prepares financial statements at month end. To do so, Work in Process Inventory must include all production costs: direct material, direct labor, and overhead. The company allocates overhead to the Cutting & Forming Work in Process Inventory based on two predetermined overhead rates: $25 per direct labor hour and $45 per machine hour. In June the employees committed 6,200 hours of direct labor time to Job #323, and 3,000 machine hours were consumed on that job. The other jobs worked on during the month received total applied overhead of $88,000 [1,000 direct labor hours (assumed) × $25 plus 1,400 machine hours (assumed) × $45].

Work in Process Inventory—Cutting & Forming (Job #323)	290	
Work in Process Inventory—Cutting & Forming (other jobs)	88	
Manufacturing Overhead—Cutting & Forming		378
To apply overhead to Cutting & Forming work in process for June using predetermined application rates.		

Notice that the amount of actual overhead for June ($120 + $32 + $255 = $407) in the Cutting & Forming Department is not equal to the amount of overhead applied to that department's Work in Process Inventory ($378). This $29

difference is the underapplied overhead for the month. Because the predetermined rates were based on annual estimates, differences in actual and applied overhead accumulate during the year. Underapplied or overapplied overhead will be closed at year-end (as shown in Chapter 3) to either Cost of Goods Sold (if the amount is immaterial) or to Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold (if the amount is material).

The preceding entries for the Cutting & Forming Department would be similar to the entries made in each of the other departments of Island Marine. Direct material and direct labor data are posted to each job order cost sheet frequently (usually daily); entries are posted to the general ledger control accounts for longer intervals (usually monthly).

Job #323 will be executed by three departments of Island Marine. Other jobs accepted by the company may involve a different combination of departments, and different conversion operations within departments. In this company, jobs flow consecutively from one department to the next. In other types of job shops, different departments may work on the same job concurrently. Similar entries for Job #323 are made throughout the production process, and Exhibit 5–7 shows the cost sheet at the job's completion. Note that direct material requisitions, direct labor cost, and applied overhead shown previously in entries 1, 2, and 4 are posted on the job cost sheet. Other entries are not detailed.

When the job is completed, its costs are transferred to Finished Goods Inventory. The journal entries related to completion and sale are as follows:

Finished Goods Inventory—Job #323	14,283	
Work in Process Inventory—Cutting & Forming		8,289
Work in Process Inventory—Welding & Assembly		4,153
Work in Process Inventory—Painting & Finishing		1,841
Cost of Goods Sold—Job #323	14,283	
Finished Goods Inventory—Job #323		14,283
Accounts Receivable—Dolphin Petroleum Co.	21,000	
Sales		21,000

The completed job order cost sheet can be used by managers in all departments to determine how well costs were controlled. Overall, costs were below the budgeted level. The Cutting & Forming Department experienced lower costs than budgeted in all categories except machine-related overhead. In the Welding & Assembly Department, actual direct material costs were well below budget. However, direct labor costs were above budget and this caused labor-related overhead to be above budget. Machine-related overhead was significantly below budget. Painting and Finishing costs, overall, were significantly below budget. Only machine-related overhead exceeded the budgeted amount. Summarizing, costs were well controlled on this job, because total actual costs were substantially below the budgeted amounts (approximately 2.37 percent below budget).

In the remainder of the chapter, the use of job order costing data to support management decision making and improve cost control is discussed. The next section discusses how standard costs, rather than actual costs, can be used to improve cost management.

JOB ORDER COSTING USING STANDARD COSTS

7

How are standard costs used in a job order costing system?

The Island Marine example illustrates the use of actual historical cost data for direct material and direct labor in a job order costing system. However, using actual direct material and direct labor costs may cause the costs of similar units to fluctuate from period to period or job to job because of changes in component costs. Use of

Job Number 323

Customer Name and Address:

Dolphin Petroleum Co.
9901 La. Freeway
New Orleans, LA

Description of Job:

Hull for floating rig
Per specifications in bid agreement #913
dated 2/01/00

Contract Agreement Date: *3/25/00*
Scheduled Starting Date: *6/5/00*
Agreed Completion Date: *7/01/01*
Actual Completion Date:
Delivery Instructions: *Floating: ICW at New Orleans*

Contract Price *$21,000,000*

CUTTING & FORMING

DIRECT MATERIALS (EST. $6,140,000)			DIRECT LABOR (EST. $1,100,000)			OVERHEAD BASED ON # OF LABOR HOURS (EST. $500,000)			OVERHEAD BASED ON # OF MACHINE HOURS (EST. $750,000)		
Date	Source	Amount	Date	Source	Amount	Date	Source	Amount	Date	Source	Amount
6/30	MR #340 MR #355	$1,982	6/30	payroll	$310	6/30	payroll	$155	6/30	Machine hour meters	$135

WELDING & ASSEMBLY
(SAME FORMAT AS ABOVE BUT WITH DIFFERENT OH RATES)

PAINTING & FINISHING
(SAME FORMAT AS ABOVE BUT WITH DIFFERENT OH RATES)

SUMMARY (THOUSANDS OF DOLLARS)

	CUTTING & FORMING		WELDING & ASSEMBLY		PAINTING & FINISHING	
	Actual	Budget	Actual	Budget	Actual	Budget
Direct materials	*$6,056*	*$6,140*	*$1,134*	*$1,200*	*$ 380*	*$ 400*
Direct labor	*1,010*	*1,100*	*2,120*	*2,100*	*650*	*700*
Overhead (labor)	*460*	*500*	*420*	*400*	*430*	*450*
Overhead (machine)	*763*	*750*	*479*	*520*	*381*	*370*
Totals	*$8,289*	*$8,490*	*$4,153*	*$4,220*	*$1,841*	*$1,920*

	Actual	Budget
Final Costs: Cutting & Forming	*$ 8,289*	*$ 8,490*
Welding & Assembly	*4,153*	*4,220*
Painting & Finishing	*1,841*	*1,920*
Totals	*$14,283*	*$14,630*

EXHIBIT 5–7

Island Marine's Completed Job Order Cost Sheet

standard costs for direct material and direct labor can minimize the effects of such cost fluctuations in the same way that predetermined rates do for overhead costs.

standard cost system

A **standard cost system** determines product cost by using, in the inventory accounts, predetermined norms for prices and/or quantities of component elements. After production is complete, the standard production cost is compared to the actual production cost to determine the efficiency of the production process. A difference between the actual quantity, price, or rate and its related standard is called a **variance**.

variance

Standards can be used in a job order system only if a company typically engages in jobs that produce fairly similar products. One type of standard job order costing system uses standards only for input prices of material and/or rates for labor. This process is reasonable if all output relies on basically the same kinds of material and/or labor. If standards are used for price or rate amounts only, the debits to Work in Process Inventory become a combination of actual and standard information: actual quantities at standard prices or rates.

Jones Brothers, a house-painting company located in Indiana, illustrates the use of price and rate standards. Management has decided that, because of the climate, one specific brand of paint (costing $30 per gallon) is the best to use. Painters employed by the company are paid $12 per hour. These two amounts can be used as price and rate standards for Jones Brothers. No standards can be set for the quantity of paint that will be used on a job, or the amount of time the job will require, because those items will vary with the quantity and texture of wood on the structure and the size of the structure being painted.

Assume that Jones Brothers paints a house requiring 50 gallons of paint and 80 hours of labor time. The standard paint and labor costs, respectively, are $1,500 (50 × $30) and $960 (80 × $12). Assume Jones Brothers bought the paint when it was on sale, so the actual price paid was $27 per gallon or a total of $1,350. Comparing this price to the standard results in a $150 favorable material price variance (50 gallons at $3 per gallon). If the actual labor rate paid to painters was $11 per hour, there would be an $80 favorable (80 hours at $1 per hour) labor rate variance.

Other job order companies produce output that is homogeneous enough to allow standards to be developed for both quantities and prices for material and labor. Such companies usually use distinct production runs for numerous similar products. In such circumstances, the output is homogeneous for each run, unlike the heterogeneous output of Jones Brothers.

Green Manufacturing, Inc., is a job order manufacturer that uses both price and quantity material and labor standards. Green manufactures wooden flower boxes that are retailed through several chains of garden supply stores. The boxes are contracted for on a job order basis, because the retailing chains tend to demand changes in style, color, and size with each spring gardening season. Green produces the boxes in distinct production runs each month for each retail chain. Price and quantity standards for direct material and direct labor have been established and are used to compare the estimated and actual costs of monthly production runs for each type of box produced.

The standards set for boxes sold to Mountain Gardens are as follows:

8 linear feet of 1" × 10" redwood plank at $0.60 per linear foot
1.4 direct labor hours at $9 per direct labor hour

In June, 2,000 boxes were produced for Mountain Gardens. Actual wood used was 16,300 linear feet, which was purchased at $0.58 per linear foot. Direct labor employees worked 2,700 hours at an average labor rate of $9.10.

From this information, it can be concluded that Green used 300 linear feet of redwood above the standard quantity for the job [16,300 − (8 × 2,000)]. This usage causes an unfavorable material quantity variance of $180 at the $0.60 standard price ($0.60 × 300 linear feet). The actual redwood used was purchased at $0.02 below the standard price per linear foot, which results in a $326 ($0.02 × 16,300) favorable material price variance.

