Learning Objectives

LO1 Identify cost behavior patterns.
LO2 Separate semivariable costs into variable and fixed components.
LO3 Prepare a budget for factory overhead costs.
LO4 Account for actual factory overhead costs.
Learning Objectives

LO5 Distribute service department factory overhead costs to production departments.

LO6 Apply factory overhead using predetermined rates.

LO7 Account for actual and applied factory overhead.
Accounting for Factory Overhead

1. Identify cost behavior patterns.
2. Budget factory overhead costs.
3. Accumulate actual overhead costs.
4. Apply factory overhead estimates to production.
5. Calculate and analyze differences between actual and applied factory overhead.
Cost Behavior Patterns

- **Variable costs** are costs that vary in proportion to volume changes.
- **Fixed costs** remain constant.
- **Semivariable costs** have characteristics of both fixed and variable costs.
  - Type A – remain constant over a range of production, then change abruptly.
  - Type B – vary continuously but not in direct proportion to volume changes.
Cost Behavior Patterns

- Variable
- Fixed
- Semivariable Type A
- Semivariable Type B
Techniques for Analyzing Semivariable Costs

- Observation Method (Account Classification Method)
- High-Low Method
- Scattergraph Method
- Method of Least Squares
Budgeting Factory

Overhead Costs

- Budgets are management’s operating plans expressed in quantitative terms.
- Costs are segregated into fixed and variable components.
- Budgets can be prepared for different levels of production (flexible budget).
- Valuable management tool for planning and controlling costs.
Accounting for Factory Overhead

- Entries are made in the general journal for indirect materials and indirect labor from the summary of materials issued and the labor cost summary.
- Other factory overhead expenses are recorded in the general ledger from the invoices and schedules for fixed costs.
- A factory overhead subsidiary ledger may be used if the number of factory overhead accounts becomes too large.
Examples of Factory Overhead Accounts

- Defective Work
- Depreciation
- Employee Fringe Benefits
- Fuel
- Heat and Light
- Indirect Labor
- Indirect Materials
- Insurance
- Janitorial Service
- Lubricants
- Maintenance
- Materials Handling
- Overtime Premium
- Plant Security
- Power
- Property Tax
- Rent
- Repairs
- Small Tools
- Spoilage
- Supplies
- Telephone/Fax
- Water
- Workers’ Compensation Insurance
Factory Overhead Analysis Sheets

- These sheets may be used to keep a subsidiary record of factory overhead expenses.
  - Expense-type analysis spreadsheet
  - Department-type analysis spreadsheet
Schedule of Fixed Costs

- Fixed costs are assumed not to vary in amount from month to month.
- Because fixed costs are predictable, schedules can be prepared in advance.
- A journal entry to record the total fixed costs can be prepared from these schedules.
### Example of Schedule of Fixed Costs

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depreciation-Machinery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. A</td>
<td>$300</td>
<td>$300</td>
<td>$300</td>
</tr>
<tr>
<td>Dept. B</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Total</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td><strong>Property Tax</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. A</td>
<td>$280</td>
<td>$280</td>
<td>$280</td>
</tr>
<tr>
<td>Dept. B</td>
<td>270</td>
<td>270</td>
<td>270</td>
</tr>
<tr>
<td>Total</td>
<td>550</td>
<td>550</td>
<td>550</td>
</tr>
<tr>
<td><strong>Total Fixed Costs</strong></td>
<td>$1,050</td>
<td>$1,050</td>
<td>$1,050</td>
</tr>
</tbody>
</table>
General Factory Overhead Expenses

- When factory overhead expenses are not identified with a specific department, they are charged to departments by a process of allocation.
- Allocations may be made for each item of expense incurred, or expenses may be accumulated as incurred and the allocations made at the end of the accounting period.
## Summary of Factory Overhead

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Dept. A</th>
<th>Dept. B</th>
<th>Dept. C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect materials</td>
<td>$100</td>
<td>$50</td>
<td>$40</td>
<td>$190</td>
</tr>
<tr>
<td>Indirect labor</td>
<td>200</td>
<td>150</td>
<td>140</td>
<td>490</td>
</tr>
<tr>
<td>Power</td>
<td>150</td>
<td>140</td>
<td>120</td>
<td>410</td>
</tr>
<tr>
<td>Depreciation</td>
<td>300</td>
<td>200</td>
<td>150</td>
<td>650</td>
</tr>
<tr>
<td>General factory expenses</td>
<td>150</td>
<td>350</td>
<td>200</td>
<td>700</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$900</strong></td>
<td><strong>$890</strong></td>
<td><strong>$650</strong></td>
<td><strong>$2,440</strong></td>
</tr>
</tbody>
</table>
Distributing Service Department Expenses

