# CHAPTER 5

# The Job Order Cost Accounting System

## *REVIEW QUESTIONS:*

5.1 *Information inputs:*

- Materials requisitions
- Time tickets
- Information on the volume of the predetermined overhead rate's basis

*Importance and usefulness:*
The source document information is vitally important in all CASs because it is the basis for directly tracing cost elements to cost objects. For those cost elements that cannot be traced directly (i.e., overhead costs), the POR's basis (i.e., volume or activity level) is needed to allocate the proper amount of overhead to products and services (or other cost objects).

In traditional CASs, many managers use the information they gather on the source documents for short-term planning and estimating, and in monitoring and controlling daily operations.

5.2 Job cost sheets can be used for four purposes:

- Track jobs through the manufacturing process or through a service project (e.g., an audit engagement, welfare case, medical patient treatment).
- Accumulate job costs as jobs progress toward completion.
- Provide the manufacturing cost of a completed job.
- Serve as a basis for budgeting similar jobs in the future.

5.3 Job cost sheets summarize data on direct materials, direct labor, and applied overhead. Additional data may be included, such as quantities, related marketing and administration costs, and profits. These data are used by management for job tracking and performance measurement. Also see Review Question 5.2 above.

5.4 The job cost sheet should include the following information:

- Customer information, job order, and contract price provide basic information about the job for identification purposes.
- Product, specifications, quantity, completion date, and other pertinent information, provide more detailed information about the job for planning, operational control, and on-time delivery performance.
- Direct materials, direct labor, and applied overhead quantity and cost data are summarized in the main body of the job cost sheet. This information is used to:
  - Monitor cost and progress through the manufacturing or service process.
  - Provide the total cost of a completed job.
  - Serve as a basis for budgeting future jobs.
- The final area on the job cost sheet provides a breakdown of related marketing and administration costs, and job profit.

5.5 Although these costs are not manufacturing costs, their inclusion provides a more complete picture of the total costs related to the job. This information can also be used in designing an activity-based JOCAS. Activity-based costing is described in Chapter 10. Further, activity-based management (ABM) can be facilitated through the use of this, and similar information (see Chapter 11).

5.6 The flow of data in a normal JOCAS is illustrated in Exhibit 5-3.

- Customer orders trigger production orders.
- Production orders initiate materials requisitions, time tickets, and overhead applications.
- Cost information is accumulated on the job cost sheets for work-in-process.
- Information on completed jobs is used in tracking and costing finished goods.
- When sold, job cost information serves as the basis for cost of goods sold.

***Let's Talk***

**Review Questions 5.7 - 5.10**

As an extra level of sophistication, you may wish to discuss how all three types of journal entries can change in a JOCAS.

In acquiring direct materials (journal entry 1), subsidiary RMI accounts can be created for each job. In this manner, different direct materials can be stored in the same location within the storeroom or stockyard. This facilitates their transfer to production when needed, as well as RMI control.

In a JIT process, journal entries 1 and 5 may be combined as materials are delivered directly to the JIT cells.

Many jobs are sold as one customer order, even though they may contain a batch of products. For example, a building contractor may order a set of custom-sized windows for a particular house. In these situations, FGI and COGS may have subsidiary ledger accounts for each job.

If some students initiate this discussion, you can praise them for thinking about and applying the basic knowledge presented in the text to more real world, sophisticated situations. Unlike financial accounting systems, cost and management accounting systems can be (and should be) custom tailored to the unique needs of particular enterprises and managements.

5.7 The three basic types of cost accounting journal entries are:

- Acquiring cost elements (journal entries 1, 2, 3, and 4 in Exhibit 5-1)
- Using cost elements in production (journal entries 5, 6, and 7)
- Accounting for completed production (journal entries 8 and 9)

The second type of journal entries concerning the usage of raw materials, factory labor, and applied overhead are different from a basic CAS.

5.8 The first and third basic types of journal entries are the same as in a basic CAS.

5.9 The acquisition of cost elements (the first type of journal entries) and the completion and sale of products (the third type) are *basically* the same in both a job order and process production system. Consequently, these journal entries do not change from one cost accounting system to the other. The usage journal entries change to permit the use of separate subsidiary accounts for each job. This technique improves cost element tracking through the manufacturing process. Higher quality information results for cost management and product costing.

5.10 The work-in-process subsidiary ledger system for product costs is different. Instead of having one subsidiary ledger account (WIP-Product cost) for all production costs incurred, a JOCAS has separate WIP subsidiary accounts for each job. This results in better product costing and cost management information.

5.11 *Applicable organizations:*
A JOCAS is appropriate in organizations providing a product, service, or construction project that possesses a long lead time, and/or its nature allows many cost elements to be traced directly to it.

*Inapplicable manufacturing environments:*
Manufacturing enterprises that produce large masses of similar products with short lead times are not appropriate candidates for a JOCAS. In these environments, few (if any) cost elements can be traced directly to an individual product or unique batch. The fundamental characteristic of a JOCAS is cost identification to an individual product or unique batch. This characteristic is not present in mass production environments.

5.12 Scrap represents fragments of material removed or lost during the production process. Examples include:
- Ends of lumber in framing a house
- Pieces of leftover suture in surgery
- Discarded photocopies from a welfare case file

5.13 Two traditional methods are commonly used in accounting for scrap:

- The market value less disposal costs (net realizable value or NRV) is removed (credited) from the job's cost and inventoried until sold. This method is appropriate when the quantity and/or value of scrap is relatively high.

  Arguments supporting this method include:
  - If the NRV is not removed from the cost of a job, the job's cost will be overstated. COGM and COGS then will be overstated and gross margin understated.
  - The reasons for scrap are long run: no suppliers are available to provide scrap-free materials, and direct technology changes to eliminate scrap are not feasible.
  - Management's motivation to eliminate scrap is not affected by inventorying it (versus leaving it in the cost of the job, i.e., the second method discussed below).

- The second method does not inventory scrap. Instead, when scrap is sold, a scrap sales account is credited for the amount of cash received. This method is expedient and reasonable when the scrap value is small.

  Arguments supporting this method include:
  - The job causes scrap. Scrap will not exist if the job is not undertaken.
  - By including the cost of scrap within the job, management must budget for it. This focuses attention on scrap and, therefore, promotes activities to eliminate it.

5.14 Scrap is included in the cost of the job. The NRV is not deducted from the job cost. This is the second method discussed in Review Question 5.13.

Proponents of world-class manufacturing (WCM) and JIT argue that scrap is a nonvalue-added activity. It should be eliminated. Total quality management (TQM) is promoted by forcing management's attention on scrap every time a job is budgeted. The more times management considers scrap, the greater its perceived importance. This should increase management's motivation to eliminate it through direct technology changes and new certified vendor relationships.

See the "Let's Talk" box on the next page.

***Let's Talk***

Scrap accounting and elimination is becoming increasingly important in the movement toward WCM status. Neither method truly accounts for the *cost* of scrap. The first method reduces the job cost by the NRV, not the scrap's cost. The NRV may be greater than or less than the cost of scrap, but this is not measured. Depending on the value of scrap sales, the management accountant may consider reclassifying scrap as a byproduct (discussed in the last section of Chapter 6).

Although some WCM and JIT advocates support the second method, it may not be congruent with WCM, JIT, and TQM. The second method creates a scrap sales account. Scrap sales will always *appear* profitable because no cost is associated with it (e.g., a "cost of scrap sold" account).

The key point in scrap accounting is to promote effective scrap measurement and control through timely scrap reports and performance measures.

5.15 Reworked units are defective products that are fixed so that they can be sold as acceptable finished units through regular marketing channels.

5.16 If rework is a normal outcome of all types of jobs produced, rework costs are estimated and included in the POR. Thus, estimated rework costs are allocated into the costs of all the jobs. When rework costs are incurred, they are not debited to jobs. These actual rework costs are debited to overhead. A second POR is needed to allocate overhead to reworked units.

5.17 The costs of unique rework associated with a particular job should be charged to that job. As a result, no special accounting is needed for the direct materials or direct labor incurred by rework. A special accounting is required, though, for overhead cost allocation. The budgeted rework cost included in the POR should be removed from it when allocating overhead to the rework activities.

5.18 Since this rework is not debited to overhead, the regular amount of applied overhead representing normal rework should not be credited from the overhead account and charged to this job. A special POR is needed to accomplish this. This POR will not include any budgeted amount for normal rework costs.

5.19 Both normal and abnormal rework costs remain within the job. Normal rework is not included in the overhead budget and the POR. This eliminates the need for two different PORs; one for normal production activities, and a special POR for rework activities.

Job cost sheets should be expanded to include budget and cost variance information about the rework activities of each job. This information should identify the sources and causes of defective products. Management can use this information in reengineering the process (Chapter 11) and in TQM activities (Chapter 12).

5.20 Defective products may not be reworked. Instead, they are rejected and disposed of (discarded or sold as damaged goods).

Normal spoilage is expected under present operating conditions.

Abnormal spoilage is the amount of rejects in excess of the expected level.

5.21 When normal spoilage occurs, its cost is charged (debited) to overhead. As with normal rework, expected spoilage costs are budgeted into the POR. In this way, normal spoilage is spread over all production through the overhead allocation journal entry (journal entry 7).

