

Chapter 8: Reporting and Interpreting Property, Plant, and Equipment; Natural Resources; and Intangibles

CHAPTER SUMMARY

This chapter discusses accounting for long-lived productive assets. These are the noncurrent assets that a business retains for long periods for use in the course of normal operations rather than being held for sale. They include tangible assets and intangible assets. At acquisition, an asset is recorded at cost. Cost includes the cash equivalent purchase price plus all reasonable and necessary expenditures made to acquire and prepare the asset for its intended use.

Expenditures related to long-lived assets are classified in two groups. Capital expenditures are those expenditures that provide benefits for one or more accounting periods beyond the current period; therefore, they are debited to appropriate asset accounts and depreciated, depleted, or amortized over their useful lives. Revenue expenditures are those expenditures that provide benefits during the current accounting period only; therefore, they are debited to appropriate expense accounts when incurred.

A long-lived productive asset represents a bundle of future services and benefits that have been purchased in advance. As this asset is used, this bundle of services is gradually used to earn revenue. In conformity with the matching principle, cost (less any estimated residual value) is allocated to expense over the periods benefited. In this way, the expense associated with the use of operational assets is matched with the revenues earned. This allocation process is called depreciation in the case of property, plant, and equipment; depletion in the case of natural resources; and amortization in the case of intangibles. Three of the most widely used methods of depreciation are straight-line, units-of-production, and declining-balance.

The disposal of long-lived assets is recorded by removing the cost of the asset and the related accumulated depreciation account. A gain or loss on the disposal will result when the disposal price is different from the book value of the asset. When an asset's ability to provide benefits in the future is impaired, the asset is written down.

CHAPTER OBJECTIVES

- LO1 Define, classify, and explain the nature of long-lived productive assets and interpret the fixed asset turnover ratio.
- LO2 Apply the cost principle to measure the acquisition and maintenance of property, plant, and equipment.
- LO3 Apply various cost allocation methods as assets are held and used over time.
- LO4 Explain the effect of asset impairment on the financial statements.
- LO5 Analyze the disposal of property, plant, and equipment.
- LO6 Apply measurement and reporting concepts for natural resources and intangible assets.
- LO7 Explain the impact on cash flows of acquiring, using, and disposing of long-lived assets.

UNDERSTANDING BUSINESS

I. BUSINESS BACKGROUND

- 1.** Management faces the challenges of forecasting long-term productive capacity (amount of plant and equipment). Managers devote considerable time to planning optimal level of productive capacity.
 - a.** Underestimates by managers may reduce sales due to the lack of capacity to meet demand.
 - b.** Overestimates may reduce profits since the excess costs of maintaining the additional assets reduce profitability.
 - c.** In either event, net income is reduced when forecasting productive capacity is in error.
- 2.** Service companies also suffer due to poor forecasting of long-term assets. Forecasting hours of labor and facilities needed to provide services is essential to operating efficiently.
 - a.** Service companies cannot inventory hours or space for future sales.
 - Examples include airlines, hotels, CPA firms, and law firms.
 - b.** If a manufacturer or merchandiser forecasts capacity incorrectly, future sales may still be enjoyed if obsolescence or spoilage do not deplete inventoriable goods.
- 3.** Decisions regarding the acquisition of long-lived productive assets are crucial in long-term planning. Issues related to property, plant, equipment, intangibles, and natural resources have a great impact in terms of strategy, pricing decisions, and profitability for a business.
- 4.** Financial analysts closely review financial statements to determine the impact of management decisions.

II. LO1 DEFINE, CLASSIFY, AND EXPLAIN THE NATURE OF LONG-LIVED PRODUCTIVE ASSETS AND INTERPRET THE FIXED ASSET TURNOVER RATIO.

A. Classifying Long-Lived Assets

Long-Lived Assets are resources that determine a company's productive capacity.