- Service departments are an essential part of the organization, but they do not work directly on the product.
- Production departments perform the actual manufacturing operations that physically change the units being processed.
- The costs of the service departments must be apportioned to the production departments.
- An analysis of the service department’s relationship to other departments must be done.
## Common Bases for Distributing Service Department Costs

<table>
<thead>
<tr>
<th>Service Departments</th>
<th>Basis for Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Maintenance</td>
<td>Floor space occupied by other departments</td>
</tr>
<tr>
<td>Inspection and Packing</td>
<td>Production volume</td>
</tr>
<tr>
<td>Machine Shop</td>
<td>Value of machinery and equipment</td>
</tr>
<tr>
<td>Human Resources</td>
<td>Number of workers in departments served</td>
</tr>
<tr>
<td>Purchasing</td>
<td>Number of purchase orders</td>
</tr>
<tr>
<td>Shipping</td>
<td>Quantity and weight of items shipped</td>
</tr>
<tr>
<td>Stores</td>
<td>Units of materials requisitioned</td>
</tr>
<tr>
<td>Tool Room</td>
<td>Total direct labor hours in departments served</td>
</tr>
</tbody>
</table>
Methods of Distributing Costs

1. Direct Distribution Method
   - Service department costs are allocated only to production departments.

2. Sequential Distribution or Step-Down Method
   - Distributes service department costs regressively to other service departments and then to production departments.

3. Algebraic Distribution Method
   - Distributes costs by simultaneous equations recognizing the relationship of services rendered by departments to each other.
Applying Factory Overhead to Production

- Factory overhead costs may not be known until the end of the accounting period.
- The cost of a job is needed soon after completion, so a method to estimate the amount of factory overhead applied must be established.
- This enables companies to bill customers on a more timely basis and to prepare bids for new contracts more accurately.
Methods of Predetermined Factory Overhead Rates

- Direct Labor Cost Method
- Direct Labor Hour Method
- Machine Hour Method
- Activity-Based Costing (ABC) Method
**Direct Labor Cost Method**

- Uses the amount of direct labor cost that has been charged to the product as the basis for applying factory overhead.

**Job 100**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>3,000</td>
</tr>
<tr>
<td>Factory overhead (50% of direct labor $)</td>
<td>1,500</td>
</tr>
<tr>
<td>Total cost of completed job</td>
<td>$5,500</td>
</tr>
</tbody>
</table>
## Direct Labor Hour Method

- Estimated factory overhead cost is divided by the estimated direct labor hours to be worked.

### Job 100

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,000</td>
</tr>
<tr>
<td>Direct labor (500 hours)</td>
<td>3,000</td>
</tr>
<tr>
<td>Factory overhead (500 hours @ $4)</td>
<td>2,000</td>
</tr>
<tr>
<td>Total cost of completed job</td>
<td>$6,000</td>
</tr>
</tbody>
</table>
Machine Hour Method

- This method best serves highly automated departments where the amount of factory overhead cost incurred on a job primarily is a function of the machine time that a job requires.

**Job 100**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,000</td>
</tr>
<tr>
<td>Direct labor (500 hours)</td>
<td>$3,000</td>
</tr>
<tr>
<td>Factory overhead (300 machine hours @ $10)</td>
<td>$3,000</td>
</tr>
<tr>
<td>Total cost of completed job</td>
<td><strong>$7,000</strong></td>
</tr>
</tbody>
</table>
Activity-Based Costing Method

- The company must first identify activities in the factory that create costs.
- Then a basis or cost driver must be decided upon to allocate each of the activity cost pools.
- This approach is best when the company has significant nonvolume-related costs in its plant which are not caused by traditional cost drivers such as labor hours and machine hours.
Accounting for Actual and Applied Factory Overhead

**Entry to apply estimated factory overhead to production**

Work in Process \[XX\]

Applied Factory Overhead \[XX\]

**At the end of the period, the applied factory overhead account is closed to factory overhead.**

Applied Factory Overhead \[XX\]

Factory Overhead \[XX\]
Under- and Overapplied Factory Overhead

- After the applied factory overhead account is closed, the underapplied (debit) or overapplied (credit) balance in the factory overhead account is moved to work in process.

Under- and Overapplied Factory Overhead  XX
Factory Overhead  XX

Cost of Goods Sold  XX
Under- and Overapplied Factory Overhead  XX
Period Costs and Product Costs

- **Period Costs**
  - All costs that are not assigned to the product, but are recognized as expense and charged against revenue in the period incurred.

- **Product Costs**
  - Costs that are included as part of inventory costs and expensed when goods are sold.