The actual DLHs used were 100 less than standard [2,700 − (1.4 hours × 2,000)], which results in a favorable labor quantity variance of $900 ($9 standard rate × 100 hours). The work crew earned $0.10 per hour above standard, which translates to a $270 unfavorable labor rate variance ($0.10 × 2,700). A summary of variances follows:

Direct material quantity variance	$ 180	unfavorable
Direct material price variance	(326)	favorable
Direct labor quantity variance	(900)	favorable
Direct labor rate variance	270	unfavorable
Net variance (cost less than expected)	$(776)	favorable

From a financial perspective, Green controlled its total material and labor costs well on the Mountain Garden job.

Variances can be computed for actual-to-standard differences regardless of whether standards have been established for both quantities and prices or for prices/rates only. Standard costs for material and labor provide the same types of benefits as predetermined overhead rates: more timely information and comparisons against actual amounts.

A predetermined overhead rate is, in essence, a type of standard. It establishes a constant amount of overhead assignable as a component of product cost and eliminates any immediate need for actual overhead information in the calculation of product cost. More is presented on standards and variances in Chapter 10.

Standard cost job order systems are reasonable substitutes for actual or normal costing systems as long as the standard cost systems provide managers with useful information. Any type of product costing system is acceptable in practice if it is effective and efficient in serving the company's unique production needs, provides the information desired by management, and can be implemented at a cost that is reasonable when compared to the benefits to be received. These criteria apply equally well to both manufacturers and service companies.

JOB ORDER COSTING TO ASSIST MANAGERS

8

How does information from a job order costing system support management decision making?

Managers are interested in controlling costs in each department as well as for each job. Actual direct material, direct labor, and factory overhead costs are accumulated in departmental accounts and are periodically compared to budgets so that managers can respond to significant deviations. Transactions must be recorded in a consistent, complete, and accurate manner to have information on actual costs available for periodic comparisons. Managers may stress different types of cost control in different types of businesses.

The major difference in job order costing for a service organization and a manufacturing firm is that most service organizations use an insignificant amount of materials relative to the value of labor for each job. In such cases, direct material may be treated (for the sake of convenience) as part of overhead rather than accounted for separately. A few service organizations, such as in the medical industry, may use some costly materials.

Accountants in some service companies may trace only direct labor to jobs and allocate all other production costs. These cost allocations may be accomplished most effectively by using a predetermined rate per direct labor hour, or per direct labor dollar. Other cost drivers may also be used as possible overhead allocation bases.

Knowing the costs of individual jobs allows managers to better estimate future job costs and establish realistic bids and selling prices. The use of budgets and standards in a job order costing system provides information against which actual costs can be compared at regular time intervals for control purposes. These comparisons can also furnish some performance evaluation information. The following two examples demonstrate the usefulness of job order costing to managers.

Custom Systems: An Illustration of Job Costing Information

Custom Systems is an engineering firm that specializes in concrete structures. The firm has a diverse set of clients and types of jobs. Josh Bradley is the founder and president. Mr. Bradley wants to know which clients are the most profitable and which

Periodically comparing actual to budgeted costs for a job will help managers engage in ongoing cost control activities. Waiting to make such a comparison until job completion provides information that can impact future jobs, but not the one just finished.

are the least profitable. To determine this information, he requested a breakdown of profits per job measured on both a percentage and an absolute dollar basis.

Mr. Bradley discovered that the company did not maintain records of costs per client-job. Costs had been accumulated only by type—travel, entertainment, and so forth. Ms. Tobias, the sales manager, was certain that the largest profits came from the company's largest accounts. A careful job cost analysis found that the largest accounts contributed the most revenue to the firm, but the smallest percentage and absolute dollars of incremental profits. Until the president requested this information, no one had totaled the costs of recruiting each client or the travel, entertainment, and other costs associated with maintaining each client.

A company that has a large number of jobs that vary in size, time, or effort may not know which jobs are responsible for disproportionately large costs. Job order costing can assist in determining which jobs are truly profitable and can help managers to better monitor costs. As a result of the cost analysis, Mr. Bradley changed the company's marketing strategy. The firm began concentrating its efforts on smaller clients who were located closer to the primary office. These efforts caused profits to substantially increase because significantly fewer costs were incurred for travel and entertainment. A job order costing system was implemented to track the per-period and total costs associated with each client. Unprofitable accounts were dropped, and account managers felt more responsibility to monitor and control costs related to their particular accounts.

Monihan's Boatworks

Monihan's Boatworks manufactures three types of boats to customer specifications.[8] Before job order costing was instituted, the managers had no means of determining

[8] This example is based on an article by Leonard A. Robinson and Loudell Ellis Robinson, "Steering a Boat Maker Through Cost Shoals," *Management Accounting* (January 1983), pp. 60–66.

the costs associated with the production of each type of boat. When a customer provided yacht specifications and asked what the selling price would be, managers merely estimated costs in what they felt was a reasonable manner. In fact, during the construction process, no costs were assigned to Work in Process Inventory; all production costs were sent to Finished Goods Inventory.

After implementing a job order costing system, Monihan's Boatworks had better control over its inventory, better inventory valuations for financial statements, and better information with which to prevent part stockouts (not having parts in inventory) and production stoppages. The job order costing system provided managers with information on what work was currently in process and at what cost. From this information, they were better able to judge whether additional work could be accepted and when current work would be completed. Because job order costing assigns costs to Work in Process Inventory, balance sheet figures were more accurate. As material was issued to production, the use of material requisition forms produced inventory records that were more current and reflective of raw material quantities on hand. Finally, the use of a job order costing system gave managers an informed means by which to estimate costs and more adequately price future jobs.

Whether an entity is a manufacturer or service organization that tailors its output to customer specifications, company management will find that job order costing techniques will help in the managerial functions. This cost system is useful for determining the cost of goods produced or services rendered in companies that are able to attach costs to specific jobs. As product variety increases, the size of production lots for many items shrinks, and job order costing becomes more applicable. Custom-made goods may become the norm rather than the exception in an environment that relies on flexible manufacturing systems and computer-integrated manufacturing.

REVISITING

Aker Gulf Marine

http://www.akermaritime.no/

Aker Gulf Marine is a relatively young firm having been established in 1991. The firm is typical of many new businesses formed today in that it is a partnership of two larger, older firms: Aker Maritime and Peter Kiewit Sons' Inc. AGM is a successful company competing in a cyclical industry. To keep operations profitable and functioning near capacity, the company must continually find ways to differentiate itself from competitors.

To successfully bid projects, the firm must carefully monitor and control costs. In part, this requires managers to achieve high levels of quality, minimize waste and scrapped materials, utilize recycled materials, and maintain a clean, safe work environment. Safety is a crucial issue both from a cost and personnel perspective because risks of injury to employees is inherently high in rig construction. The company has implemented several successful programs to involve employees in safety and quality training.

AGM has also invested heavily in capital equipment to leverage technology. Recently the firm built a facility to house certain production operations, such as painting, that are sensitive to weather effects. Also, the company has built a massive, specialized lifting device that dominates the Corpus Christi Bay skyline. This lifting device is capable of moving 4,800-ton product components from the land-based construction yard to the firm's dockage on the intracoastal waterway.

Today, AGM's products can be found offshore in the Gulf of Mexico, West Africa, and South America.

SOURCES: Discussions with company personnel; Anonymous, "Aker Gulf Marine," http://www.hartpub.com/wallmaps/rampow/aker.htm.

CHAPTER SUMMARY

A cost accounting system should be compatible with the manufacturing environment in which it is used. Job order costing and process costing are two traditional cost accounting systems. Job order costing is used in companies that make a limited quantity of products or provide a limited number of services uniquely tailored to customer specifications. This system is especially appropriate and useful for many service businesses, such as advertising, legal, and architectural firms. Process costing is appropriate in production situations in which large quantities of homogeneous products are manufactured on a continuous flow basis.

A job order costing system considers the "job" as the cost object for which costs are accumulated. A job can consist of one or more units of output, and job costs are accumulated on a job order cost sheet. Job order cost sheets for uncompleted jobs serve as the Work in Process Inventory subsidiary ledger. Cost sheets for completed jobs not yet delivered to customers constitute the Finished Goods Inventory subsidiary ledger, and cost sheets for completed and sold jobs compose the Cost of Goods Sold subsidiary ledger.

In an actual or a normal cost job order system, direct material and direct labor are traced, respectively, using material requisition forms and employee time sheets, to individual jobs in process. Service companies may not attempt to trace direct material to jobs, but instead consider the costs of direct material to be part of overhead. Tracing is not considered necessary when the materials cost is insignificant in relation to the job's total cost.

Technology is playing an increasing role in aiding the management of jobs and in tracking job costs. Even basic accounting software typically has a job costing module. By automating the data entry processes, more accurate and timely data are gathered and employees are relieved of the recurring burden of logging data. The latest technology being adopted in job shops is project management software. These programs allow operational and financial data about jobs to be shared throughout the firm. Intranets are being created to facilitate the dissemination of this information.

In an actual cost system, actual overhead is assigned to jobs. More commonly, however, a normal costing system is used in which overhead is applied using one or more predetermined overhead rates multiplied by the actual activity base(s) incurred. Overhead is applied to Work in Process Inventory at the end of the month or when the job is complete, whichever is earlier.

Standard costing can be utilized in a job shop environment. Standards may be established both for the quantities of production inputs and the prices of those inputs. By using standard costs rather than actual costs, managers have a basis for evaluating the efficiency of operations. Differences between actual costs and standard costs are captured in variance accounts. By analyzing the variances, managers gain an understanding of the factors that cause costs to differ from the expected amounts. Standard costing is most easily adopted in job shops that routinely produce batches of similar products.

