Chapter 3

Lecture Notes

Chapter theme: Managers need to assign costs to products to facilitate external financial reporting and internal decision making. This chapter illustrates an absorption costing approach to calculating product costs known as job-order costing.

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*Helpful Hint: Briefly review the concepts of fixed and variable manufacturing costs to help students grasp the meaning of absorption costing. Mention that total fixed costs are constant and therefore change on a per unit basis. Variable costs are proportional to the number of units produced and are constant on a per unit basis.*

1. Job-order costing: an overview
	1. Job-order costing systems are used when:
		1. Many different products are produced each period.

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* + 1. Products are manufactured to order.
		2. The unique nature of each order requires tracing or allocating costs to each job, and maintaining cost records for each job.

B. Examples of companies that would use job-order costing include:

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1. Boeing (aircraft manufacturing)
2. Bechtel International (large scale construction)
3. Walt Disney studios (movie production)
4. Job-order costing−an example
	1. Types of manufacturing costs that are assigned to products using a job-order costing system:
		1. Direct costs
			1. Direct materials − Traced directly to each job as the work is performed.

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* + - 1. Direct labor − Traced directly to each job as the work is performed.
		1. Indirect costs
			1. Manufacturing overhead (including indirect materials and indirect labor). These costs are allocated to jobs rather than directly traced to each job.

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* 1. The job cost sheet − The accounting department relies upon a job cost sheet for tracking the direct and indirect costs associated with a given job.
		1. An overview of a job cost sheet for a hypothetical company called PearCo:
			1. A job number uniquely identifies each job.

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* + - 1. Direct material, direct labor, and manufacturing overhead costs are accumulated for each job.
			2. The job cost sheet is a subsidiary ledger to the Work in Process account.
		1. Measuring direct materials cost
			1. Once a sales order has been received and a production order issued, the Production Department prepares a materials requisition form to specify the type, quantity, and total cost of materials (e.g., $116) to be drawn from the storeroom, and the job number (e.g., A-143) to which the cost of the materials is to be charged.

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* + - * 1. For an existing product, the production department can refer to a bill of materials to determine the type and quantity of each item of materials needed to complete a unit of product.
			1. The Accounting Department records the total direct material cost (e.g., $116) on the appropriate job cost sheet. Notice, the material requisition number (e.g., X7-6890) is included on the job cost sheet to provide easy access to the source document.

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* + 1. Measuring direct labor costs
			1. Workers use time tickets to record the amount of time that they spent on each job and the total cost assigned to each job.

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* + - 1. The Accounting Department records the labor costs from the time tickets (e.g., $88) on to the job cost sheet.

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* + 1. Computing predetermined overhead rates

*Learning Objective 1: Compute a predetermined overhead rate.*

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* + - 1. An allocation base, such as direct labor hours, direct labor dollars, or machine hours, is used to assign manufacturing overhead to products. Allocation bases are used because:
				1. It is impossible or difficult to trace these costs to particular jobs (i.e., manufacturing overhead is an indirect cost).

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* + - * 1. Manufacturing overhead consists of many different items ranging from the grease used in machines to the production manager’s salary.
				2. Many types of manufacturing overhead costs are fixed even though output may fluctuate during the year.
			1. The predetermined overhead rate is calculated by dividing the estimated amount of manufacturing overhead for the coming period by the estimated quantity of the allocation base for the coming period. Ideally, the allocation base chosen should be the cost driver of overhead cost.

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* + - * 1. Predetermined overhead rates that rely upon estimated data are often used because:

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Actual overhead costs for the period are not known until the end of the period, thus inhibiting the ability to estimate job costs during the period.

Actual overhead costs can fluctuate seasonally, thus misleading decision makers.

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* + - 1. Predetermined overhead rates are calculated using a four-step process.

The first step is to estimate the total amount of the allocation base required for next period’s estimated level of production.

The second step is to estimate the total fixed manufacturing overhead cost for the coming period and the variable manufacturing overhead cost per unit of the allocation base.

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The third step is to use a cost formula to estimate the total manufacturing overhead cost for the coming period.