5.22 Abnormal spoilage should be written-off as a loss of the reporting period through debiting an expense account such as "Loss from abnormal spoilage."

5.23 Both normal and abnormal rework and spoilage costs are left within the cost of the job. Job cost sheets are expanded to include budget and cost variance information concerning rework and spoilage.

This approach specifically budgets for, and measures the actual costs of, rework and spoilage. Because all rework and spoilage remain within the job's cost, this information can be used to identify and analyze rework and spoilage causes. Cost measurement, identification, and analysis are prerequisites for TQM activities to eliminate their causes. Chapter 12 presents specific measurement techniques for total quality management.

5.24 Computers can be used to estimate construction costs in the following ways:

- An historical database can be developed for estimating the costs of projects through organizing, storing, and retrieving data from similar past projects.
- Calculations necessary for preparing bids, such as adjustments for time, location, and size, can be efficiently performed by job order software systems.
- Integrating an electronic digitizer allows accurate and efficient takeoffs for materials quantities.

Computers can also facilitate cost management.

- With an ICBIS, various transactions can be entered into the system's database through different LANs. Eliminating redundant, manually prepared transactions in separate LANs streamlines data entry and reduces input error costs.
- The more timely and detailed cost information available can improve customer relations. Progress billings provide more specific information allowing for quicker customer verification and payment. If warranty and service work is required, service personnel can access the original job orders to determine what parts were used in a specific job.
- This information can be summarized and accessed by other LANs as needed for operational control and performance evaluation. For example, different display modes are available, such as graphical displays and cost variance reports organized by detailed work item categories.

5.25 Work item software serves the following purposes:

- Work item software is used to prepare detailed cost estimates for bidding jobs. Two basic approaches (WBS and CSI described in Review Question 5.37) allow the identification and organization of specific activities. Using work item software reduces the possibility of overlooking some activities in preparing job cost estimates. Examples are provided in Exhibits 5-19, 5-20, and 5-21.

- Work item software can also support operational control and performance evaluation by providing a structure for the detailed costs incurred. Performance reports and graphical displays can be accessed via LAN terminals to provide detailed cost information. Exhibit 5-22 illustrates an example report.

5.26 *Direct technology in construction:*
Accounting for direct technology costs was introduced in Chapter 1. Examples of direct technology costs in construction projects include the costs of bulldozers, scrapers, graders, cranes, trucks, and paving machinery.

In the construction industry, a significant amount of work requires the use of expensive heavy equipment. Since equipment normally represents a large cost of construction work, this cost element is separately budgeted to promote more accurate cost estimation and more effective cost control.

*Direct technology in highly automated manufacturing:*
One of the characteristics of WCM enterprises is a significant investment in automated production and control equipment. One of the objectives of JIT is computer-integrated manufacturing (CIM). CIM uses groups of technologies that are integrated through an ICBIS and controlled by visual factory computerized monitoring systems. CIM was introduced in Chapter 2. Exhibits 2-19 and 3-3 illustrate these production environments.

The effect of this movement toward capital intensive operations is a shift from labor-related to machinery-related production costs. In traditional CASs, machinery and related computer control costs are accounted for as overhead. Many traditional overhead allocation systems are based on direct labor hours or cost, however. This can lead to miscosting products. Further, by combining all equipment-related costs in the overhead account, the detailed information needed for effective and efficient cost management may not be available. This degrades the quality of the CAS. A high-quality JOCAS will trace as many production costs as is possible directly to each job.

Many WCM enterprises have developed new budgeting, control, and evaluation techniques to support their movement toward CIM. Some of the topics presented in later chapters are mentioned in the "Let's Talk" box on the next page.

***Let's Talk***

This question can be an excellent vehicle for introducing some of the modern cost management techniques presented in Chapters 7 through 10, and in Part III.

In Chapter 7, the effect of increasing fixed costs in budgeting standard costs is introduced in the last section of the chapter. Exhibits 8-20 and 8-21 demonstrate how direct technology costs can be budgeted for JIT cells, and their cost variances reported based on production activities. Chapter 9 begins with a discussion of the need for multiple PORs. Chapter 10 presents activity-based costing (ABC).

In Part III, Chapter 11 builds on ABC by introducing activity-based management performance measures such as benchmarked machine setup time graphs (Exhibit 11-13), machine uptime (Exhibit 11-23), and machine productivity ratios. Exhibit 12-23 illustrates *p* charts and statistical process control. Throughput analysis can be introduced with Exhibit 15-6.

5.27 Students probably are already familiar with applications of work item software in services they use. For example, many clinics and doctors' offices use customized invoices with detailed work item codes for listing the specific services and supplies used by a patient. Veterinary clinics also use similar invoices for pets.

Not-for-profit services can also use work item software. Welfare agencies can use detailed lists of services provided to streamline and control their caseloads. Work item software provides a checklist of services to be performed for different types of cases and client needs.

5.28 Work item software aids operational control in two ways:

- In monitoring and controlling job costs, work item software provides a detailed coding system for cost input activities. Using the Construction Specification Institute (CSI) division of work items, if WIP is general ledger account 140, and this is job 3, a coding system to record the subcontractor payment for clearing sitework might be account 143-02-110, as detailed below (taken from Exhibit 5-20):

| **Cost element description** | **G/L Account** |
|---|---|
| *WIP Inventory* | *140-xx-xxx* |
| *Job 3* | *xx3-xx-xxx* |
| *Sitework* | *xxx-02-xxx* |
| *Clearing* | *xxx-xx-110* |

- Work item software also provides a means of organizing detailed construction-in-progress reports showing budget, actual, and cost variance information by work item. This is demonstrated in Exhibit 5-22.

5.29 Common features of job order costing software systems include:

- *User-friendly* — Simple enough so not to overwhelm the average user, including online help, menus, and tutorials.
- *Internal controls* — Input, processing, output, and database controls.
- *Flexibility* — Permit each job to be set up according to the work ordered by the customer.
- *Break down by work areas* — Ability to break down a job into departments, workcenters, or cells to measure work performed and costs for each work area.
- *Integration* — Easily integrated with other accounting tasks: payroll for entering labor costs and determining labor performance; inventory for entering material costs and updating quantity on hand; accounts payable and purchasing for ordering materials and other items; accounts receivable for producing customer invoices and recording receipts; general ledger for preparing journals and monthly financial statements.
- *WIP reporting* — Keeps management abreast of progress on various jobs and shows when costs (such as scrap, rework, and spoilage) are getting out of control.
- *Pre-billing data* — Provide a pre-billing worksheet to review before customer invoices are prepared and mailed.
- *Job scheduling* — Information including start and due date, percent completed, and a list of open and closed jobs.
- *Job profitability* — Computes costs incurred and profit margin for each job.
- *New-job estimating* — Cost information that aids management in bidding for new jobs.

5.30 The three main elements in estimating construction costs include:

- *Bid price* — The contract price offered by the general contractor to the customer.
- *Target profit* — The desired profit included in the bid price of a job.
- *Estimated costs* — The budgeted costs used to prepare the bid price.

5.31 The following factors make cost estimation the lifeblood of construction:

- The bid price must be high enough to cover the estimated costs of the job and return an acceptable profit.
- It cannot be too high, though, or the contractor will not win the contract against other contractors also bidding on it.
- Accurate cost estimation is critical to successful contract bidding. If certain costs are overlooked, the target profit will not be achieved. If these costs are greater than the target profit, the contractor will suffer a loss on the job. If costs are overestimated, then the bid will not be competitive and the job contract will go to a competitor.

5.32 A preliminary cost estimate is a rough estimate of project costs based on the historical costs of similar past projects adjusted for time, location, and size. Preliminary cost estimates are used by a prospective owner in deciding whether the project design and construction should proceed.

5.33 Basic parameters facilitate preliminary estimates. For example, the cost of concrete can be estimated by using an average cost per cubic yard. The cubic yards of concrete in a project is a basic parameter. Often, preliminary estimates of home construction are based on an average cost per square foot multiplied by the size (in square feet) of the house.

5.34 Preliminary cost estimates involve four steps:

- *Calculate average cost per unit* — A weighted average cost from previous similar jobs is first calculated.
- *Adjust for time differences* — Indices reflecting the differences in costs over time (general inflation indices) are used to adjust past costs to current costs.
- *Adjust for location differences* — Different geographic locations have different costs. Location indices are used to adjust the costs from past locations to the location of the current project.
- *Adjust for size differences* — The adjusted per unit cost from the first three steps is multiplied by size of the current project.

5.35 Detailed cost estimates involve specific estimates of the individual work items involved in a project. Preliminary cost estimates are based on rough averages from previous projects adjusted for time, location and size (see Review Question 5.34).