- 1.** Tangible assets have physical substance. They are usually classified as property, plant, and equipment (fixed assets). They include:
 - a.** Land used in operations.
 - b.** Buildings, fixtures, and equipment used in operations.
 - c.** Natural resources used in operations.
- 2.** Intangible assets have no physical substance. These assets confer rights on the owner. They are evidenced by legal documents.
 - a.** Examples include patents, copyrights, franchises, licenses, and trademarks.
- 3.** Fixed Asset Turnover
 - a.** How effectively is management using fixed assets to generate revenue?
 - b.** For each dollar of fixed assets, how many dollars of sales revenue are generated?

$$\text{Fixed Asset Turnover} = \frac{\text{Net Sales (or Operating Revenues)}}{\text{Average Net Fixed Assets}}$$

$$\text{Average Net Fixed Assets} = \frac{\text{Beginning Net Fixed Assets} - \text{Ending Net Fixed Assets}}{2}$$

III. LO2 APPLY THE COST PRINCIPLE TO MEASURE THE ACQUISITION AND MAINTENANCE OF PROPERTY, PLANT, AND EQUIPMENT.

A. Measuring and Recording Acquisition Cost

- 1.** Under the cost principle, all reasonable and necessary costs incurred to acquire and prepare an asset for use should be capitalized, i.e., assigned (recorded) to the asset account.
 - a.** Acquisition costs: the net cash equivalent paid or to be paid for long-lived assets. Examples:
 1. Costs to buy the asset include the invoice price (less early payment discounts), sales taxes, legal fees, and transportation costs.
 2. Setup costs, including special wiring, platforms (such as a concrete foundations), and other installation costs.
 3. Costs to place the asset in service (to ready it for use) include expenditures for testing, adjusting, renovating, and complying with safety requirements.
 - b.** Generally, financing charges associated with the asset are treated as interest expense (not capitalized).
- 2.** Various means of acquiring long-lived assets include:
 - a.** For cash: cash is paid at the time of acquisition.
 - b.** For debt: a note is negotiated with the seller or the bank to finance the purchase.
 - c.** For equity or noncash consideration: when stock or other noncash consideration is included as part of the purchase price.
 1. The cash-equivalent cost is measured by the current market value of the stock or non-cash consideration.
 2. If the value of what is given up is not determinable, the current market value of what is received should be used for measurement purposes.
 - d.** By construction: self-constructed assets should include all necessary costs associated with construction such as labor and materials.
 - Interest incurred during the construction process (capitalized interest) is normally included even when funds are not borrowed to directly support the construction. In such cases, capitalized interest is based on the funds invested in the project.

B. Repairs, Maintenance, and Additions

- 1.** Most productive assets require expenditures during their useful lives for ordinary repairs and maintenance, major repairs, replacements, and additions.
 - a.** Depending on the nature of the cost, these expenditures must be recorded either to expense accounts or to asset accounts.
- 2.** Revenue expenditures: recorded as expenses since they provide benefits only during the current accounting period.
 - a.** These are for ordinary repairs and maintenance. They are expenditures for the normal operating upkeep of assets to keep them in working condition.
 - b.** They are relatively small, recurring amounts that do not effectively lengthen the useful life of the asset.
 - c.** These revenue expenditures are reported as expenses in the current period.
- 3.** Capital expenditures: recorded as increases in asset accounts since they provide benefits for one or more accounting periods beyond the current period.
 - a.** These costs are then depreciated over their useful lives.
 - b.** Included in this category are extraordinary repairs; i.e., major, high-cost, long-term repairs that increase the economic usefulness of the asset in terms of greater efficiency or longer life.
 - c.** Examples:
 - Major overhauls, complete reconditioning, and major replacements and improvements. They are additions, extensions to, or enlargements of, existing assets. These are considered capital expenditures and are therefore shown as an increase to an asset account.

4. Management experience and professional judgment help to distinguish between the classification of expenditures as either revenue expenditures (expenses) or capital expenditures (assets). This decision can be quite subjective.
 - a. Decisions to "expense" items result in lower net income in the current period. Decisions to "capitalize" items result in higher net income in the current period.
 - b. Auditors and financial analysts pay close attention to management decisions in this area.
 - c. The materiality and cost-benefit constraints are important considerations in decisions to "expense" versus "capitalize".