Job order costing assists management in planning, controlling, decision making, and evaluating performance. It allows managers to trace costs associated with specific current jobs to better estimate costs for future jobs. Additionally, managers using job order costing can better control the costs associated with current production, especially if comparisons with budgets or standards are used. Attachment of costs to jobs is also necessary to price jobs that are contracted on a cost-plus basis. Last, because costs are accumulated by jobs, managers can more readily determine which jobs or types of jobs are most profitable to the organization.

KEY TERMS

cost-plus contract (p. 181)
employee time sheet (p. 179)
intranet (p. 184)
job (p. 176)
job order cost sheet (p. 179)
job order costing system (p. 174)
material requisition form (p. 178)
process costing system (p. 174)
standard cost system (p. 188)
variance (p. 188)

SOLUTION STRATEGIES

Basic Journal Entries in a Job Order Costing System

Raw Material Inventory	XXX	
Accounts Payable		XXX
To record the purchase of raw materials.		
Work in Process Inventory—Dept. (Job #)	XXX	
Manufacturing Overhead	XXX	
Raw Material Inventory		XXX
To record the issuance of direct and indirect materials requisitioned for a specific job.		
Work in Process Inventory—Dept. (Job #)	XXX	
Manufacturing Overhead	XXX	
Wages Payable		XXX
To record direct and indirect labor payroll for production employees.		
Manufacturing Overhead	XXX	
Various accounts		XXX
To record the incurrence of actual overhead costs. (Account titles to be credited must be specified in an actual journal entry.)		
Work in Process Inventory—Dept. (Job #)	XXX	
Manufacturing Overhead		XXX
To apply overhead to a specific job. (This may be actual OH or OH applied using a predetermined rate. Predetermined OH is applied at job completion or end of period, whichever is earlier.)		
Finished Goods Inventory (Job #)	XXX	
Work in Process Inventory		XXX
To record the transfer of completed goods from WIP to FG.		
Accounts Receivable	XXX	
Sales		XXX
To record the sale of goods on account.		
Cost of Goods Sold	XXX	
Finished Goods Inventory		XXX
To record the cost of the goods sold.		

DEMONSTRATION PROBLEM

Advanced Exploration is a newly formed firm that conducts marine research in the Gulf of Mexico for contract customers. Organizationally, the firm is composed of two departments: Offshore Operations and Lab Research. The Offshore Operations

Department is responsible for gathering test samples and drilling operations on the ocean floor. The Lab Research Department is responsible for analysis of samples and other data gathered by Offshore Operations.

In its first month of operations (March 2001), Advanced Exploration obtained contracts for three research projects:

Job 1: Drill, collect, and analyze samples from 10 sites for a major oil company.
Job 2: Collect and analyze samples for specific toxins off the coast of Louisiana for the U.S. government.
Job 3: Evaluate 12 existing offshore wells for the presence of oil seepage for a major oil company.

Advanced Exploration contracts with its customers on a cost-plus basis; that is, the price charged is equal to costs plus a profit equal to 10 percent of costs. The firm uses a job order costing system based on normal costs. Overhead is applied in the Offshore Operations Department at the predetermined rate of $2,000 per hour of research vessel use (RVH). In the Lab Research Department, overhead is applied at the predetermined rate of $45 per professional labor hour (PLH). For March 2001, significant transactions are summarized here:

1. Materials and test components were purchased on account: $110,000.
2. Materials were requisitioned for use in the three research projects by the Offshore Operations Department (all of these materials are regarded as direct): Job #1—$40,000; Job #2—$28,000; and Job #3—$10,000. Materials were issued to the Lab Research Department: Job #1—$8,000; Job #2—$6,000; and Job #3—$4,500.
3. The time sheets and payroll summaries indicated the following direct labor costs were incurred:

	Offshore Operations	Lab Research
Job #1	$60,000	$56,000
Job #2	50,000	20,000
Job #3	45,000	16,000

4. Indirect research costs were incurred in each department:

	Offshore Operations	Lab Research
Labor	$120,000	$10,000
Utilities/Fuel	290,000	5,000
Depreciation	330,000	80,000

5. Overhead was applied based on the predetermined overhead rates in effect in each department. Offshore Operations had 360 RVHs (170 RVHs on Job #1; 90 RVHs on Job #2; and 100 RVHs on Job #3), and Lab Research worked 2,300 PLHs (1,400 PLHs on Job #1; 500 PLHs on Job #2; and 400 PLHs on Job #3) for the year.
6. Job #1 was completed and cash was collected for the agreed-on price of cost plus 10 percent. At the end of the month, Jobs #2 and #3 were only partially complete.
7. Any underapplied or overapplied overhead is assigned to Cost of Goods Sold.

Required:

a. Record the journal entries for transactions 1 through 7.
b. As of the end of March 2001, determine the total cost assigned to Jobs #2 and #3.

Solution to Demonstration Problem

a. 1. Raw Material Inventory 110,000
Accounts Payable 110,000
To record purchase of materials.

2. WIP Inventory—Offshore Operations (Job #1)	40,000	
WIP Inventory—Offshore Operations (Job #2)	28,000	
WIP Inventory—Offshore Operations (Job #3)	10,000	
Raw Material Inventory		78,000
To record requisition and issuance of materials to Offshore Operations.		
WIP Inventory—Lab Research (Job #1)	8,000	
WIP Inventory—Lab Research (Job #2)	6,000	
WIP Inventory—Lab Research (Job #3)	4,500	
Raw Material Inventory		18,500
To record requisition and issuance of materials to Lab Research.		
3. WIP Inventory—Offshore Operations (Job #1)	60,000	
WIP Inventory—Offshore Operations (Job #2)	50,000	
WIP Inventory—Offshore Operations (Job #3)	45,000	
Wages Payable		155,000
To record direct labor costs for Offshore Operations.		
WIP Inventory—Lab Research (Job #1)	56,000	
WIP Inventory—Lab Research (Job #2)	20,000	
WIP Inventory—Lab Research (Job #3)	16,000	
Wages Payable		92,000
To record direct labor costs for Lab Research.		
4. Research Overhead—Offshore Operations	740,000	
Research Overhead—Lab Research	95,000	
Wages Payable		130,000
Utilities/Fuel Payable		295,000
Accumulated Depreciation		410,000
To record indirect research costs.		
5. WIP Inventory—Offshore Operations (Job #1)	340,000	
WIP Inventory—Offshore Operations (Job #2)	180,000	
WIP Inventory—Offshore Operations (Job #3)	200,000	
Research Overhead—Offshore Operations		720,000
To record application of research overhead.		
WIP Inventory—Lab Research (Job #1)	63,000	
WIP Inventory—Lab Research (Job #2)	22,500	
WIP Inventory—Lab Research (Job #3)	18,000	
Research Overhead—Lab Research		103,500
To record application of research overhead.		
6. Finished Goods Inventory*	567,000	
WIP Inventory—Offshore Operations		440,000
WIP Inventory—Lab Research		127,000
To record completion of Job #1.		
Cash	623,700	
Research Revenues**		623,700
To record sale of Job #1.		
Cost of Goods Sold	567,000	
Finished Goods Inventory		567,000
To record cost of sales for Job #1.		
7. Cost of Goods Sold	11,500	
Research Overhead—Lab Research	8,500	
Research Overhead—Offshore Operations		20,000
To assign underapplied and overapplied overhead to cost of goods sold.		

*Job #1 costs = $40,000 + $8,000 + $60,000 + $56,000 + $340,000 + $63,000 = $567,000

**Revenue, Job #1 = $567,000 × 1.10 = $623,700

b.

	Job #2	Job #3
Direct material—Offshore Operations	$ 28,000	$ 10,000
Direct labor—Offshore Operations	50,000	45,000
Research overhead—Offshore Operations	180,000	200,000
Direct material—Lab Research	6,000	4,500
Direct labor—Lab Research	20,000	16,000
Research overhead—Lab Research	22,500	18,000
Totals	$306,500	$293,500

QUESTIONS

1. When a company produces custom products to the specifications of its customers, why should it not aggregate costs across customer orders to determine the prices to be charged?
2. What production conditions are necessary for a company to use job order costing?
3. What is the alternative to the use of a job order costing system? In what type of production environment would this alternative costing system be found?
4. Identify the three valuation methods discussed in the chapter. What are the differences among these methods?
5. In a job order costing system, what is a job?
6. What are the three stages of production of a job? Of what use is cost information pertaining to completed jobs?
7. What are the principal documents used in a job order costing system and what are their purposes?
8. Why is the material requisition form an important document in a company's audit trail?
9. What is a job order cost sheet, and what information does it contain? How do job order cost sheets relate to control accounts for Work in Process, Finished Goods, and Cost of Goods Sold?
10. Of what use to management are job order cost sheets? Why do some job order cost sheets contain columns for both budgeted and actual costs?
11. "Because the costs of each job are included in the job order cost sheet, they do not need to be recorded in the general ledger." Is this statement true or false, and why?
12. Which document in a job order costing system would show the amount of overtime worked by a specific individual? Explain.
13. Is an actual overhead application rate better than a predetermined overhead rate? Why or why not?
14. What creates underapplied or overapplied overhead when applying overhead to jobs?
15. What is the principal difference in job order costing between service and manufacturing firms?
16. How is the cost of goods sold determined in a company that uses job order costing?
17. How are the advancement of technology and the development of new software affecting the accounting function in job order costing systems?
18. Many software companies produce custom programs for computerized accounting applications. Search the Internet and find two or more companies that make software for job order costing (job costing). Read the ads and descriptions of the job order costing software and identify five of the most important capabilities (or modules) that the software company offers. Write one

to two pages describing how these modules might be used in a company that custom manufactures robotic equipment used in manufacturing applications.