5.36 The steps in detailed cost estimation include:

| | |
|---|---|
| *1: Review the scope of the project* | Consider the effect of location, security, traffic, available storage space, underground utilities, and other factors on costs. |
| *2: Review all bidding requirements, technical specifications, and conditions of the contract* | Understanding instructions to bidders, bid forms, insurance and bond requirements, various regulatory requirements, general contractor's obligations, quality control, measurement and payment terms, and contract closeout. |
| *3: Prepare a checklist of all work items necessary* | Making sure that all work items required to build the project are included. |
| *4: Determine material quantities* | The quantity of materials in the project can be accurately determined from the blueprints (or drawings). |
| *5: Estimate labor costs* | This step determines the cost of construction (direct) labor. |
| *6: Estimate equipment costs* | This step usually uses standard costs from industry publications to estimate equipment costs. |
| *7: Obtain subcontractors' bids* | For many projects, a significant amount of work is performed by subcontractors who specialize in particular work items. |
| *8: Estimate overhead costs* | Overhead includes project overhead that can be traced directly to a project, and general overhead of the central office or headquarters of the general contractor. |
| *9: Estimate contingency costs* | Generally, there is some unforeseen work that develops during construction, such as a severe rainstorm washing away excavation work that must be redone. |
| *10: Include insurance and bonds* | Insurance usually includes basic builder's risk insurance and various liability insurance policies. The main bond is the contractor's performance bond. |
| *11: Determine the target profit* | This amount is subject to considerable variation, depending on the size of the project, extent of risk and complexity involved, desire of the general contractor to get the project, extent of competition, and other factors. |

5.37 Two basic approaches have evolved to organize work items for estimating:

- Work breakdown structure (WBS) identifies work items by their location on a project. For example, a general contractor bidding for an electric power project involving one substation at Sacramento and one substation at San Francisco may organize the work items under three groups: substation at Sacramento, substation at San Francisco, transmission line connecting the two substations.

- Construction Specification Institute (CSI) division of work items. Building construction contractors organize their estimates that closely follow the CSI's 16 major divisions recognized as the industry standard. A typical summary of an estimate for a building construction project is illustrated in Exhibit 5-19. Each major division is subdivided into smaller work items. For example, the work required for division 2 sitework is subdivided into nine work items, as shown in Exhibit 5-20.

Regardless of the system selected, either WBS or CSI, a code number is assigned to each work item. This same code should be used in accounting and keeping track of each work item during construction. It often becomes part of the general ledger account number in both manual and computerized JOCASs. For example, if WIP is general ledger account 140, and this is job 3, a coding system to record the subcontractor payment for clearing sitework might be G/L account 143-02-110, as detailed below:

| **Cost element description** | **G/L Account** |
|---|---|
| *WIP Inventory* | *140-xx-xxx* |
| *Job 3* | *xx3-xx-xxx* |
| *Sitework* | *xxx-02-xxx* |
| *Clearing* | *xxx-xx-110* |

## CHAPTER-SPECIFIC PROBLEMS:

5.38

> ***Let's Talk***
>
> The journal entries for Problems 5.38 and 5.39 are combined here. We recommend both problems be assigned together. This facilitates "seeing the big picture." The problems are separated within the text so that students can obtain a better feel for the nature of professional exam questions.

| Ref | General Ledger Account Titles | dr's | cr's | Notes: |
|---|---|---|---|---|
| | PURCHASE (ACQUISITION) OF RAW MATERIALS: | | | |
| 1: | Raw Materials Inventory | $45,000 | | given in P5.39 |
| | Accounts Payable | | $45,000 | all RMI purchases are charged |
| | PREPARING (RECORDING) PAYCHECKS: | | | |
| 2: | Gross Wages | $20,000 | | given in P5.39 |
| | FIT Withholdings Payable | | $2,000 | +$GROSS WAGES*0.1 |
| | SIT Withholdings Payable | | $1,000 | +$GROSS WAGES*0.05 |
| | FICA Taxes Payable | | $1,500 | +$GROSS WAGES*0.075 |
| | Pension Plan Payable | | $400 | +$GROSS WAGES*0.02 |
| | Health Insurance Payable | | $300 | +$GROSS WAGES*0.015 |
| | Wages Payable | | $14,800 | GROSS WAGES - WITHHOLDINGS |
| | EMPLOYER'S PAYROLL TAXES & BENEFITS (BURDEN): | | | |
| 3: | Gross Wages | $5,200 | | @SUM(G23..G28) |
| | FICA Taxes Payable | | $1,500 | = withheld from paychecks |
| | FUTA Taxes Payable | | $160 | +$GROSS WAGES*0.008 |
| | SUTA Taxes Payable | | $1,080 | +$GROSS WAGES*0.054 |
| | Pension Plan Payable | | $1,000 | +$GROSS WAGES*0.05 |
| | Health Insurance Payable | | $660 | +$GROSS WAGES*0.033 |
| | Vacation Payable | | $800 | +$GROSS WAGES*(2/50) |
| | OTHER OVERHEAD COSTS INCURRED: | | | |
| 4: | WIP Inventory-Mfg. Overhead (Utilities) | $4,000 | | amounts given |
| | WIP Inventory-Mfg. Overhead (Equipment depr.) | $20,000 | | |
| | Accounts Payable | | $4,000 | amounts charged |
| | Accumulated Depreciation-Factory Equipment | | $20,000 | |

5.39

PROBLEM 5.38 & 5.39: JOCAS JOURNAL ENTRIES: Using cost elements & Completed production

| Ref | General Ledger Account Titles | dr's | cr's | Notes: |
|---|---|---|---|---|
| | REQUISITION OF RAW MATERIALS INTO THE FACTORY: | | | |
| 5: | WIP Inventory-Job #X (DM) | $10,000 | | given in P5.38 |
| | WIP Inventory-Job #Y (DM) | $20,000 | | given in P5.38 |
| | WIP Inventory-Job #Z (DM) | $15,000 | | given in P5.38 |
| | WIP Inventory-Manufacturing Overhead (IM) | $5,000 | | "plug" to balance |
| | Raw Materials Inventory | | $50,000 | given in P5.39 |
| | | | | |
| | DISTRIBUTING GROSS WAGES TO PRODUCTS: | | | |
| 6: | WIP Inventory-Job #X (DL) | $5,000 | | given in P5.38 |
| | WIP Inventory-Job #Y (DL) | $4,000 | | given in P5.38 |
| | WIP Inventory-Job #Z (DL) | $2,500 | | given in P5.38 |
| | WIP Inventory-Manufacturing Overhead (IL) | $13,700 | | "plug" to balance |
| | Gross Wages | | $25,200 | gross pay + employer burden |
| | | | | |
| | OVERHEAD ALLOCATION TO PRODUCTS: | | | |
| 7: | WIP Inventory-Job #X (Applied OH) | $20,000 | | From P5.38, POR = 400% of DL$ |
| | WIP Inventory-Job #Y (Applied OH) | $16,000 | | |
| | WIP Inventory-Job #Z (Applied OH) | $10,000 | | |
| | WIP Inventory-Manufacturing Overhead | | $46,000 | |
| | | | | |
| | PRODUCTS COMPLETED: | | | |
| 8: | Finished Goods Inventory-Job #X | $85,000 | | See P5.40 JOC Report |
| | Finished Goods Inventory-Job #Z | $27,500 | | See P5.40 JOC Report |
| | WIP Inventory-Job #X | | $85,000 | |
| | WIP Inventory-Job #Z | | $27,500 | |
| | | | | |
| | PRODUCTS SOLD (INVENTORY RELIEF JOURNAL ENTRY ONLY): | | | |
| 9: | Cost of Goods Sold-Job #X | $85,000 | | From COGM |
| | Finished Goods Inventory-Job #X | | $85,000 | |

5.40

FREEFLOW COMPANY
WIP INVENTORY AND JOB COSTS SUMMARY
For the Month of May, 19XX

| COSTS: | JOB # X | JOB # Y | JOB # Z | MFG OH | TOTALS |
|---|---|---|---|---|---|
| Direct Materials: Beg Bal | $20,000 | $5,000 | $0 | | $25,000 |
| Direct Materials: Added | 10,000 | 20,000 | 15,000 | | 45,000 |
| Subtotal: | $30,000 | $25,000 | $15,000 | | $70,000 |
| Direct Labor: Beg Bal | 6,000 | 4,000 | 0 | | 10,000 |
| Direct Labor: Added | 5,000 | 4,000 | 2,500 | | 11,500 |
| Subtotal: | $11,000 | $8,000 | $2,500 | | $21,500 |
| Applied OH - Beg Bal | 24,000 | 16,000 | 0 | | 40,000 |
| Applied OH - Added | 20,000 | 16,000 | 10,000 | ($46,000) | 0 |
| Subtotal: | $44,000 | $32,000 | $10,000 | | $86,000 |
| Overhead - Beg Bal | | | | 3,000 | |
| Indirect Materials | | | | 5,000 | |
| Indirect Labor | | | | 13,700 | |
| Other | | | | 4,000 | |
| Depreciation | | | | 20,000 | |
| Actual OH - Added | | | | 42,700 | |
| TOTAL JOB COSTS: | $85,000 | $65,000 | $27,500 | ($300) | $177,200 |
| LESS: Completed Jobs | (85,000) | | (27,500) | | (112,500) |
| WIP INVENTORY BALANCE | $0 | $65,000 | $0 | ($300) | $64,700 |

5.41

**WIP Inventory**

| | | | |
|---|---|---|---|
| Beginning balance | $24,000 | | |
| Direct materials | 80,000 | $200,000 | COGM |
| Direct labor | 60,000 | | |
| Applied overhead | 54,000 | | |
| Ending balance | $18,000 | | |

**Job 100**

| | | |
|---|---|---|
| Direct materials | (solve for last) | $8,500 |
| Direct labor | (Applied OH ÷ 90%) | 5,000 |
| Applied overhead | (given at 90% of DL cost) | 4,500 |
| Total job cost | | $18,000 |

5.42

***Let's Talk***

This is an interesting problem for accruing the vacation liability. In this situation, the payroll is monthly but three weeks of vacation are earned per year.