The fourth step is to compute the predetermined overhead rate.

v. Applying manufacturing overhead

*Learning Objective 2: Apply overhead costs to jobs using a predetermined overhead rate.*

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1. Manufacturing overhead is applied to jobs using the predetermined overhead rate multiplied by the actual amount of the allocation base used completing the job (this is called a normal costing system). For example, assume PearCo:
2. Applies overhead to jobs based on direct labor hours.
3. Estimated that 160,000 direct labor hours would be required to support the planned production for the year.

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1. Estimated $200,000 of total fixed overhead cost and $2.75 of variable overhead per direct labor-hour.
2. Used a cost formula to estimate its total manufacturing overhead cost of $640,000.
3. Calculated its predetermined overhead rate of $4 per direct labor hour.
4. The amount of overhead that would be applied to the job cost sheet that we have been working with related to Job A-143 is $32, calculated as follows:

Eight direct labor hours were worked on Job A-143.

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The predetermined overhead rate is $4 per direct labor hour.

8 direct labor hours × $4 per hour = $32.

*Learning Objective 3: Compute the total cost and average cost per unit of a job.*

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vi. Completing the job cost sheet

1. The total direct material, direct labor, and manufacturing overhead costs assigned to Job A-143 is $236.

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1. Since this job included two units, the average cost per unit is $118. The average unit cost should not be interpreted as the costs that would actually be incurred if another unit was produced.

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1. The fixed overhead would not change if another unit were produced, so the incremental cost of another unit is something less than $118.

 *Quick Check − job cost* *accounting*

22-23

1. Job-order costing−the flow of costs

*Learning Objectives 4 and 5: Understand the flow of costs in a job-order costing system and prepare appropriate journal entries to record costs. Use T-accounts to show the flow of costs in a job-order costing system.*

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*Helpful Hint: Sometimes students need a brief review of journal entries and the use of T-accounts before beginning this section of the chapter.*

* 1. Key definitions
		1. Raw materials include any materials that go into the final product.
		2. Work in process consists of units of production that are only partially complete and will require further work before they are ready for sale to customers.

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* + 1. Finished goods consist of completed units of product that have not yet been sold to customers.
		2. Cost of goods manufactured includes the manufacturing costs associated with the goods that were finished during the period.
	1. Flow of cost: a conceptual overview
		1. Raw materials purchases are recorded in the Raw Materials inventory account.
		2. When raw materials are used in production, their costs are transferred to the Work in Process inventory account as direct materials.

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* + 1. Direct labor costs are added directly to Work in Process—they do not flow through Raw Materials inventory.
		2. Manufacturing overhead costs are applied to Work in Process by multiplying the predetermined overhead rate by the actual quantity of the allocation base consumed by each job.
		3. When goods are completed, their costs are transferred from Work in Process to Finished Goods.
		4. The amount transferred from Work in Process to Finished Goods is referred to as the cost of goods manufactured.

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* + 1. As goods are sold, their costs are transferred from Finished Goods to Cost of Goods Sold.
		2. Period costs (or selling and administrative expenses) do not flow through inventories on the balance sheet. They are recorded as expenses on the income statement in the period incurred.
	1. The transactions (in T-account and journal entry form) that capture the flow of costs in a job-order costing system are as follows:

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* + 1. The purchase and issue of raw materials
			1. In T-account form:
				1. The cost of raw material purchases is debited, and although not shown, the credit side of the transaction would be to Accounts Payable.
				2. The cost of direct material requisitions is debited to Work in Process and added to the job cost sheets which serve as a subsidiary ledger.

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* + - * 1. The cost of indirect material requisitions is debited to Manufacturing Overhead.
			1. In journal entry form:

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* + - * 1. Debit Raw Materials and credit Accounts Payable.
				2. Debit Work in Process and Manufacturing Overhead and credit Raw Materials.

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* + 1. The recording of labor costs
			1. In T-account form:
				1. Direct labor costs are debited to Work in Process and added to the job cost sheets which serve as a subsidiary ledger.

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* + - * 1. Indirect labor costs are debited to Manufacturing Overhead.
			1. In journal entry form:
				1. Debit Work in Process and Manufacturing Overhead and credit Salaries and Wages Payable.

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* + 1. Recording actual manufacturing overhead costs (other than indirect materials and indirect labor)
			1. In T-account form:
				1. The manufacturing overhead costs are debited to Manufacturing Overhead.