19. What differences exist between job order costing based on actual costs and job order costing based on standard costs? Why would a company use a standard cost job order system?

20. If a company produces a given type of product only one time, will standard costing be as useful as if the company continually produces the same type of product? Explain.

21. How does a firm use information on "variances" in a standard costing system to control costs?

22. How can the implementation of a job order costing system help improve managerial decision making?

EXERCISES

23. *(Classifying)* For each of the following firms, determine whether it is more likely to use job order or process costing. This firm

- **a.** does custom printing.
- **b.** manufactures paint.
- **c.** is involved in landscape architecture.
- **d.** is an automobile repair shop.
- **e.** provides public accounting services.
- **f.** manufactures hair spray and hand lotion.
- **g.** is a hospital.
- **h.** cans vegetables and fruits.
- **i.** designs custom software.
- **j.** provides property management services for a variety of real estate developments.

24. *(Journal entries)* Olson Inc. produces custom-made floor tiles. During June 2001, the following information was obtained relating to operations and production:

1. Direct material purchased on account, $85,000.
2. Direct material issued to jobs, $81,900.
3. Direct labor hours incurred, 1,700. All direct factory employees were paid $18 per hour.
4. Actual factory overhead costs incurred for the month totaled $41,100. This overhead consisted of $9,000 of supervisory salaries, $17,500 of depreciation charges, $3,600 of insurance, $6,250 of indirect material, and $4,750 of utilities. Salaries, insurance, and utilities were paid in cash, and indirect material was removed from the supplies account.
5. Overhead is applied to production at the rate of $25 per direct labor hour. The beginning balances of Raw Material Inventory and Work in Process Inventory were $4,150 and $11,150, respectively. The ending balance in Work in Process Inventory was $2,350.

- **a.** Prepare journal entries for the above transactions.
- **b.** Determine the balances in Raw Material Inventory and Work in Process Inventory at the end of the month.
- **c.** Determine the cost of the goods completed during June. If 5,000 similar units were completed, what was the cost per unit?
- **d.** What is the amount of underapplied or overapplied overhead at the end of June?

25. *(Journal entries; cost flows)* U Store It produces customized storage buildings that serve the midwest U.S. market. For February 2001, the company incurred the following costs:

Direct material purchased on account		$19,000
Direct material used for jobs		
Job #217	$11,200	
Job #218	1,800	
Other jobs	13,400	26,400
Direct labor costs for month		
Job #217	$ 2,600	
Job #218	3,500	
Other jobs	4,900	11,000
Actual overhead costs for February		18,900

The February beginning balance in Work in Process Inventory was $4,200, which consisted of $2,800 for Job #217 and $1,400 for Job #218. The February beginning balance in Direct Material Inventory was $12,300.

Actual overhead is applied to jobs on the basis of direct labor cost. Job #217 was completed and transferred to finished goods during February. It was then sold for cash at 140 percent of cost.

a. Prepare journal entries to record the above information.
b. Determine the February ending balance in Work in Process Inventory and the amount of the balance related to Job #218.

26. *(Cost flows)* Custom Landscapes began operations on March 1, 2001. Its Work in Process Inventory account on March 31 appeared as follows:

Work in Process Inventory

Direct material	554,400	Cost of completed jobs	??
Direct labor	384,000		
Applied overhead	345,600		

The company applies overhead on the basis of direct labor cost. Only one job was still in process on March 31. That job had $132,600 in direct material and $93,600 in direct labor cost assigned to it.

a. What was the predetermined overhead application rate?
b. How much cost was transferred out for jobs completed during March?

27. *(Normal versus actual costing)* For fiscal year 2001, Lazlow Metalworks estimated it would incur total overhead costs of $1,200,000 and work 40,000 machine hours. During January 2001, the company worked exclusively on one job, Job #1211. It incurred January costs as follows:

Direct material usage		$121,000
Direct labor (1,400 hours)		30,800
Manufacturing overhead:		
Rent	$11,200	
Utilities	15,200	
Insurance	32,100	
Labor	15,500	
Depreciation	23,700	
Maintenance	10,800	
Total OH		108,500

Machine hours worked in January: 3,400

a. Assuming the company uses an actual cost system, compute the January costs assigned to Job #1211.
b. Assuming the company uses a normal cost system, compute the January costs assigned to Job #1211.
c. What is the major factor driving the difference between your answers in parts (a) and (b)?

28. *(Cost flows)* Integrated Solutions manufactures hardware for local-area networks. The firm applies overhead to jobs at a rate of 120 percent of direct labor cost. On December 31, 2001, a flood destroyed many of the firm's computerized cost records. Only the following information for 2001 was available from the records:

Direct Material Inventory

Beg. bal.	6,150		
Purchases	?		?
	2,050		

Work in Process Inventory

Beg. bal.	14,000		
Direct mat.	?		?
Direct labor	45,000		
Overhead			
	12,000		

Finished Goods Inventory

Beg. bal.	22,500		
Goods completed	?		342,500
	21,000		

Cost of Goods Sold

		?	

As the accountant of Integrated Solutions, you must find the following:

a. Cost of goods sold for the year.
b. Cost of goods completed during the year.
c. Cost of direct material used during the year.
d. Amount of applied factory overhead during the year.
e. Cost of direct material purchased during the year.

29. *(Departmental overhead rates)* Ashford Paving Company uses a predetermined overhead rate to apply overhead to jobs, and the company employs a job order costing system. Overhead is applied to jobs in the Mixing Department based on the number of machine hours used, whereas Paving Department overhead is applied on the basis of direct labor hours. In December 2000, the company estimated the following data for its two departments for 2001:

	Mixing Department	Paving Department
Direct labor hours	1,000	3,500
Machine hours	7,500	1,500
Budgeted overhead cost	$60,000	$98,000

a. Compute the predetermined overhead rate that should be used in each department of the Ashford Paving Company.
b. Job #116 was started and completed during March 2001. The job cost sheet shows the following information:

	Mixing Department	Paving Department
Direct material	$5,800	$700
Direct labor cost	$60	$525
Direct labor hours	12	60
Machine hours	80	22

c. Compute the overhead applied to Job #116 for each department and in total.
d. If the company had computed a companywide rate for overhead rather than departmental rates, do you feel that such a rate would be indicative of the actual overhead cost of each job? Explain.

30. *(Job cost and pricing)* Jason Hart is an attorney who employs a job order costing system related to his client engagements. Hart is currently working on a case for Janice Keene. During the first four months of 2001, Hart logged 85 hours on the Keene case.

In addition to direct hours spent by Hart, his secretary has worked 14 hours typing and copying 126 pages of documents related to the Keene case. Hart's secretary works 160 hours per month and is paid a salary of $1,800 per month. The average cost per copy is $0.04 for paper, toner, and machine rental. Telephone charges for long-distance calls on the case totaled $165.50. Last, Hart has estimated that total office overhead for rent, utilities, parking, and so on, amount to $7,200 per month and that, during a normal month, he is at the office 120 hours.

a. Hart feels that his time, at a minimum, is worth $40 per hour, and he wishes to cover all direct and allocated indirect costs related to a case. What minimum charge per hour (rounded to the nearest dollar) should Hart charge Keene? (*Hint:* Include office overhead.)

b. All the hours that Hart spends at the office are not necessarily billable hours. In addition, Hart did not take into consideration certain other expenses such as license fees, country club dues, automobile costs, and other miscellaneous expenses, when he determined the amount of overhead per month. Therefore, to cover nonbillable time as well as other costs, Hart feels that billing each client for direct costs plus allocated indirect costs plus 50 percent margin on his time and overhead is reasonable. What will Hart charge Keene in total for the time spent on her case?

31. *(Underapplied or overapplied overhead)* For 2001, Ainsworth Rafter Co. applied overhead to jobs using a predetermined overhead rate of $23.20 per machine hour. This rate was derived by dividing the company's total budgeted overhead of $556,800 by the 24,000 machine hours anticipated for the year.

At the end of 2001, the company's manufacturing overhead control account had debits totaling $562,600. Actual machine hours for the year totaled 24,900.

a. How much overhead should be debited to Work in Process Inventory for 2001?

b. Is overhead underapplied or overapplied and by how much?

c. Job #47 consumed 750 machine hours during 2001. How much overhead should be assigned to this job for the year?

d. Describe the disposition of the underapplied or overapplied overhead determined in part (b).

32. *(Assigning costs to jobs)* Westside Racing uses a job order costing system in which overhead is applied to jobs at a predetermined rate of $2.20 per direct labor dollar. During April 2001, the company spent $13,900 on direct labor related to Job #344. In addition, the company incurred direct material costs of $24,800 on this job during the month. Budgeted factory overhead for the company for the year was $660,000.

a. Give the journal entry to apply overhead to all jobs if April's total direct labor cost was $30,100.

b. How much overhead from part (a) was assigned to Job #344?

c. If Job #344 had a balance of $14,350 on April 1, what was the balance on April 30?

d. Demonstrate how the company arrived at the predetermined overhead rate. Include the amount of budgeted direct labor costs for the year in your answer.