The formula for the vacation accrual is not affected by the time period for the payroll. In other words, 3/49ths of the monthly payroll represents the correct amount to use. You may wish to prove this with the following reconciliation (assume everyone takes their vacation in the last month for simplicity):

Monthly vacation accrual ($100,000 x 3/49ths) = $6,122.45

Total vacation payable:
Annual gross wages ($100,000 x 12 months) = $1,200,000
Weekly average gross wages ($1,200,000 ÷ 52) = $23,077
3 weeks vacation liability = $69,231

December payroll journal entry 2:

| | | |
|---|---|---|
| Vacation Payable | $69,231 | |
| Gross Wages ($100,000 - $69,231) | $30,769 | |
| Withholdings and Wages Payable | | $100,000 |

Reconciliation of Vacation Payable account:

| | | |
|---|---|---|
| Accrued through November ($6,122.45 x 11) | = | $67,347 |
| December accrual ($30,769 x 3/49ths) | = | 1,884 |
| Total accrued for the year | | $69,231 |

5.42

| Ref | General Ledger Account Titles | dr's | cr's | Notes: |
|---|---|---|---|---|
| | PURCHASE (ACQUISITION) OF RAW MATERIALS: | | | |
| 1: | Raw Materials Inventory | $50,000 | | given (1) |
| | Accounts Payable | | $50,000 | all RMI purchases are charged |
| | PREPARING (RECORDING) PAYCHECKS: | | | |
| 2: | Gross Wages | $100,000 | | given (2) |
| | FIT Withholdings Payable | | $15,000 | +$GROSS WAGES*0.15 |
| | SIT Withholdings Payable | | $3,000 | +$GROSS WAGES*0.03 |
| | FICA Taxes Payable | | $7,500 | +$GROSS WAGES*0.075 |
| | Pension Plan Payable | | $1,000 | +$GROSS WAGES*0.01 |
| | Health Insurance Payable | | $1,500 | +$GROSS WAGES*0.015 |
| | Wages Payable | | $72,000 | GROSS WAGES - WITHHOLDINGS |
| | EMPLOYER'S PAYROLL TAXES & BENEFITS (BURDEN): | | | |
| 3: | Gross Wages | $23,922 | | @SUM(G23..G28) |
| | FICA Taxes Payable | | $7,500 | = withheld from paychecks |
| | FUTA Taxes Payable | | $600 | +$GROSS WAGES*0.006 |
| | SUTA Taxes Payable | | $4,700 | +$GROSS WAGES*0.047 |
| | Pension Plan Payable | | $2,000 | +$GROSS WAGES*0.02 |
| | Health Insurance Payable | | $3,000 | +$GROSS WAGES*0.03 |
| | Vacation Payable | | $6,122 | +$GROSS WAGES*(3/49) |
| | OTHER OVERHEAD COSTS INCURRED: | | | |
| 4: | WIP Inventory-Mfg. Overhead (Other OH costs) | $36,000 | | given (4) |
| | WIP Inventory-Mfg. Overhead (Equipment depr.) | $70,000 | | given (4) |
| | Accounts Payable | | $36,000 | amounts charged |
| | Accumulated Depreciation-Factory Equipment | | $70,000 | |
| | REQUISITION OF RAW MATERIALS INTO THE FACTORY: | | | |
| 5: | WIP Inventory-Job #14 (DM) | $50,000 | | given (5) |
| | WIP Inventory-Job #26 (DM) | $25,000 | | given (5) |
| | WIP Inventory-Manufacturing Overhead (IM) | $5,000 | | "plug" to balance |
| | Raw Materials Inventory | | $80,000 | given (5) |
| | DISTRIBUTING GROSS WAGES TO PRODUCTS: | | | |
| 6: | WIP Inventory-Job #14 (DL) | $40,000 | | given (6) |
| | WIP Inventory-Job #26 (DL) | $20,000 | | given (6) |
| | WIP Inventory-Manufacturing Overhead (IL) | $63,922 | | "plug" to balance |
| | Gross Wages | | $123,922 | gross pay + employer burden |
| | OVERHEAD ALLOCATION TO PRODUCTS: | | | |
| 7: | WIP Inventory-Job #14 (Applied Overhead) | $100,000 | | POR = $100 per Mhr. |
| | WIP Inventory-Job #26 (Applied Overhead) | $75,000 | | Mhrs given (7) |
| | WIP Inventory-Manufacturing Overhead | | $175,000 | |
| | PRODUCTS COMPLETED: | | | |
| 8: | Finished Goods Inventory | $155,000 | | See JOC Report in P5.43 |
| | WIP Inventory-Job #26 | | $155,000 | |
| | PRODUCTS SOLD (INVENTORY RELIEF JOURNAL ENTRY ONLY): | | | |
| 9: | Cost of Goods Sold | $155,000 | | From COGM for Job #26 |
| | Finished Goods Inventory | | $155,000 | |

5.43

ABRAM'S JEANS, INC.
WIP INVENTORY AND JOB COSTS SUMMARY
For the Month of August, 19XX

| COSTS: | JOB # 14 | JOB # 26 | MFG OH | TOTALS |
|---|---|---|---|---|
| Direct Materials: Beg Bal | $0 | $5,000 | | $5,000 |
| Direct Materials: Added | 50,000 | 25,000 | | 75,000 |
| Subtotal: | $50,000 | $30,000 | | $80,000 |
| Direct Labor: Beg Bal | 0 | 10,000 | | 10,000 |
| Direct Labor: Added | 40,000 | 20,000 | | 60,000 |
| Subtotal: | $40,000 | $30,000 | | $70,000 |
| Applied OH - Beg Bal | 0 | 20,000 | | 20,000 |
| Applied OH - Added | 100,000 | 75,000 | (175,000) | 0 |
| Subtotal: | $100,000 | $95,000 | | $195,000 |
| Overhead - Beg Bal | | | 4,000 | |
| Indirect Materials | | | 5,000 | |
| Indirect Labor | | | 63,922 | |
| Other | | | 36,000 | |
| Depreciation | | | 70,000 | |
| Actual OH - Added | | | 174,922 | |
| TOTAL JOB COSTS: | $190,000 | $155,000 | $3,922 | $348,922 |
| LESS: Completed Jobs | | (155,000) | | (155,000) |
| WIP INVENTORY BALANCE | $190,000 | $0 | $3,922 | $193,922 |

5.44 a.

Hamilton Company
Schedule of Cost of Goods Manufactured
For the Month Ended February 28, 19XX

| | | |
|---|---|---|
| Direct materials used | | $26,000 |
| Direct labor | | 20,000 |
| Overhead applied | (150% of direct labor cost) | 30,000 |
| Total manufacturing costs | | 76,000 |
| Beginning WIP inventory | (Job 101 = $9,000) | 9,000 |
| Less ending WIP inventory | (Job 104 = $2,800 + $1,800 + $2,700) | <7,300> |
| Cost of goods manufactured | | $77,700 |

b.

| | | | |
|---|---|---|---|
| Actual overhead | | $32,000 | |
| Less applied overhead | ($20,000 x 150%) | <30,000> | |
| Ending overhead balance | | $2,000 | underapplied |

See "Let's Talk" box on the next page for a discussion of whether the part b answer is correct!

### *Let's Talk*

Some students may consider part b to be a trick question, given the answer of $2,000 underapplied.

The ending overhead account balance is $2,000 underapplied only if there is no beginning balance on February 1.

More importantly, should this balance be closed to COGS? This is a *month-end* balance, not a *year-end* balance. The year-end balance is closed to COGS if it is insignificant. It is prorated over COGS and the ending balances in WIP and FGI if it is significant.

The "unofficial" CPA exam solution for part b states that this balance should be closed to COGS. Some students will argue that it should not be closed. Rather, it should remain in the overhead account until year-end. We agree with the students.

The purpose of using a normal cost system and allocating overhead with a POR is to match overhead costs to products. A POR is necessary because:

- Overhead costs cannot be directly traced to products.
- Actual overhead costs are incurred at different times from when they are used.

The second reason is important in answering part b. It is inappropriate to charge an annual insurance premium to COGS in February simply because it was paid in February and debited to overhead (thus creating an ending underapplied overhead balance). The POR will allocate this cost over all products manufactured throughout the year. At the end of the year, if overhead was accurately budgeted and effectively controlled, no ending balance will remain. But, this will not be known until year-end. Therefore, monthly under- or overapplied overhead balances should not be closed to COGS for that month. This mismatches revenues and their associated costs.