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* + - * 1. The credit side of the entry is the various liability accounts (e.g., Accounts Payable and Property Taxes Payable), prepaid asset accounts (e.g., Prepaid Insurance), and contra-asset accounts (e.g., Accumulated Depreciation).
			1. In journal entry form:

 34

* + - * 1. Debit Manufacturing Overhead and credit various accounts as shown.
		1. Applying manufacturing overhead costs to work in process
			1. In T-account form:
				1. Work in process is debited and Manufacturing Overhead is credited by the amount of the actual quantity of the allocation base multiplied by the predetermined rate.
				2. Actual manufacturing overhead costs are not debited to Work in Process, nor are they charged to jobs via the job cost sheets.

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* + - * 1. The Manufacturing Overhead account is a clearing account. The actual amount of overhead incurred during the period on the debit side of the account will almost certainly not equal the amount applied to Work in Process as shown on the credit side of the account. This requires a year-end adjusting entry that will be discussed shortly.
			1. In journal entry form:
				1. Debit Work in Process and Credit Manufacturing Overhead.

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*Helpful Hint: Students sometimes have difficulty understanding the use of Manufacturing Overhead as a clearing account. Explain that the purpose of the clearing account is to find any discrepancy that exists between the amount of overhead applied to inventory and the amount of overhead actually incurred. Actual overhead incurred is debited to the account. Overhead applied to inventory using the predetermined rate is credited to the account.*

* + 1. Accounting for nonmanufacturing costs

*Helpful Hint: Review the concepts of product and period costs at this point. Since period costs are not directly related to the actual manufacture of the products, they are expensed as incurred.*

* + - 1. Companies that use job-order cost systems to assign manufacturing costs to products also incur nonmanufacturing costs.
			2. Nonmanufacturing costs should not go into the Manufacturing Overhead account.

37-38

* + - 1. Nonmanufacturing costs are not assigned to individual jobs, rather they are expensed in the period incurred. For example:
				1. The salary expenses of employees that work in a marketing, selling, or administrative capacity are expensed in the period incurred.
				2. Advertising expenses are expensed in the period incurred.
		1. Transferring completed units from work in process to finished goods
			1. In T-account form:
				1. The sum of all amounts transferred from work in process to finished goods represents the cost of goods manufactured for the period.

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* + - * 1. The Finished Goods Inventory is debited and the Work in Process account is credited.
			1. In journal entry form:

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* + - * 1. Debit Finished Goods and credit Work in Process.
		1. Transferring finished goods to cost of goods sold
			1. In T-account form:
				1. Debit Cost of Goods Sold and credit Finished Goods.
				2. If only a portion of the units associated with a particular job are shipped, then the unit cost figure from the job cost sheet is used to determine the amount of the journal entry.

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* + - * 1. This journal entry is also accompanied by a journal entry that recognizes the sales revenue.
			1. In journal entry form:
				1. Debit Accounts Receivable and credit Sales.

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* + - * 1. Debit Cost of Goods Sold and credit Finished Goods.

*Helpful Hint: As a concluding thought, remind students that all inventory accounts are governed by the same logic: Beginning inventory + Additions = Ending Inventory + Transfers out. In the case of raw materials, transfers out consist of both direct and indirect materials requisitions. Direct materials requisitions are added to Work in Process inventory. Indirect materials requisitions are debited to Manufacturing Overhead. Additions to Work in Process consist of direct materials requisitions, direct labor, and overhead applied. Transfers out of Work in Process consist of costs transferred to Finished Goods. Transfers out of Finished Goods consist of Cost of Goods Sold.*

1. Schedules of cost of goods manufactured and cost of goods sold

*Learning Objective 6: Prepare schedules of cost of goods manufactured and cost of goods sold and an income statement.*

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* 1. Key concepts

###### This schedule contains three types of costs, namely **direct materials, direct labor, and manufacturing overhead**.

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* + 1. It calculates the cost of raw material and direct labor used in production and the amount of manufacturing overhead applied to production.
		2. It calculates the manufacturing costs associated with goods that were finished **during the period**.
	1. Product cost flows
		1. To create a schedule of cost of goods manufactured, as well as a balance sheet and income statement, it is important to understand the flow of product costs:
			1. Raw material purchases made during the period are added to beginning raw materials inventory. The ending raw materials inventory is deducted to arrive at the **raw materials used in production**.