33. *(Assigning costs to jobs, cost flows)* Martha's Interiors, an interior decorating firm, uses a job order costing system and applies overhead to jobs using a predetermined rate of 60 percent of direct labor cost. At the beginning of June

2002, Job #918 was the only job in process. Costs of Job #918 included direct material of $16,500, direct labor of $2,400, and applied overhead of $1,440. During June, the company began work on Jobs #919, #920, and #921 and purchased and issued $34,700 of direct material. Direct labor cost for the month totaled $12,600. Job #920 had not been completed at the end of June, and its direct material and direct labor charges were $6,700 and $1,300, respectively. All the other jobs were completed in June.

a. What was the total cost of Job #920 as of the end of June 2002?
b. What was the cost of goods manufactured for June 2002?
c. If actual overhead for June was $8,700, was the overhead underapplied or overapplied for the month? By how much?

34. *(Assigning costs to jobs)* Ace Show is an advertising consultant. Recently, he has been working with his accountant to develop a formal accounting system. His accountant has suggested the use of a job order costing system to simplify costing procedures. During September, Ace and his staff worked on jobs for the following companies:

	Angston Company	Westside Manufacturing	Randall Inc.
Direct material cost	$4,500	$8,100	$9,600
Direct labor cost	$1,800	$9,450	$20,250
Number of ads designed	5	10	15

Ace is able to trace direct material to each job because most of the cost associated with material is related to photography and duplicating. The accountant has told Joe that a reasonable charge for overhead, based on previous information, is $55 per direct labor hour. The normal labor cost per hour is $45.

a. Determine the total cost for each of the advertising accounts for the month.
b. Determine the cost per ad developed for each client.
c. Ace has been charging $4,500 per ad developed. What was his net income for the month, if actual overhead for the month was $40,000?
d. Do you have any suggestions for Ace about the way he bills his clients for developing ads?

35. *(Standard costing)* Corner Kopy, Inc., incurred the following direct material costs in November 2002 for high-volume routine print jobs:

Actual unit purchase price	$0.015 per sheet
Quantity purchased in November	480,000 sheets
Quantity used in November	480,000 sheets
Standard quantity allowed for good production	460,000 sheets
Standard unit price	$0.017 per sheet

Calculate the material price variance and the material quantity variance.

36. *(Standard costing)* Carolina Mfg. uses a standard cost system. The company experienced the following results related to direct labor in December 2002:

Actual hours worked	45,500
Actual direct labor rate	$9.25
Standard hours allowed for production	44,200
Standard direct labor rate	$9.75

a. Calculate the total actual payroll.
b. Determine the labor rate variance.
c. Determine the labor quantity variance.

37. *(Standard costing)* Gone To The Birds employs a job order costing system based on standard costs. For one of its products, a small teak-rimmed concrete bird bath (Product No. 17), the standard costs per unit are as follows:

Direct material	$10
Direct labor	18
Manufacturing overhead	15

a. Record the journal entry for the transfer of direct material into production for 800 units of Product No. 17.
b. Compute the total cost assigned to the 800 units of Product No. 17, and record the journal entry to recognize the completion of the 800 units.
c. Record the journal entries associated with the sale of the 800 units of Product No. 17 for $44,300.

38. *(Cost control)* Baltimore Fabricated Steel Products Company produces a variety of steel drums that are used as storage containers for various chemical products. One of the products the firm produces is a 55-gallon drum. In the past year, the company produced this drum on four separate occasions for four different customers. Some financial details of each of the four orders follow.

Date	Job No.	Quantity	Bid Price	Budgeted Cost	Actual Cost
Jan. 17	2118	30,000	$150,000	$120,000	$145,000
Mar. 13	2789	25,000	125,000	100,000	122,000
Oct. 20	4300	40,000	200,000	160,000	193,000
Dec. 3	4990	35,000	175,000	140,000	174,000

Baltimore Fabricated Steel Products Company uses a job order costing system and obtains jobs based on competitive bidding. For each project, a budget is developed. As the controller of the company, write a memo to company management describing any problems that you perceive in the data presented and steps to be taken to eliminate the recurrence of these problems.

39. *(Production and marketing environment) When it comes to tortillas, Americans and Mexicans have distinctly different tastes. Americans are content to purchase mass-produced, prepackaged tortillas from their local grocery stores. Regional and national brands dominate sales. In Mexico, more than 95 percent of all tortillas are sold in little shops licensed by the government. These outlets, many grinding tortillas on hand-powered conveyor belts, are virtual monopolies in their neighborhoods, with a captive market that so far has resisted modern sales efforts.*

Assume that you are involved in developing a strategy for your employer, a U.S. food company, to produce tortillas. You are considering competing in both the United States and Mexico. Write a brief report recommending how your company should produce and market tortillas in each country. Also, describe the product costing system that you would recommend for each country.

SOURCE: Adapted from Joel Millman, "Mexican Tortilla Firms Stage U.S. Bake-Off," *The Wall Street Journal* (May 10, 1996), p. A6.

40. *(Cost manipulation) Excel Communications is a direct sales marketer of long-distance phone services. The company earns revenues by selling long-distance services to new subscribers. The company is preparing to "go public" through an initial public offering (IPO) of its stock. As with any IPO, the trick for an investment analyst is to determine the value of the stock.*

One of the controversial valuation issues for Excel is how to treat the costs the firm incurs to obtain subscribers. Excel defers a large portion of the costs it incurs to sign up new subscribers—$85 million in the first two months of 1996 alone. Excel amortizes these costs and revenue over 12 months as a way to "appropriately match revenues and expenses."

SOURCE: Adapted from Jeff D. Opdyke, "Excel's Accounting Methods Raise Red Flags Among IPO Watchers," *The Wall Street Journal* (May 8, 1996), p. T2.

Put yourself into the position of a stock analyst. Write a report for your investor clientele explaining the effect of Excel's accounting methods on its level of reported net income. Be sure to include a discussion of whether this accounting method provides a fair picture of the firm's "economic earnings."

41. *(Cost management) A focus on the customer may lead companies to join forces with erstwhile competitors. "If a customer is looking for a solution to a business problem, then it's quite common for us to work together with a competitor to find that exact solution," says Jim Mavel, CEO and president of Scan-Optics, Inc., a $57 million Manchester, Connecticut, firm that manufactures and supports high-performance scanners, develops software, and offers professional services. "We also sometimes bid against that firm for other projects at the same time."*

http://www.scsinc.com

In some cases, as part of a prearranged deal, Scan-Optics will win a contract and subcontract with a competitor that vied for, but lost, that same deal. In rarer cases, Scan-Optics incorporates a competitor's products or services into a bid for work the competitor is also seeking.

In what may be a glimpse of the complicated business relationships of the future, a company could find itself serving as competitor, supplier, customer, and partner to another firm on an given day, says Barry Nalebuff, Yale University School of Management professor.

In today's complex, intertwined economy, the business-as-war, winner-take-all mindset doesn't cut it, says Nalebuff. Better to get a piece of the pie, he says, than no portion at all.

SOURCE: Harvey Meyer, "My Enemy, My Friend," *Journal of Business Strategy* (Sept.–Oct. 1998), p. 42. © Faulkner & Gray, reprinted with permission.

a. How does the contemporary use of joint ventures and other cooperative arrangements with other firms add complexity to the accounting function for a business managing its costs?

b. Why is it necessary for managers and accountants not to look only inside the firm to manage costs, but to also look outside the firm?

PROBLEMS

42. *(Journal entries)* Sunny Day Awning Company installs awnings on residential and commercial structures. The company had the following transactions for February 2002:

- Purchased $440,000 of building (raw) material on account.
- Issued $370,000 of building (direct) material to jobs.
- Issued $60,000 of building (indirect) material for use on jobs.
- Accrued wages payable of $594,000, of which $474,000 could be traced directly to particular jobs.
- Applied overhead to jobs on the basis of 60 percent of direct labor cost.
- Completed jobs costing $666,000. For these jobs, revenues of $824,000 were collected.

Make all appropriate journal entries for the above transactions. (*Hint:* There is no finished goods inventory.)

43. *(Journal entries)* Canton Refrigeration uses a job order costing system based on actual costs. The following transactions relate to a single period in which the beginning Direct Material Inventory was $10,000, Work in Process Inventory was $25,000, and Finished Goods Inventory was $21,000.

- Direct material purchases on account were $70,000.
- Direct labor cost for the period totaled $75,500 for 8,000 direct labor hours.
- Actual overhead costs were $72,000.

- Actual overhead is applied to production based on direct labor hours.
- The ending inventory of Direct Material Inventory was $3,000.
- The ending inventory of Work in Process Inventory was $10,500.
- Of the goods finished during the period, goods costing $95,000 were sold for $133,000.

Prepare all journal entries for the above transactions and determine the ending balance in Finished Goods Inventory.

44. *(Journal entries, assigning costs to jobs)* Alpha Mechanical uses a job order costing system. On September 1, 2002, the company had the following account balances:

Raw Material Inventory	$ 332,400
Work in Process Inventory	1,056,300
Cost of Goods Sold	4,732,000

Work in Process Inventory is the control account for the job cost subsidiary ledger. On September 1, the three accounts in the job cost ledger had the following balances:

Job #75	$593,200
Job #78	316,800
Job #82	146,300

The following transactions occurred during September:

Sept. 1 Purchased $940,000 of raw material on account.