5.45

| COSTS: | JOB 432 |
|---|---|
| Direct Materials: Beginning Balance | $0 |
| Direct Materials: Added | 25,000 |
| Subtotal: | $25,000 |
| Direct Labor: Beginning Balance Dept M | 0 |
| Direct Labor: Beginning Balance Dept A | 0 |
| Direct Labor: Added Dept M | 8,000 |
| Direct Labor: Added Dept A | 12,000 |
| Subtotal: | $20,000 |
| Applied OH - Beginning Balance Dept M | 0 |
| Applied OH - Beginning Balance Dept A | 0 |
| Applied OH - Added Dept. M | 24,000 |
| Applied OH - Added Dept. A | 6,000 |
| Subtotal: | $30,000 |
| TOTAL JOB COSTS: | $75,000 |

5.46

***Let's Talk***

This problem is adapted from a CPA exam question. It can serve as an excellent vehicle for integrating scrap and spoilage accounting.

5.46 *(parts a and b):*

1 (a) In this journal entry, the fair market value (FMV) of the spoiled units is inventoried, and this amount is removed from the job's cost. The result is that any loss from this spoilage remains within the cost of the job. No portion of the spoilage cost is debited to overhead.

This must be normal spoilage caused by the specific job. If this is normal spoilage attributable to all production, the total cost of the spoiled units ($6,000) should be removed from the job's cost and debited to overhead. If this is abnormal spoilage, $6,000 also should be credited from the cost of the job. Because the spoiled goods are sold at $0.60 each, this amount is inventoried and the units moved to a special section of FGI. The accounting for the FMV and the inventory control procedure are consistent with scrap accounting method 1.

(b) WIP does not contain subsidiary ledger accounts for each of the cost elements. Posting references are used to trace the cost elements within jobs. Spoiled goods can be treated as a separate inventory account or set up as a subsidiary FGI account (as done below). A more appropriate journal entry is:

| | | |
|---|---|---|
| FGI-Spoiled goods | $600 | |
| WIP-Job 1236 | | $600 |

2 (a) In this journal entry, the cost of the spoilage is removed from the job. The FMV is inventoried, and the loss is charged to overhead.

This journal entry is appropriate when spoilage is attributable to all jobs due to the general characteristics of the production process. Normal spoilage, such as the 1,000 units in job 1236, is budgeted at the beginning of the year and included in the POR.

(b) In addition to the problems noted in 1(b), overhead is not an expense account. A more appropriate journal entry is:

| | | |
|---|---|---|
| FGI-Spoiled goods | $600 | |
| WIP-Manufacturing overhead (Spoilage) | $5,400 | |
| WIP-Job 1236 | | $6,000 |

3 (a) In this journal entry, the cost of the spoilage is removed from the job. The FMV is inventoried, and the loss is charged to an expense account. This journal entry is appropriate when the spoilage is abnormal.

(b) The general ledger accounts for the credits to WIP need to be changed:

| | | |
|---|---|---|
| FGI-Spoiled goods | $600 | |
| Loss from abnormal spoilage | $5,400 | |
| WIP-Job 1236 | | $6,000 |

4. (a) In this journal entry, the spoilage loss is set up as a receivable. Apparently, the customer ordering this job has agreed to reimburse D. Hayes Company for the net loss (cost less NRV) from spoilage on this job separately from the normal sales price.

(b) The receivable account should be more specific:

| | | |
|---|---|---|
| FGI-Spoiled goods | $600 | |
| Accounts Receivable-Customer ? | $5,400 | |
| WIP-Job 1236 | | $6,000 |

*Part c:*

1-3. A world-class JOCAS reports the spoilage costs of each job. No distinction is made between normal and abnormal spoilage within the general ledger accounts. If normal spoilage is budgeted within the job, any abnormal spoilage is reported as an unfavorable cost variance on the job cost report. Since the spoilage has a sales value, the NRV offsets the extra cost from the spoilage. Two journal entries are possible:

- If spoilage is to be inventoried (appropriate in traditional production processes that maintain FGI, and when the quantity or value of spoilage is significant):

| | | |
|---|---|---|
| FGI-Spoiled goods | $600 | |
| WIP-Job 1236 (spoilage sales) | | $600 |

- If spoilage is not inventoried (appropriate in JITs that maintain no FGI, and when the quantity or value of spoilage is insignificant):

| | | |
|---|---|---|
| Cash or Accounts receivable | $600 | |
| WIP-Job 1236 (spoilage sales) | | $600 |

4. The two journal entries just illustrated are also appropriate in this situation. When the customer agrees to pay for the net loss of spoilage on a job, the JOCAS measures the cost ($6,000) and nets out the sales proceeds ($600), reporting an unfavorable spoilage cost variance ($5,400). A job change order is issued, increasing the job's sales price $5,400. As is true with any job change order, this creates a favorable sales price variance.

5.47

***Let's Talk***

If some students have problems with the algebra involved in calculating the 75 hours of ideal time, you may wish to "walk them through" this with the following:

$$\frac{10{,}800 \text{ yds}^3}{0.8 \text{ yds}^3 \text{ per bucket}} = 13{,}500 \text{ buckets}$$

$$\div \frac{180 \text{ buckets per hour}}{75 \text{ hours of ideal time}}$$

Ideal time: $$\frac{10{,}800 \text{ cubic yards}}{180 \text{ cubic yds per hr x } 0.80} = 75 \text{ hours}$$

Budgeted time: $$\frac{\text{Ideal time} = 75 \text{ hours}}{\text{Actual operator time per hour of ideal time} = 0.75} = 100 \text{ hours}$$

Budgeted total cost of job (100 hrs x $100 per hr) = $10,000

5.48

a. Average hourly cost of ironworker:

| | |
|---|---|
| $15.80 per hr x 40 hrs/week = | $632.00 |
| $15.80 per hr x 1.5 OT rate x 10 hrs per week = | $237.00 |
| $15.80 per hr x 2 DT rate x 10 hrs Saturday = | $316.00 |
| Gross wages | $1,185.00 |
| Payroll taxes (7.51% + 3% of gross wages) | $124.54 |
| Insurance (5.5% + 3.25% of base wages) | $82.95 |
| Fringe benefits ($1.27 x 60 hours) | $76.20 |
| Weekly cost of ironworker | $1,468.69 |
| AVERAGE HOURLY COST OF IRONWORKER | $24.4782 |

b. Average labor cost per pound:
(Hourly cost x 10 hours per day x
5 workers / 6500 pounds) = $0.1883

Note: Base wages = $15.80 per hour x 60 hours = $948.00

5.49

| | |
|---|---|
| Trenching machine | $86.25 |
| Utility truck | 12.50 |
| Machine operator | 16.50 |
| Truck driver | 5.10 |
| Laborer 1 | 6.90 |
| Laborer 2 | 6.90 |
| Foreman | 17.30 |
| Cost per hour | $151.45 |
| x Hours required (2940 feet / 40 feet per hr) | 73.5 |
| Operating costs | $11,131.58 |
| + Transportation costs | 1,260.00 |
| TOTAL TRENCHING COST | $12,391.58 |
| AVERAGE COST PER FOOT | $4.2148 |

5.50

Tractor cost:

| | | |
|---|---|---|
| 60,480 bricks / 1,600 bricks per hour | = | 37.80 hours |
| x (Tractor + Operator cost) | | $28.50 |
| TRACTOR COST | | $1,077.30 |

Laborers cost:

| | | |
|---|---|---|
| 60,480 bricks / 8 bricks per load | = | 7,560 loads |
| x Time per load (3/4 minute) | | 0.0125 hours |
| Budgeted labor hours | | 94.50 hours |
| x Laborer cost per hour | | $7.50 |
| LABOR COST | | $708.75 |
| TRACTOR COST + LABOR COST | | $1,786.05 |
| AVERAGE COST PER BRICK | | $0.0295 |

5.51

City C building cost per square foot:

| | |
|---|---|
| $3,308,550 / 48,300 square feet = | $68.50 |
| x City A building's square feet | 32,500 |
| City A building cost last year | $2,226,250 |
| x inflation factor for 4 years | 1.075234 |
| City A current cost estimate | $2,393,740 |
| x Location adjustment from City C to City A (1,025 / 1,260) | 0.813492 |
| CITY A BUILDING ESTIMATED COST | $1,947,288 |
| ESTIMATE TO USE IN BIDDING PROJECT | $2,000,000 |

5.52

| Project | Cost | Square feet | Cost per square foot |
|---|---|---|---|
| 1 | $147,300 | 1,580 | $93.23 |
| 2 | 153,700 | 2,900 | $53.00 |
| 3 | 128,100 | 2,100 | $61.00 |
| 4 | 118,400 | 1,850 | $64.00 |
| 5 | 135,700 | 2,300 | $59.00 |
| | | | $66.05 |

Weighted average unit cost:

$$\frac{\$53.00 + (4 \times \$66.05) + \$93.23}{6}$$

$$= \$68.41$$

Estimated cost for project:

$$= \$184,707$$

Estimate to use in bidding project:

$$= \$185,000$$

## *THINK-TANK PROBLEMS:*

5.53 a. A job order cost system is appropriate for manufacturing, merchandising, and service firms that provide individual products or services, or products or services in unique batches. The process characteristic that makes a JOCAS desirable is the ability to trace materials and labor directly to the unit or batch.

b and c. Spreadsheet solutions are provided on the next page.

d. If the ending overhead balance *at the end of the year* (or the life of the POR) is significant, it should be prorated over COGS and the ending balances in WIP and FGI. If it is insignificant, the ending balance can be closed to COGS.