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* + - * 1. As items are removed from raw materials inventory and placed into the production process, they are called **direct materials**.
			1. Direct labor used in production and manufacturing overhead applied to production are added to direct materials to arrive at **total manufacturing costs**.

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* + - 1. Total manufacturing costs are added to the beginning work in process to arrive at **total work in process**.

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* + - 1. The ending work in process inventory is deducted from the total work in process for the period to arrive at the **cost of goods manufactured**.

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* + - 1. The cost of goods manufactured is added to the beginning finished goods inventory to arrive at cost of goods available for sale. The ending finished goods inventory is deducted from this figure to arrive at **cost of goods sold**.

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50-57

*Quick Check − product cost flows*

1. Underapplied and overapplied overhead—a closer look

*Learning Objective 7: Compute underapplied or overapplied overhead cost and prepare the journal entry to close the balance in Manufacturing Overhead to the appropriate accounts.*

 58

* 1. There are two key concepts related to this topic, the first of which is:
		1. Defining and computing underapplied and overapplied overhead
			1. The difference between the overhead cost applied to Work in Process and the actual overhead costs of a period is termed either underapplied or overapplied overhead.
				1. Underapplied overhead exists when the amount of overhead applied to jobs during the period using the predetermined overhead rate is less than the total amount of overhead actually incurred during the period.

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* + - * 1. Overapplied overhead exists when the amount of overhead applied to jobs during the period using the predetermined overhead rate is greater than the total amount of overhead actually incurred during the period.

*Helpful Hint: Students need to understand that factory overhead must be estimated at the beginning of the production period. Therefore, there most likely will be a difference between actual and applied overhead. A debit balance in the Manufacturing Overhead account indicates more overhead has been incurred than has been applied to inventory and overhead is underapplied. A credit balance indicates more overhead has been applied than has been incurred and overhead is overapplied.*

* + - 1. Computing underapplied or overapplied overhead, an example:
				1. Assume that PearCo’s actual overhead and direct labor hours for the year were $650,000 and 170,000, respectively.
				2. Recall that PearCo’s total estimated overhead and direct labor hours for the year were $640,000 and 160,000, respectively. Therefore, the predetermined overhead rate would be $4 per direct labor hour.

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* + - * 1. The amount of overhead applied to jobs during the year would be 170,000 direct labor hours × $4 per hour = $680,000.
				2. In this example, overhead was overapplied by $680,000 − $650,000 = $30,000.

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62-63

*Quick Check − underapplied and overapplied overhead*

* + 1. Disposition of underapplied or overapplied overhead balances
			1. Any remaining balance in the Manufacturing Overhead account, such as PearCo.’s $30,000 of overapplied overhead, is disposed of in one of two ways:
				1. It can be closed out to Cost of Goods Sold.

 64

* + - * 1. It can be allocated between Work in Process, Finished Goods, and Cost of Goods Sold in proportion to the overhead applied during the current period in the ending balances of these accounts.

* + - 1. The journal entry, in T-account form, to close out PearCo’s $30,000 of overapplied overhead into Cost of Goods Sold would be as follows:

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* + - * 1. Debit Manufacturing Overhead and credit Cost of Goods Sold.
			1. Calculating the allocation of underapplied or overapplied overhead between Work in Process, Finished Goods, and Cost of Goods Sold.
				1. Assume the overhead applied in Ending Work in Process Inventory, Ending Finished Goods Inventory, and Cost of Goods Sold is $68,000, $204,000, and $408,000, respectively (total value of accounts $680,000).

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* + - * 1. In this case, the allocation percentages for Work in Process, Finished Goods, and Cost of Goods Sold would be 10%, 30%, and 60%, respectively.

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* + - * 1. The allocation of the $30,000 of overapplied overhead would be: Work in Process, $3,000; Finished Goods, $9,000; and Cost of Goods Sold, $18,000.

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* + - 1. The journal entry to close out the $30,000 of overapplied overhead to each of the three accounts would be:

 68

* + - * 1. Debit Manufacturing Overhead and credit Work in Process, Finished Goods, and Cost of Goods Sold.
			1. In summary, there are two methods for disposing of underapplied and overapplied overhead.
				1. Close out to Cost of Goods Sold.
				2. Allocate between Work in Process, Finished Goods, and Cost of Goods Sold.