4 Issued $950,000 of raw material as follows: Job #75, $43,800; Job #78, $227,800; Job #82, $396,600; Job #86, $256,200; indirect material, $25,600.

15 Prepared and paid the factory payroll for Sept. 1–15 in the amount of $368,500. Analysis of the payroll for Sept. 1–15 reveals the following information as to where labor effort was devoted:

Job #75	4,430 hours	$ 44,300
Job #78	11,160 hours	111,600
Job #82	12,150 hours	121,500
Job #86	5,540 hours	55,400
Indirect wages		35,700

16 Alpha Mechanical applies manufacturing overhead to jobs at a rate of $7.50 per direct labor hour each time the payroll is made.

16 Job #75 was completed and accepted by the customer and billed at a selling price of cost plus 25 percent.

20 Paid the following monthly factory bills: utilities, $17,200; rent, $38,300; and accounts payable (accrued in August), $91,000.

24 Purchased raw material on account, $412,000.

25 Issued raw material as follows: Job #78, $74,400; Job #82, $108,300; Job #86, $192,500; and indirect material, $27,200.

30 Recorded additional factory overhead costs as follows: depreciation, $206,500; expired prepaid insurance, $35,100; and accrued taxes and licenses, $13,000.

30 Recorded the gross salaries and wages for the factory payroll for Sept. 16–30 of $357,200. Analysis of the payroll follows:

Job #78	8,840 hours	$ 88,400
Job #82	11,650 hours	116,500
Job #86	11,980 hours	119,800
Indirect wages		32,500

30 Applied overhead for the second half of the month to jobs.

a. Prepare journal entries for the transactions for September 2002.
b. Use T-accounts to post the information from the journal entries in part (a) to the job cost subsidiary accounts and to general ledger accounts.
c. Reconcile the September 30 balances in the subsidiary ledger with the Work in Process Inventory account in the general ledger.
d. Determine the amount of underapplied or overapplied overhead for September.

45. *(Journal entries, cost flows)* Specialty Components began 2002 with three jobs in process:

	TYPE OF COST			
Job No.	Direct Material	Direct Labor	Overhead	Total
247	$ 77,200	$ 91,400	$ 34,732	$ 203,332
251	176,600	209,800	79,724	466,124
253	145,400	169,600	64,448	379,448
Totals	$399,200	$470,800	$178,904	$1,048,904

During 2002, the following transactions occurred:
1. The firm purchased and paid for $532,000 of raw material.
2. Factory payroll records revealed the following:

- Indirect labor incurred was $54,000.
- Direct labor incurred was $602,800 and was associated with the jobs as follows:

Job No.	Direct Labor Cost
247	$ 17,400
251	8,800
253	21,000
254	136,600
255	145,000
256	94,600
257	179,400

3. Material requisition forms issued during the year revealed the following:

- Indirect material issued totaled $76,000.
- Direct material issued totaled $468,400 and was associated with jobs as follows:

Job No.	Direct Material Cost
247	$ 14,400
251	6,200
253	16,800
254	103,200
255	119,800
256	72,800
257	135,200

4. Overhead is applied to jobs on the basis of direct labor cost. Management budgeted overhead of $240,000 and total direct labor cost of $600,000 for 2002. Actual total factory overhead costs (including indirect labor and indirect material) for the year were $244,400.
5. Jobs #247 through #255 were completed and delivered to customers, C.O.D. The revenue on these jobs was $2,264,774.

a. Prepare journal entries for all of the above events.
b. Determine ending balances for jobs still in process.
c. Determine cost of jobs completed, adjusted for underapplied or overapplied overhead.

46. *(Simple inventory calculation)* Production data for the first week in November 2002 for Illinois Lighting were as follows:

WORK IN PROCESS INVENTORY

	Job No.	Material	Labor	Machine Time (Overhead)
Nov. 1	411	$950	18 hours	25 hours
1	412	620	5 hours	15 hours
7	417	310	4 hours	8 hours

Finished Goods Inventory, Nov. 1: $11,900
Finished Goods Inventory, Nov. 7: $ 0

MATERIAL RECORDS

	Inv. 11/1	Purchases	Issuances	Inv. 11/7
Aluminum	$4,150	$49,150	$29,350	$?
Steel	6,400	13,250	17,100	$?
Other	2,900	11,775	12,950	$?

Direct labor hours worked: 340. Labor cost is $15 per direct labor hour. Machine hours worked: 600; Job #411, 175 hours; Job #412, 240 hours; and Job #417, 185 hours.

Overhead for first week in November:	
Depreciation	$ 4,500
Supervisor salaries	7,200
Indirect labor	4,175
Insurance	1,400
Utilities	1,125
Total	$18,400

Overhead is charged to production at a rate of $30 per machine hour. Underapplied or overapplied overhead is treated as an adjustment to Cost of Goods Sold at year-end. (All company jobs are consecutively numbered, and all work not in ending Finished Goods Inventory has been completed and sold.)

a. Calculate the value of beginning Work in Process Inventory.

b. What is the value at the end of November of (1) the three material accounts, (2) Work in Process Inventory, and (3) Cost of Goods Sold?

47. *(Job cost sheet analysis)* As a candidate for a cost accounting position with Global Construction, you have been asked to take a quiz to demonstrate your knowledge of job order costing. Global's job order costing system is based on normal costs and overhead is applied based on direct labor cost. The following records pertaining to May have been provided to you:

Job No.	Direct Material	Direct Labor	Applied Overhead	Total Cost
167	$ 17,703	$ 6,920	$ 7,960	$ 32,583
169	54,936	7,240	8,328	70,504
170	1,218	2,000	2,300	5,518
171	154,215	28,500	43,700	226,415
172	28,845	2,200	2,532	33,577

To explain the missing job number, you are informed that Job #168 had been completed in April. You are also told that Job #167 was the only job in process at the beginning of May. At that time, the job had been assigned $12,900 for direct material and $3,600 for direct labor. At the end of May, Job #171 had not been completed; all others had. You are to provide answers to the following questions:

a. What is the predetermined overhead rate used by Global Construction?
b. What was the total cost of beginning Work in Process Inventory?
c. What were total direct manufacturing costs incurred for May?
d. What was cost of goods manufactured for May?

48. *(Departmental rates)* The Houston Custom Tile Corporation has two departments: Mixing and Drying. All jobs go through each department, and the company uses a job order costing system. The company applies overhead to jobs based on labor hours in Mixing and on machine hours in Drying. In December 2001, corporate management estimated the following production data for 2002 in setting its predetermined overhead rates:

	Mixing	Drying
Machine hours	7,200	104,000
Direct labor hours	88,000	12,400
Departmental overhead	$374,000	$494,000

Two jobs completed during 2002 were #2296 and #2297. The job order cost sheets showed the following information about these jobs:

	Job #2296	Job #2297
Direct material cost	$4,875	$6,300
Direct labor hours—Mixing	425	510
Machine hours—Mixing	40	45
Direct labor hours—Drying	20	23
Machine hours—Drying	110	125

Direct labor workers are paid $9 per hour in the Mixing Department and $22 per hour in Drying.

a. Compute the predetermined overhead rates used in Mixing and Drying for 2002.
b. Compute the direct labor cost associated with each job for both departments.
c. Compute the amount of overhead assigned to each job in each department.
d. Determine the total cost of Jobs #2296 and #2297.
e. Actual data for 2002 for each department follow. What is the amount of underapplied or overapplied overhead for each department for the year ended December 31, 2002?

	Mixing	Drying
Machine hours	7,400	106,800
Direct labor hours	86,400	12,600
Overhead	$362,000	$512,000

49. *(Comprehensive)* In May 2002, Aztec Construction Company was the successful bidder on a contract to build a pedestrian overpass in Flagstaff, Arizona. The firm utilizes a job order costing system, and this job was assigned Job #515. The contract price for the overpass was $450,000. The owners of Aztec Construction agreed to a completion date of December 15, 2002, for the contract. The firm's engineering and cost accounting departments estimated the following costs for completion of the overpass: $120,000 for direct material, $135,000 for direct labor, and $81,000 for overhead.

The firm began work on the overpass in August. During August, direct material cost assigned to Job #515 was $30,900 and direct labor cost associated with Job #515 was $47,520. The firm uses a predetermined overhead rate of 60 percent of direct labor cost. Aztec Construction also worked on several other jobs during August and incurred the following costs:

Direct labor (including Job #515)	$252,000
Indirect labor	27,900
Administrative salaries and wages	19,800
Depreciation on construction equipment	13,200
Depreciation on office equipment	3,900
Client entertainment (on accounts payable)	5,550
Advertising for firm (paid in cash)	3,300
Indirect material (from supplies inventory)	9,300
Miscellaneous expenses (design related; to be paid in the following month)	5,100
Accrued utilities (for office, $900; for construction, $2,700)	3,600

During August, Aztec Construction completed several jobs that had been in process before the beginning of the month. These completed jobs generated $312,000 of revenues for the company. The related job cost sheets showed costs associated with those jobs of $214,500. At the beginning of August, Aztec Construction had Work in Process Inventory of $135,900.

a. Prepare a job order cost sheet for Job #515, including all job details, and post the appropriate cost information for August.
b. Prepare journal entries for the above information.
c. Prepare a Schedule of Cost of Goods Manufactured for August for Aztec Construction Company.
d. Assuming the company pays income tax at a 40 percent rate, prepare an income statement for August.