5.54 a(1). PORs are used rather than actual overhead rates for four related purposes:

- To calculate an appropriate amount of overhead to be included in the cost of products or services.
- To enable overhead allocation to be made in a timely manner, rather than waiting until total actual overhead costs and hours worked become known at the end of the year.
- To provide timely product cost information for journal entries transferring completed products from WIP to FGI, and from FGI to COGS.
- To normalize the overhead charge: PORs smooth out uncontrollable fluctuations in actual overhead costs that are unrelated to activity or volume levels. Actual overhead rates, if calculated monthly for example, often vary due to seasonal factors.

a(2, 3, 4). Solution is on page 32.

a(5). The ending overhead balance at the end of the fiscal year is $11,000 underapplied. This is less than one percent of the actual overhead costs incurred. Theoretically, proper product costing requires any ending balance, regardless of its significance, to be prorated over all the jobs worked on throughout the year. Insignificant amounts such as this will not distort net income or the ending WIP and FGI balances. Thus, from a practical perspective, Valport Company is justified in closing the ending overhead balance to COGS.

b. Solution is on page 32.

c. Solution is on page 33.

PROBLEM 5.53 (b):

CONSTRUCTO, INC.
WIP INVENTORY AND JOB COSTS SUMMARY
At 5/31/X4

| COSTS: | JOB DRS114 |
|---|---|
| April costs incurred | $250,000 |
| Direct materials added in May | 124,000 |
| Purchased parts requisitioned in May | 87,000 |
| Direct Labor used in May | 200,500 |
| Applied overhead during May | 146,250 |
| TOTAL JOB COSTS: | $807,750 |

Notes:

TOH POR = $4,500,000 / 600,000 DLhr = $7.50

PROBLEM 5.53 (c):

CONSTRUCTO, INC.
FINISHED GOODS INVENTORY ANALYSIS FOR PLAYPENS
At 5/31/X4

| COSTS: | JOB PLP086 | UNITS | COST/UNIT |
|---|---|---|---|
| Beginning FGI balance, 5/1/X4 | $679,000 | 19,400 | $35.00 |
| Playpens manufactured in May: | | | |
| April costs incurred | $420,000 | | |
| Direct materials added in May | 3,000 | | |
| Purchased parts added in May | 10,800 | | |
| Direct Labor used in May | 43,200 | | |
| Applied overhead during May | 33,000 | | |
| Total job costs: | $510,000 | 15,000 | $34.00 |
| PLAYPENS AVAILABLE FOR SALE | $1,189,000 | 34,400 | |
| Less sales for May | | | |
| From beginning FGI | (679,000) | (19,400) | $35.00 |
| From Job PLP086 | (54,400) | (1,600) | $34.00 |
| FGI BALANCE at 5/31/X4 | $455,600 | 13,400 | $34.00 |

PROBLEM 5.54 (a2, a3, a4)

$$\text{TOH POR} = \frac{\text{Budgeted TOH cost}}{\text{Budgeted machine hours}}$$

$$\$15.00 \text{ per Mhr} = \frac{\$1,200,000}{80,000 \text{ Mhr}}$$

| | Applied overhead | = | TOH POR | x | Actual Mhr |
|---|---|---|---|---|---|
| Through 10/31/X5: | $1,095,000 | = | $15.00 | x | 73,000 |
| For November: | $90,000 | = | $15.00 | x | 6,000 |

**WIP - Manufacturing Overhead**

| | | | |
|---|---|---|---|
| (actual through Oct.) | $1,100,000 | $1,095,000 | (applied) |
| (November actual) | $96,000 | $90,000 | |
| | $11,000 | | |
| | underapplied | | |

PROBLEM 5.54 (b):

VALPORT COMPANY
FINISHED GOODS INVENTORY SUMMARY
At 11/30/X5

| COSTS: | JOB N11-013 |
|---|---|
| 10/31 beginning balance | $55,000 |
| Direct materials added in November | 4,000 |
| Direct Labor used in November | 12,000 |
| Applied overhead during November | 15,000 |
| TOTAL JOB COSTS: | $86,000 |

PROBLEM 5.54 (c)

Valport Company
Schedule of Cost of Goods Manufactured
For the Year Ended 11/30/X5

| | | |
|---|---|---|
| Raw materials inventory: | | |
| Beginning inventory | $105,000 | |
| Raw materials purchases | 1,063,000 | |
| Raw materials available | $1,168,000 | |
| Less ending inventory | (85,000) | |
| Raw materials used | $1,083,000 | |
| Less indirect materials used | (134,000) | |
| Direct materials used | | $949,000 |
| Direct Labor | | 925,000 |
| Manufacturing overhead applied | | 1,185,000 |
| Total manufacturing costs | | $3,059,000 |
| Beginning WIP inventory | | 60,000 |
| Less ending WIP inventory | | (150,200) |
| Cost of goods manufactured | | $2,968,800 |

Ending WIP Inventory Analysis:

| Cost elements | Job D12-002 | D12-003 | Totals |
|---|---|---|---|
| Beginning balance at 10/31/X5 | $0 | $0 | $0 |
| Direct materials added in November | 37,900 | 26,000 | 63,900 |
| Direct labor incurred in November | 20,000 | 16,800 | 36,800 |
| November applied overhead | 37,500 | 12,000 | 49,500 |
| TOTAL JOB COSTS | $95,400 | $54,800 | $150,200 |

5.55 a.

$$\text{TOH POR} = \frac{\text{Budgeted TOH} = \$606{,}000}{\text{Budgeted DLhr} = 120{,}000}$$

$$= \underline{\$5.05 \text{ per DLhr}}$$

b. Journal entries are presented on the next page.
The direct labor distribution journal entry is based on the following calculations:

| | | | | |
|---|---|---|---|---|
| Direct labor rate | = | $51,000 ÷ 8,500 DLhr | = | $6.00 per DLhr |
| Job 87-50 DL cost | = | $6.00/DLhr x 3,500 DLhr | = | $21,000 |
| Job 87-51 DL cost | = | $6.00/DLhr x 3,000 DLhr | = | $18,000 |
| Job 87-52 DL cost | = | $6.00/DLhr x 2,000 DLhr | = | $12,000 |
| Total DL cost | | 8,500 DLhr | | $51,000 |

c. November WIP inventory and job cost report is on page 36.

d. This report is shown on page 37.

1. $134,100
2. $9,000
3. $38,250
4. $47,500

PROBLEM 5.55 (b): JOCAS JOURNAL ENTRIES

| Ref | General Ledger Account Titles | dr's | cr's |
|---|---|---|---|
| | PURCHASE (ACQUISITION) OF RAW MATERIALS: | | |
| 1: | Raw Materials Inventory | $150,000 | |
| | Accounts Payable | | $150,000 |
| | OTHER OVERHEAD COSTS INCURRED: | | |
| 4: | WIP Inventory-Mfg. Overhead (Building costs) | $6,500 | |
| | WIP Inventory-Mfg. Overhead (Equipment Costs) | $8,000 | |
| | Accumulated Depreciation | | $1,500 |
| | Accounts Payable or Cash | | $13,000 |
| | REQUISITION OF RAW MATERIALS INTO THE FACTORY: | | |
| 5: | WIP Inventory-Job 87-50 (DM) | $45,000 | |
| | WIP Inventory-Job 87-51 (DM) | $37,500 | |
| | WIP Inventory-Job 87-52 (DM) | $25,500 | |
| | WIP Inv.-Manufacturing Overhead (IM) | $12,000 | |
| | Raw Materials Inv. | | $120,000 |
| | DISTRIBUTING GROSS WAGES TO JOBS: | | |
| 6: | WIP Inventory-Job 87-50 (DL) | $21,000 | |
| | WIP Inventory-Job 87-51 (DL) | $18,000 | |
| | WIP Inventory-Job 87-52 (DL) | $12,000 | |
| | WIP Inventory-Manufacturing Overhead (IL) | $21,000 | |
| | Gross Wages | | $72,000 |
| | OVERHEAD APPLIED TO JOBS: | | |
| 7: | WIP Inventory-Job 87-50 (Applied OH) | $17,675 | |
| | WIP Inventory-Job 87-51 (Applied OH) | $15,150 | |
| | WIP Inventory-Job 87-52 (Applied OH) | $10,100 | |
| | WIP Inventory-Mfg. Overhead | | $42,925 |
| | JOBS COMPLETED: | | |
| 8: | Finished Goods Inventory | $137,675 | |
| | WIP Inventory-Job 87-50 | | $137,675 |
| | JOBS SOLD (INVENTORY RELIEF JOURNAL ENTRY ONLY): | | |
| 9: | Cost of Goods Sold | $137,675 | |
| | Finished Goods Inventory | | $137,675 |