 69

* + - * 1. The latter method is considered more accurate, but it is more complex to compute.

 *Quick Check − under- and overapplied overhead*

70-71

1. Selected topics
	1. Multiple predetermined overhead rates
		1. The chapter discussion assumes that there is a single predetermined overhead rate for an entire factory called a plantwide overhead rate.
		2. In larger companies, multiple predetermined overhead rates are often used. For example, each production department may have its own predetermined overhead rate.

 72

* + 1. While using multiple predetermined overhead rates is more complex, it is also more accurate because it reflects differences across departments in how overhead costs are incurred.
	1. Job-order costing in services companies
		1. Although our attention has focused upon manufacturing applications, it bears re-emphasizing that job-order costing is also used in services industries.

 73

* + - 1. For example, in a law firm, each client represents a “job.” Legal forms and similar inputs represent direct materials. The time expended by attorneys represents direct labor. The costs of secretaries, clerks, rent, depreciation, and so forth, represent the overhead.
1. Appendix 3A: the predetermined overhead rate and capacity (Slide #74 is a title slide)

*Learning Objective 8: Understand the implications of basing the predetermined overhead rate on activity at capacity rather than on estimated activity for the period.*

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* 1. Calculating predetermined overhead rates using an estimated, or budgeted amount of the allocation base
		1. This method was used throughout the chapter; however, recently it has been criticized in two ways:

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* + - 1. Basing the predetermined overhead rate on budgeted activity results in product costs that fluctuate depending upon the activity level.
			2. Calculating predetermined rates based upon budgeted activity charges products for costs that they do not use.
	1. Capacity-based overhead rates
		1. The aforementioned criticisms can be overcome by using “estimated total units in the allocation base at capacity” in the denominator of the predetermined overhead rate calculation (rather than the “estimated total units in the allocation base” in the denominator).

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* + 1. The following example will help distinguish between these two approaches.
			1. Assume that a company leases a piece of equipment for $100,000 per year. If run at full capacity, the machine can produce 50,000 units per year.

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* + - 1. The company estimates that 40,000 units will be produced and sold next year.
			2. The predetermined overhead rate, if based on the estimated number of units that will be produced and sold, is $2.50 per unit.

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* + - 1. The predetermined overhead rate, if based on capacity, is $2.00.

*Quick Check − estimated units of allocation base vs. capacity of the allocation base*

80-87

* 1. Income statement preparation
		1. Critics suggest that the underapplied overhead that results from idle capacity should be disclosed on the income statement as the cost of unused capacity − a period expense.

 88

* + - 1. Using a measure of capacity in the denominator of the predetermined overhead rate enables this type of disclosure.
			2. Using the estimated or budgeted amount of the allocation base in the denominator of the predetermined overhead rate calculation does not enable this type of disclosure.

 89

* + - * 1. Underapplied overhead is not treated as a period expense, rather it is closed out to work in process, finished goods, and/or cost of goods sold.

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1. **Appendix 3B**: **further classification of labor costs** (Slide #90 is the title slide)

*Learning Objective 9: Properly account for labor costs associated with idle time, overtime, and fringe benefits.*

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#### Accounting for idle time, overtime, and fringe benefits

* + 1. **Idle time** − Machine breakdowns, material shortages, power failures and the like, result in idle time. The labor costs incurred during idle time are ordinarily treated as manufacturing overhead. This spreads the costs across all the production rather than the units in process when the disruptions occur.

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* + 1. **Overtime** − The overtime premiums for all factory workers are usually considered to be part of manufacturing overhead. This is done to avoid penalizing particular products or customer orders simply because they happen to fall on the tail end of the daily production schedule.

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* + 1. **Labor fringe benefits** − These costs relate to employment-related costs paid by an employer such as insurance programs, retirement plans, and supplemental unemployment programs. They also include the employer’s share of Social Security, Medicare, workers’ compensation, federal employment tax, and state unemployment insurance.

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* + - 1. These costs often add up to 30% to 40% of an employee’s base pay.

 94

* + - 1. Some companies include all of these costs in manufacturing overhead. Other companies opt for the conceptually superior method of treating fringe benefit expenses of direct laborers as additional direct labor costs.