50. *(Comprehensive)* Enforcer Inc. designs and manufactures perimeter fencing for large retail and commercial buildings. Each job goes through three stages: design, production, and installation. Three jobs were started and completed during the first week of May 2002. There were no jobs in process at the end of April 2002. Information for the three departments for the first week in May follows:

	DEPARTMENT		
Job #2019	**Design**	**Production**	**Installation**
Direct labor hours	100	NA	70
Machine hours	NA	90	NA
Direct labor cost	$10,200	$ 4,250	$1,260
Direct material	$ 1,200	$14,550	$1,300

Job #2020	**Design**	**Production**	**Installation**
Direct labor hours	85	NA	80
Machine hours	NA	300	NA
Direct labor cost	$8,670	$ 7,450	$1,440
Direct material	$1,025	$33,600	$4,600

Job #2021	**Design**	**Production**	**Installation**
Direct labor hours	90	NA	410
Machine hours	NA	120	NA
Direct labor cost	$9,180	$ 2,950	$1,900
Direct material	$2,200	$29,000	$1,300

Overhead is applied using departmental rates. Design and Installation use direct labor cost as the base, with rates of 40 and 90 percent, respectively. Production uses machine hours as the base, with a rate of $15 per hour.

Actual overhead in the Design Department for the month was $12,200. Actual overhead costs for the Production and Installation Departments were $7,200 and $3,850, respectively.

a. Determine the overhead to be applied to each job. By how much is the overhead underapplied or overapplied in each department? For the company?
b. Assume no journal entries have been made to Work in Process Inventory. Make all necessary entries to both the subsidiary ledger and general ledger accounts.
c. Calculate the total cost for each job.

51. *(Standard costing)* One of the products made by Factory Logistics is a robotic conveyor system. A single model (Model No. 89) accounts for approximately 60 percent of the company's annual sales. Because the company has produced and expects to continue to produce a significant quantity of this model, the company uses a standard costing system to account for Model No. 89 production costs. The company has a separate plant that is strictly dedicated to Model No. 89 production. The standard costs to produce a single unit follow:

Direct material (7,000 pounds)	$14,000
Direct labor 430 hours at $20.00 per hour	8,600
Overhead	19,000
Total standard cost	$41,600

For the 200 units of Model No. 89 produced in 2002, the actual costs were

Direct material (1,500,000 pounds)	$2,900,000
Direct labor (89,200 hours)	1,739,400
Overhead	3,700,000
Total actual cost	$8,339,400

a. Compute a separate variance between actual and standard cost for direct material, direct labor, and manufacturing overhead for the Model No. 89 units produced in 2002.
b. Is the direct material variance found in part (a) driven primarily by the price per pound difference between standard and actual or the quantity difference between standard and actual? Explain.

52. *(Standard costing)* Trailer Solutions uses a job order costing system. During July 2002, the company worked on two production runs of the same product, a trailer hitch component. These units were included in Jobs #918 and #2002. Job #918 consisted of 1,200 units of the product, and Job #2002 contained 2,000 units. The hitch components are made from 1/2" sheet metal. Because the trailer hitch component is a product that is routinely produced for one of Trailer Solution's long-term customers, standard costs have been developed for its production. The standard cost of material for each unit is $4.50; each unit contains six pounds of material. The standard direct labor time per unit is six minutes for workers earning a rate of $20 per hour. The actual costs recorded for each job were as follows:

	Direct Material		Direct Labor	
Job #918	(7,500 pounds)	$5,250	(130 hours)	$2,470
Job #2002	(11,800 pounds)	9,440	(230 hours)	4,255

a. What is the standard cost of each trailer hitch component?
b. What was the total standard cost assigned to each of the jobs?
c. Compute the variances for direct material and for direct labor for each job.
d. Why should variances be computed separately for each job rather than for the aggregate annual trailer hitch component production?

CASES

53. *(Comprehensive; job cost sheet)* The Big Plains Construction Company builds bridges. For the months of October and November 2001, the firm worked exclusively on a bridge spanning the Niobrara River in northern Nebraska. The firm is organized into two departments. The Precast Department builds structural elements of the bridges in temporary plants located near the construction sites. The Construction Department operates at the bridge site and assembles the precast structural elements. Estimated costs for the Niobrara River Bridge for the Precast Department were $150,000 for direct labor, $310,500 for direct material, and $110,000 for overhead. For the Construction Department, estimated costs for the Niobrara River Bridge were $160,000 for direct labor, $50,000 for direct material, and $160,000 for overhead. Overhead is applied on the last day of each month. Overhead application rates for the Precast and Construction Departments are $18 per machine hour and 100 percent of direct labor cost, respectively.

TRANSACTIONS FOR OCTOBER

Oct. 1	$150,000 of material was purchased (on account) for the Precast Department to begin building structural elements. All of the material issued to production, $130,000, was considered direct.
5	Utilities were installed at the bridge site at a total cost of $15,000.
8	Rent was paid for the temporary construction site housing the Precast Department, $4,000.
15	Bridge support pillars were completed by the Precast Department and transferred to the construction site.
20	$30,000 of machine rental expense was incurred by the Construction Department for clearing the bridge site and digging foundations for bridge supports.
24	Additional material costing $285,000 was purchased on account.
31	The company paid the following bills for the Precast Department: utilities, $7,000; direct labor, $45,000; insurance, $6,220; and supervision and other indirect labor costs, $7,900. Departmental depreciation was recorded, $15,200. The company also paid bills for the Construction Department: utilities, $2,300; direct labor,$16,300; indirect labor, $5,700; and insurance, $1,900. Departmental depreciation was recorded on equipment, $8,750.
31	A check was issued to pay for the material purchased on October 1 and October 24.
31	Overhead was applied to production in each department; 2,000 machine hours were worked in the Precast Department in October.

TRANSACTIONS FOR NOVEMBER

Nov. 1	Additional structural elements were transferred from the Precast Department to the construction site. The Construction Department incurred a cash cost of $5,000 to rent a crane.
4	$200,000 of material was issued to the Precast Department. Of this amount, $165,000 was considered direct.
8	Rent of $4,000 was paid in cash for the temporary site occupied by the Precast Department.
15	$85,000 of material was issued to the Construction Department. Of this amount, $40,000 was considered direct.
18	Additional structural elements were transferred from the Precast Department to the construction site.
24	The final batch of structural elements was transferred from the Precast Department to the construction site.
29	The bridge was completed.
30	The company paid final bills for the month in the Precast Department: utilities $15,000; direct labor, $115,000; insurance, $9,350; and supervision and other indirect labor costs, $14,500. Depreciation was recorded, $15,200. The company also paid bills for the Construction Department: utilities, $4,900; direct labor, $134,300; indirect labor, $15,200; and insurance, $5,400. Depreciation was recorded on equipment, $18,350.
30	Overhead was applied in each department. The Precast Department recorded 3,950 machine hours in November.
30	The company billed the state of Nebraska for the completed bridge at the contract price of $1,550,000.

a. Prepare all necessary journal entries for the preceding transactions. For purposes of this problem, it is not necessary to transfer direct material and direct labor from one department into the other.
b. Post all entries to T-accounts.
c. Prepare a job order cost sheet, which includes estimated costs, for the construction of the bridge.

54. *(Comprehensive)* Young Stuff is a manufacturer of furnishings for infants and children. The company uses a job order cost system. Young Stuff's Work in Process Inventory on April 30, 2002, consisted of the following jobs:

Job No.	Items	Units	Accumulated Cost
CBS102	Cribs	20,000	$ 900,000
PLP086	Playpens	15,000	420,000
DRS114	Dressers	25,000	1,570,000

The company's finished goods inventory, carried on a FIFO basis, consists of five items:

Item	Quantity and Unit Cost	Total Cost
Cribs	7,500 units @ $ 64	$ 480,000
Strollers	13,000 units @ $ 23	299,000
Carriages	11,200 units @ $102	1,142,400
Dressers	21,000 units @ $ 55	1,155,000
Playpens	19,400 units @ $ 35	679,000
		$3,755,400

Young Stuff applies factory overhead on the basis of direct labor hours. The company's factory overhead budget for the year ending May 31, 2002, totals $4,500,000, and the company plans to expend 600,000 direct labor hours during this period. Through the first 11 months of the year, a total of 555,000 direct labor hours were worked, and total factory overhead amounted to $4,273,500.