PROBLEM 5.55 (c): JOB ORDER COST REPORT

BAEHR COMPANY
WIP INVENTORY AND JOB COSTS SUMMARY
For the Month of November, 19XX

| COSTS: | JOB 87-50 | JOB 87-51 | JOB 87-52 | MFG OH | TOTALS |
|---|---|---|---|---|---|
| Direct Materials: Beg Bal | $20,850 | $0 | $0 | | $20,850 |
| Direct Materials: Added | 45,000 | 37,500 | 25,500 | | 108,000 |
| Subtotal: | $65,850 | $37,500 | $25,500 | | $128,850 |
| Direct Labor: Beg Bal | 18,000 | 0 | 0 | | 18,000 |
| Direct Labor: Added | 21,000 | 18,000 | 12,000 | | 51,000 |
| Subtotal: | $39,000 | $18,000 | $12,000 | | $69,000 |
| Applied OH - Beg Bal | 15,150 | 0 | 0 | | 15,150 |
| Applied OH - Added | 17,675 | 15,150 | 10,100 | (42,925) | 0 |
| Subtotal: | $32,825 | $15,150 | $10,100 | | $58,075 |
| Overhead - Beg Bal | | | | 0 | |
| Indirect Materials | | | | 12,000 | |
| Indirect Labor and salaries | | | | 21,000 | |
| Factory facilities | | | | 6,500 | |
| Equipment costs | | | | 8,000 | |
| Actual OH - Added | | | | 47,500 | |
| TOTAL JOB COSTS: | $137,675 | $70,650 | $47,600 | $4,575 | $260,500 |
| LESS: Completed Jobs | (137,675) | | | | (137,675) |
| WIP INVENTORY BALANCE | $0 | $70,650 | $47,600 | $4,575 | $122,825 |

PROBLEM 5.55 (d): JOB ORDER COST REPORT

BAEHR COMPANY
WIP INVENTORY AND JOB COSTS SUMMARY
For the Month of November, 19XX

| COSTS: | JOB 87-50 | JOB 87-51 | JOB 87-52 | MFG OH | TOTALS |
|---|---|---|---|---|---|
| Direct Materials: Beg Bal | $20,850 | $0 | $0 | | $20,850 |
| Direct Materials: Added | 45,000 | 37,500 | 25,500 | | 108,000 |
| Subtotal: | $65,850 | $37,500 | $25,500 | | $128,850 |
| Direct Labor: Beg Bal | 18,000 | 0 | 0 | | 18,000 |
| Direct Labor: Added | 21,000 | 18,000 | 12,000 | | 51,000 |
| Subtotal: | $39,000 | $18,000 | $12,000 | | $69,000 |
| Applied OH - Beg Bal | 13,500 | 0 | 0 | | 13,500 |
| Applied OH - Added | 15,750 | 13,500 | 9,000 | (38,250) | 0 |
| Subtotal: | $29,250 | $13,500 | $9,000 | | $51,750 |
| Overhead - Beg Bal | | | | 0 | |
| Indirect Materials | | | | 12,000 | |
| Indirect Labor and salaries | | | | 21,000 | |
| Factory facilities | | | | 6,500 | |
| Equipment costs | | | | 8,000 | |
| Actual OH - Added | | | | 47,500 | |
| TOTAL JOB COSTS: | $134,100 | $69,000 | $46,500 | $9,250 | $258,850 |
| LESS: Completed Jobs | (134,100) | | | | (134,100) |
| WIP INVENTORY BALANCE | $0 | $69,000 | $46,500 | $9,250 | $124,750 |

5.56

***Let's Talk***

This is a CMA-adapted problem. It appears that the WIP balance includes only job costs, and the overhead control account includes only the actual overhead costs through November. To avoid any unnecessary confusion, you may wish to point out these assumptions to your students before assigning this problem. The answer to part a is formatted consistent with the text presentation in Chapter 4. You may also wish to re-emphasize the need for students to note their assumptions. This was discussed in the "Let's Talk" box for Problem 4.42.

a. The overhead account analysis is presented on the next page.

b. The ending overhead balance at the end of the year is $57,000 underapplied. This is approximately two percent of the actual overhead costs incurred, and less than one percent of the ending WIP, FGI, and COGS balances at the end of November. Theoretically, proper product costing requires any ending balance, regardless of its significance, to be prorated over all the jobs worked on throughout the year. Insignificant amounts such as this will not distort net income or the ending WIP and FGI balances. Thus, from a practical perspective, Targon, Inc. is justified in closing the ending overhead balance to COGS.

c and d. These solutions are on page 40.

PROBLEM 5.56 (a):

$$\text{TOH POR} = \frac{\text{Budgeted TOH cost}}{\text{Budgeted DL hours}}$$

$$\$6.00 \text{ per DLhr} = \frac{\$2,400,000}{400,000 \text{ DLhr}}$$

| | Applied overhead | = | TOH POR | x | Actual DLhr |
|---|---|---|---|---|---|
| Through 11/30/X5: | $2,202,000 | = | $6.00 | x | 367,000 |
| For December: | $192,000 | = | $6.00 | x | 32,000 |

**WIP - Manufacturing Overhead**

| | | | |
|---|---|---|---|
| (actual through Nov.) | $2,260,000 | $2,202,000 | (applied) |
| (IM) | 20,000 | 192,000 | |
| (IL) | 84,000 | | |
| (Depreciation) | 62,500 | | |
| (Utilities) | 15,000 | | |
| (Insurance) | 1,000 | | |
| (Property taxes) | 3,500 | | |
| (Maintenance) | 5,000 | | |
| | $57,000 | | |
| | underapplied | | |

PROBLEM 5.56 (c):

TARGON, INC.
WIP INVENTORY AND JOB COSTS SUMMARY
At 12/31/X5

| COSTS: | JOB 202 |
|---|---|
| November costs incurred | $0 |
| Direct materials added in December | 92,000 |
| Direct Labor used in December | 5,000 |
| Applied overhead during December | 3,000 |
| TOTAL JOB COSTS: | $100,000 |

Notes:

TOH POR = $2,400,000 / 400,000 DLhr = $6.00

PROBLEM 5.56 (d):

TARGON, INC.
FINISHED GOODS INVENTORY ANALYSIS FOR ESTATE SPRINKLERS
At 12/31/X5

| COSTS: | JOB 105 | UNITS | COST/UNIT |
|---|---|---|---|
| Beginning FGI balance, 12/1/X5 | $110,000 | 5,000 | $22.00 |
| Estate sprinklers manufactured in December: | | | |
| November costs incurred | $700,000 | | |
| Direct materials added in December | 210,000 | | |
| Direct Labor used in December | 62,000 | | |
| Applied overhead during December | 36,000 | | |
| Total job costs: | $1,008,000 | 50,000 | $20.16 |
| ESTATE SPRINKLERS AVAILABLE FOR SALE | $1,118,000 | 55,000 | |
| Less sales for December | | | |
| From beginning FGI | (110,000) | (5,000) | $22.00 |
| From Job 105 | (221,760) | (11,000) | $20.16 |
| FGI BALANCE at 12/31/X5 | $786,240 | 39,000 | $20.16 |

5.7 *New scrap, rework, and spoilage accounting policy:*
Because scrap is collected by workers and set aside for sale after each job is completed, it can be traced directly to each job.

- If production data are collected manually, a clipboard with a scrap log sheet can be placed next to the scrap bin. As workers place the scrap from a job in the scrap bin, they can enter the amount on the log sheet. In this manner, scrap can be identified with each job. As scrap is returned to RMI, it should be inventoried. The net realizable value can be used to adjust the cost of the jobs, as illustrated in the journal entries presented in the next section.
- When the scrap is sold, the accounts receivable department can use the log sheet data to allocate the proceeds to the jobs. This will provide better cost information and better scrap control information.
- If certain jobs incur significantly different net scrap costs, they can be analyzed to discover the reasons. This will facilitate improved scrap budgeting and control in future jobs.
- If Waste Management Company installs an ICBIS, a terminal can be installed next to the scrap bin. Data can be input by touch screen or keyboard. The accounts receivable LAN can be accessed to obtain sales information so that the net scrap cost can be posted to the job cost record. As needed, engineering, marketing, and cost accounting LANs can access this information in a real time mode.

Rework and spoilage are identified with each job already, and it appears that the shop foreman uses this information in controlling these nonvalue-added costs. Thus, no new data collection procedures appear needed. The journal entries are illustrated below.

*Journal entries to record scrap, rework, and spoilage:*

- To illustrate the scrap journal entry, assume that job 25 scrap was sold for $3,000 and job 28 scrap was sold for $2,000.

When scrap is returned to RMI:

| | | |
|---|---|---|
| RMI-Scrap material | $5,000 | |
| WIP-Job 25 (Scrap sales) | | $3,000 |
| WIP-Job 28 (Scrap sales) | | $2,000 |

When scrap is sold:

| | | |
|---|---|---|
| Cash or accounts receivable | $5,000 | |
| RMI-Scrap material | | $5,000 |

- Budgeted rework and spoilage will not be included in the overhead budget for POR. Instead, each job will include a budget for normal rework and spoilage. Only one POR is needed (assuming Waste Management Company does not use a multiple overhead accounting system or an activity-based costing system, discussed in Chapters 9 and 10). The new POR is 35% of direct labor cost ($210,000 ÷ $600,000).