At the end of April, the balance in Young Stuff's Material Inventory account, which includes both raw material and purchased parts, was $668,000. Additions to and requisitions from the material inventory during May included the following:

	Raw Material	Parts Purchased
Additions	$242,000	$396,000
Requisitions:		
Job #CBS102	51,000	104,000
Job #PLP086	3,000	10,800
Job #DRS114	124,000	87,000
Job #STR077 (10,000 strollers)	62,000	81,000
Job #CRG098 (5,000 carriages)	65,000	187,000

During May, Young Stuff's factory payroll consisted of the following:

Job No.	Hours	Cost
CBS102	12,000	$122,400
PLP086	4,400	43,200
DRS114	19,500	200,500
STR077	3,500	30,000
CRG098	14,000	138,000
Indirect	3,000	29,400
Supervision		57,600
		$621,100

The jobs that were completed in and the unit sales for May follow:

Job No.	Items	Quantity Completed
CBS102	Cribs	20,000
PLP086	Playpens	15,000
STR077	Strollers	10,000
CRG098	Carriages	5,000

Items	Quantity Shipped
Cribs	17,500
Playpens	21,000
Strollers	14,000
Dressers	18,000
Carriages	6,000

a. Describe when it is appropriate for a company to use a job order costing system.
b. Calculate the dollar balance in Young Stuff's Work in Process Inventory account as of May 31, 2002.
c. Calculate the dollar amount related to the playpens in Young Stuff's Finished Goods Inventory as of May 31, 2002.
d. Explain the treatment of underapplied or overapplied overhead when using a job order costing system. *(CMA adapted)*

55. *(Missing amounts)* Downstream Manufacturing Company realized too late that it had made a mistake locating its controller's office and its electronic data processing system in the basement. Because of the spring thaw, the Mississippi River overflowed on May 2 and flooded the company's basement. Electronic data storage was beyond retrieval, and the company had not provided off-site storage of data. Some of the paper printouts were located but were badly faded and only partially legible. On May 3, when the river subsided, company accountants were able to assemble the following factory-related data from the debris and from discussions with various knowledgeable personnel. Data about the following accounts were found:

- Raw Material (includes indirect material) Inventory: Balance April 1 was $4,800.
- Work in Process Inventory: Balance April 1 was $7,700.
- Finished Goods Inventory: Balance April 30 was $6,600.
- Total company payroll cost for April was $29,200.
- Accounts payable balance April 30 was $18,000.
- Indirect material used in April cost $5,800.
- Other nonmaterial and nonlabor overhead items for April totaled $2,500.

Payroll records, kept at an across-town service center that processes the company's payroll, showed that April's direct labor amounted to $18,200 and represented 4,400 labor hours. Indirect factory labor amounted to $5,400 in April.

The president's office had a file copy of the production budget for the current year. It revealed that the predetermined manufacturing overhead application rate is based on planned annual direct labor hours of 50,400 and expected factory overhead of $151,200.

Discussion with the factory superintendent indicated that only two jobs remained unfinished on April 30. Fortunately, the superintendent also had copies of the job cost sheets that showed a combined total of $2,400 of direct material and $4,500 of direct labor. The direct labor hours on these jobs totaled 1,072. Both of these jobs had been started during the current period.

A badly faded copy of April's Cost of Goods Manufactured and Sold schedule showed cost of goods manufactured was $48,000, and the April 1 Finished Goods Inventory was $8,400.

The treasurer's office files copies of paid invoices chronologically. All invoices are for raw material purchased on account. Examination of these files revealed that unpaid invoices on April 1 amounted to $6,100; $28,000 of purchases had been made during April; and $18,000 of unpaid invoices existed on April 30.

a. Calculate the cost of direct material used in April.
b. Calculate the cost of raw material issued in April.
c. Calculate the April 30 balance of Raw Material Inventory.
d. Determine the amount of underapplied or overapplied overhead for April.
e. What is the Cost of Goods Sold for April?

REALITY CHECK

56. One of the main points of using a job order costing system is to achieve profitability by charging a price for each job that is proportionate to the related costs. The fundamental underlying concept is that the buyer of the product should be charged a price that exceeds all of the costs related to the job contract—thus the price reflects the cost.

However, there are settings in which the price charged to the consumer does not reflect the costs incurred by the vendor to serve that customer. This is the situation in a recent case heard by the U.S. Supreme Court. The case involves the University of Wisconsin, which charges all students a user fee, then redistributes these fees to student organizations.

The purpose of collecting the fee is to ensure that money is available to support diversity of thought and speech in student organizations. Even unpopular causes were supported so that the students would hear many voices. In total, the fee subsidized about 125 student groups. However, a group of students filed suit claiming that students should not be required to fund causes that are inconsistent with their personal beliefs.

a. In your opinion, how would diversity of thought be affected if a student were allowed to select the organizations that would receive the student's user fee (e.g., as with dues)?
b. Is the University of Wisconsin treating its students ethically by charging them to support student organizations that conflict with students' personal beliefs?

57. In 1995, British steelmaker Ispat purchased Kazakhstan's largest steel plant:

http://www.inland.com

Little known outside the steel world, Ispat has in recent months assumed a new visibility—as an example of Western companies' problems in the former Soviet Union. Hundreds of its employees come to work drunk; its biggest customer is broke; and Chechen gunmen have been spotted prowling the plant's perimeter, threatening suppliers and hitting customers up for bribes. Despite all their experience in the developing world, the Ispat officials at Karmet "are up against problems we never dreamed about," says Lakshmi Mittal, the company's chairman.

Since arriving, Ispat has ladled out $11 million for back pay, $31 million to repay debts to raw material suppliers, and $75 million to begin rebuilding the crumbling plant. Overall, the company has pledged to pay $450 million over the next four years, plus an additional $550 million for new technology.

Because the company is the first Karmet owner in years to have any money, it was quickly viewed as a soft target. The local union is seeking a 75% increase in workers' pay, and a Temirtau child-care center is hitting up plant managers for more money.

Soon after Ispat arrived, a man claiming to represent a society for the blind asked the company for donations. If Ispat would donate steel, he said, the society could resell it and raise money. After the company agreed, 68 other societies for the blind turned up. "Karmet in 1995 was not a steel plant. It was looked upon more as a social institution," says Arabinda Tripathy, Ispat's personnel director.

So, Ispat embarked on an ambitious goal—to teach its workers about capitalism. Senior managers get a weeklong course, beginning with the basics of how a market economy works and progressing to discuss how profits are calculated.

SOURCE: Kyle Pope, "Saga on the Steppes: A Steelmaker Built Up By Buying Cheap Mills Finally Meets Its Match," *The Wall Street Journal* (May 2, 1996), pp. A1, A6. Reprinted by permission of *The Wall Street Journal,* © 1996 Dow Jones & Company, Inc. All rights reserved worldwide. Permission conveyed through the Copyright Clearance Center.

a. How would the quality considerations in the Temirtau, Kazakhstan, steel plant be fundamentally different from quality considerations in a more developed nation?
b. Should the ethical standards of conduct be different for managers in the Temirtau plant than in other plants operated by Ispat? Explain.

58. From William J. Fife Jr., chairman of Giddings & Lewis Inc.:

http://www.giddings.com

"The labor content of a product today is probably less than 15%. So, I don't care how much I cut [direct] labor, it's not going to get to the bottom line. We have to get at overhead costs."

Today, U.S. firms have some of the highest overhead burdens of all global companies. Much of the higher overhead cost is associated with the tiered management structures prevalent in the United States. The layers of white-collar managers create a tremendous cost disadvantage. The redundant layers of management are associated with the traditional notion that employees need to be supervised to maintain productivity and control quality.

SOURCE: Adapted from Thane Peterson, "Can Corporate America Get Out From Under Its Overhead?" *Business Week* (May 18, 1992), p. 102.

a. With appropriate training of blue-collar workers in American industry, how can layers of white-collar managers be eliminated and productivity and quality increased?
b. How does the traditionally hostile relationship between white-collar managers and blue-collar workers place American firms at a disadvantage in the global market relative to countries that have traditionally fostered cooperation among all employees?

59. *Cyclemakers Group of Washdyke near Timaru (New Zealand) is lifting its profile locally and overseas in the cycling world through its custom-built bike service.*

Although the prospect of sitting astride a 10-speed may not be everyone's idea of relaxation, at least now they can dictate their choice of seat—or for that matter, their choice of frame, wheels, gears, and the other bits and pieces that Cyclemakers imports from the major branded overseas manufacturers. The company has built simulators so people can try out a range of configurations to see what measurements suit. They can then choose from an enormous range of components of varying sizes and prices including the color and style of the paint job.

"We're doing it at a price not much greater than an off-the-peg production bike because we use a computerised system. The idea has proven very successful here and in Australia. It's not a large percentage of business yet but has provided a lot at the top end," says Bryan Jackson, managing director.

SOURCE: "Boosting Bike Sales," *NZ Business* (November 1992), p. 33. NZ Business is published by Profile Publishing Ltd., P.O. Box 5544, Auckland, New Zealand; www.profile.co.nz.

a. Why would Cyclemakers be able to produce custom-made bicycles for almost the same cost as mass-produced ones?
b. Would you expect the quality of the custom-produced bicycles to be higher or lower than the mass-produced ones? Discuss the rationale for your answer.
c. Why would the custom-made bicycles "provide a lot at the top end" (show a high profit margin)?

60. Two types of contracts are commonly used when private firms contract to provide services to governmental agencies: cost-plus and fixed-price contracts. The cost-plus contract allows the contracting firm to recover the costs associated with providing the product or service plus a reasonable profit. The fixed-price contract provides for a fixed payment to the contractor. When a fixed-price contract is used, the contractor's profits will be based on its ability to control costs relative to the price received.

http://www.atk.com

A *Wall Street Journal* article announced that, in May 1996, Alliant Techsystems Inc. was being investigated for the way that it accounted for its government contracts. Specifically, the company was being investigated because of suspicions that costs related to fixed-price government contracts were being shifted to cost-plus government contracts.

SOURCE: Andy Pasztor, "Alliant Unit Is Said to Face Criminal Probe," *The Wall Street Journal* (May 3, 1996), pp. A3, A6. Reprinted by permission of *The Wall Street Journal,* © 1996 Dow Jones & Company, Inc. All rights reserved worldwide.

a. Why would a company that conducts work under both cost-plus and fixed-price contracts have an incentive to shift costs from the fixed-price to the cost-plus contracts?
b. From an ethical perspective, do you feel such cost shifting is ever justified? Explain.