  - Rework:

| | | |
|---|---|---|
| WIP-Job 25 (rework) | $1,850 | |
| WIP-Job 28 (rework) | $210 | |
| RMI | | $575 |
| Gross wages | | $1,100 |
| WIP-Manufacturing overhead | | $385 |

    Rework costs for job 25 = $500 (DM) + $1,000 (DL) + $350 (OH)
    Job 28 = $75 (DM) + $100 (DL) + $35 (OH).

  - Spoilage:
    No special journal entry is needed to record the spoilage costs of job 28. The cost elements were included in the direct materials requisitions, direct labor distribution, and overhead allocation charged to the job in journal entries 5, 6, and 7. Direct materials cost for the 40 spoiled units is $400, direct labor is $480. and applied overhead (at 35%) is $168. The total cost of the 40 spoiled units is $1,048.

    This actual cost will be compared against any budgeted spoilage for job 28 and the difference reported as a cost variance on the job cost report. Any cost variance, if significant, should be investigated to determine the underlying sources and causes. These causes should lead to reengineering activities as part of Waste Management's activity-based management (ABM) and total quality management (TQM) programs. Chapter 11 covers ABM, and TQM is covered in Chapter 12.

*PORs, scrap, rework, and spoilage:*
If these nonvalue-added costs are to be traced directly to the jobs incurring them, no allowances should be included in the POR. When the POR includes an allowance for these costs, a second POR that does not include these allowances is needed. The justification for including allowances in the POR is to spread these costs over all good products manufactured. When rework and spoilage occur, though, they use other overhead items, but not more rework and spoilage. Thus, it is inappropriate to allocate overhead to these units that includes an allowance for rework and spoilage. Consequently, a second POR is needed.

If the overhead budget does not include allowance for rework and spoilage, it is appropriate for allocating overhead to good and bad units. Directly tracing rework and spoilage to the jobs simplifies the overhead allocation process. It also provides cost variance information to facilitate better cost management.

58 High-quality information possesses five attributes:

- *Accuracy:*
  - The critical component of a JOCAS for accuracy is data input. Accurate materials, labor, scrap, rework, and spoilage data is required for product costing and cost management.
  - Inaccurate product costs can lead to unprofitable pricing decisions and hurt the competitiveness of the enterprise.
  - Inaccurate data (and the resulting information from it) can also result in not identifying activities that need control.
  - Inaccurate information resulting from bad data can also cause improper performance evaluation.
  - Budgeting for similar jobs in the future will also be impaired.

- *Relevancy:*
  - Product cost information is necessary for valuing ending inventories and COGS. Probably the most important issue is overhead allocation. Chapters 9 and 10 introduce the need for multiple overhead accounts and PORs, and activity-based costing (ABC). These accounting systems can provide more accurate and relevant information for financial accounting.
  - In cost management, relevant information includes job cost budgets and reports that compare budgeted and actual costs. The budgeting activity supports the planning function of management. Operational control is facilitated when this information is available in a real time mode. Performance evaluation is enhanced through the reporting and investigation of cost variances. Exhibit 5-22 illustrates a high-quality job cost report for operational control and performance evaluation.

- *Timeliness:*
  - Timely information is important for product pricing decisions. If the job cost information (both budgeted and actual) is not available when needed, inappropriate pricing decisions may result. This can cause a loss of business in the short run, and inhibit long-run survival.
  - Timely information is especially important in operational control. Workers and managers need real time information to be able to control operations and correct problems where and when they occur.
  - If control information is not available to the proper shop floor personnel, production problems will be passed through the process adversely affecting the quality of the product.

- *Fairness:*
  This attribute is most important with respect to overhead allocations and accounting for scrap, rework, and spoilage. ABC overhead techniques can produce more accurate and fair product costs. Directly accounting for scrap, rework, and spoilage within the budget and cost of a job provides more accurate, and thus, fair information for product costing and cost management.

- *Usability:*
  - JOCAS information is used by marketing personnel in sales price and product profitability decisions. The job cost reports should include more than just production cost information. Exhibit 5-2 demonstrates how other non-manufacturing information can be incorporated into the JOCAS reports.
  - JOCAS information is also used by engineering personnel in continuous improvement campaigns, such as design of experiment and reengineering activities. These were introduced in Chapter 2, and are covered in more detail in Chapters 11 and 12.

Major trends in WCM are important in designing a high-quality JOCAS.

- *High-quality:*
  - In Chapters 2 and 3, high-quality products were the focus of attention. Product quality is improved when the JOCAS can report budget, actual, and cost variance information about nonvalue-added activities such as scrap, rework, and spoilage. Thus, these costs should be accounted for as direct costs of the jobs.
  - High-quality also involves the information system. It is difficult to believe that WCM status can be obtained and maintained without a high-quality cost accounting system.

- *Customer service:*
  - Timely, accurate, and usable JOCAS information is needed by customer service personnel, and customers if accessing ICBIS information through an EDI system, for scheduling and delivery information.
  - Especially in jobs with long lead times and change orders, current cost information in necessary in adjusting sales prices and progress billings.

- *Low inventories:*
  - Low inventories are important because they do not allow production problems to be buried in large quantities of WIP and FGI. Successfully eliminating inventories requires production control activities at the source so that problems do not cause bottlenecks, late deliveries, and/or poor quality products.
  - Low inventories also promote high-quality JOCASs. If production problems cannot be hidden in WIP buffers, the real sources and causes of production problems can be identified. This is a prerequisite for continuous improvement.

- *Flexibility:*
  A high-quality JOCAS supports production flexibility in job order environments. Flexibility is most important in custom production. A JOCAS that provides budget, actual cost, and cost variance information aids management in planning and scheduling new projects, and thus, in being flexible.

- *Using automation:*
  - Automation is a key attribute of a high-quality JOCAS. Not only is the shop floor automated, the information system is as well. An ICBIS linking shop floor LANs with the other LANs will allow real time data input and user access from any location. With an EDI system, this access can even be at the customer's or vendor's location.
  - Automated JOCASs are necessary for operational control activities on the shop floor. Without real time information, possibly displayed through a visual factory control system, workers and managers will not be able to identify, correct, and prevent production problems.
  - An automated JOCAS will also promote more accurate recording of production and nonproduction costs.

- *Creating a team concept:*
  - Feelings of belonging to a team are critical for the successful functioning of a high-quality JOCAS. With low inventories, flexible operations, a commitment to high-quality and control at the source, workers and managers who were historically protected by rigid departmental boundaries must now work together. They have to share accurate, timely, and relevant information to find production problems and correct them (or prevent them) at the source.
  - Information sharing and problem solving also will require a commitment to accepting responsibility for production problems. One of primary reasons for the failure of traditional management accounting in providing relevant cost management information has been in how JOCASs were designed and used by management. No longer can workers and managers emphasize production quantities, and pass poor quality products into inventories to avoid unfavorable cost variances. If a cost variance is created in one department or JIT cell because of a problem originating in a previous process, the workers and manager of the former process have to be advised, and assume the responsibility. *Jidoka* and visual factory control systems aid this process.
  - Both WCM and high-quality JOCAS design require managers to share production problem information in a feedforward mode. If one department identifies a production problem that will affect another down-the-line, then they must communicate that information.

- *Integrated computer-based information systems (ICBISs):*
  - ICBISs support, and may be necessary for, a high-quality JOCAS. As discussed above, many different organizational roles need JOCAS information. Often, this information has to be available at remote locations in real time.
  - All three functions of management (planning, operational control, and performance evaluation) can benefit from the capabilities of an ICBIS to capture large masses of detailed data (through bar code scanning), process and store it with sophisticated programs (statistical process control programs, MRP II, and the like), and allow flexible user access to it through LAN linkages to WANs (client/user systems).

5.59

TOPPER, INC.
WIP INVENTORY AND JOB COSTS SUMMARY
For the Year Ended 12/31/XX

| COSTS: | JOB 31 | JOB 42 | MFG OH | TOTALS |
|---|---|---|---|---|
| Direct Materials: Beg Bal | $200,000 | $0 | | $200,000 |
| Direct Materials: Added | 50,000 | 25,000 | | 75,000 |
| Subtotal: | $250,000 | $25,000 | | $275,000 |
| Direct Labor: Beg Bal | 150,000 | 0 | | 150,000 |
| Direct Labor: Added | 100,000 | 75,000 | | 175,000 |
| Subtotal: | $250,000 | $75,000 | | $325,000 |
| Applied OH - Beg Bal | 300,000 | 0 | | 300,000 |
| Applied OH - Added | 200,000 | 150,000 | (350,000) | 0 |
| Subtotal: | $500,000 | $150,000 | | $650,000 |
| Overhead - Beg Bal | | | 0 | |
| Indirect Materials | | | 5,000 | |
| Indirect Labor | | | 77,000 | |
| Other | | | 88,000 | |
| Depreciation | | | 200,000 | |
| Actual OH - Added | | | 370,000 | |
| TOTAL JOB COSTS: | $1,000,000 | $250,000 | $20,000 | $1,270,000 |
| LESS: Completed Jobs | (1,000,000) | | | (1,000,000) |
| WIP INVENTORY BALANCE | $0 | $250,000 | $20,000 | $270,000 |

5.60 See Problem 5.40 for this report.

5.61 See Problem 5.43 for this report.