IV. LO3 APPLY VARIOUS COST ALLOCATION METHODS AS ASSETS ARE HELD AND USED OVER TIME.

A. Depreciation Concepts

1. Land is considered to have an unlimited life. In accordance with the cost principle, land remains on a company's books at its cost. With the exception of impairment, no adjustment is made to the cost of land.
2. Other long-lived assets such as buildings and equipment have limited useful lives.
 - a. The cost of these assets represents the collective amount of future services and benefits that will help earn future revenues.
 - b. The matching principle requires that a portion of the cost be allocated to each period in which revenue is earned by using these assets.
3. Depreciation is the systematic and rational cost allocation of tangible productive assets, other than land, to future periods in which the assets contribute services or benefits to help earn revenues.
 - a. No matter which method of determining depreciation expense for the period is used, the accounts involved in the journal entry are the same.

Depreciation Expense	xxx
Accumulated Depreciation	xxx

- b. Depreciation Expense is presented on the income statement.
- c. Accumulated Depreciation, the total amount of depreciation expense recorded for an asset since its acquisition date, reduces the cost of the productive asset on the balance sheet.

Asset Cost
- Accumulated Depreciation
Net Book Value of Asset

- d. Accumulated Depreciation is a contra-asset account since it reduces the book value (carrying value) of an asset. Note: Since Accumulated Depreciation is a contra asset account, it is not closed during the closing process.
- e. The balance sheet presentation does not represent current market values.
4. The calculation of depreciation expense requires three amounts to be determined, two of which are estimates made by management. Therefore, depreciation expense is an estimate.
 - a. Acquisition cost – All cost incurred to purchase and get the asset ready for use.
 - b. Useful life is the estimated service life of an asset to the present owner. This life often differs from the total economic life of the asset. The continuity assumption (going concern) underlies the determination of this estimate.
 - c. Residual value (salvage value, scrap value, or trade-in value) is the estimated amount to be recovered at the end of the estimated useful life of the asset.

B. Alternative Depreciation Methods

1. Because of differences between companies and the assets they own, different depreciation methods exist.
 - a. Each method that is in conformity with GAAP allocates costs in a systematic and rational manner.
 - b. The amount of cost allocation in each period varies by method, but the depreciation charges over the entire estimated life will be the same in total for all methods.

2. Three of the most commonly used depreciation methods are as follows:
 - a. Straight-line depreciation
 1. Allocates the depreciable cost in equal amounts over the estimated useful life.
 2. The most commonly used method due to its relative simplicity.
 3. Based on the estimated time for using the asset.
 4. Provides for a constant depreciation expense, equal increases to accumulated depreciation, and equal decreases of book value each year.

$$\text{Depreciation expense} = (\text{Cost} - \text{Residual Value}) \times \frac{1}{\text{Useful life}}$$

- b. Units-of-production depreciation
 1. Allocates the cost over the useful life based on its productive output (usage) related to its total estimated productive output (usage).
 2. Results in depreciation expense, accumulated depreciation, and book values that vary from period to period.
 - a. Varies directly with the units produced.
 - b. Depreciation under this method is a variable expense.
 3. Based on an estimate of the total productive capacity of an asset. This is an “activity” based estimate instead of a time based estimate.

$$\text{Depreciation rate per unit} = \frac{\text{Cost} - \text{Residual value}}{\text{Estimated total production}}$$

$$\text{Depreciation expense} = \text{Depreciation rate} \times \text{Actual production (Units used)}$$

- c. Declining-balance depreciation
 1. An accelerated depreciation method.
 2. It allocates cost over the useful life based on a multiple of the straight line rate.
 3. Declining balance ignores residual value in its computation, but, the asset may not be depreciated beyond the residual value.
 4. The declining balance rate often used is 200% or 2 times the straight-line rate.

$$\text{Straight Line Rate} = \frac{100\%}{\text{Life in years}}$$

$$\text{Declining Balance Rate} = \text{Straight Line Rate} \times \text{Declining Balance multiple}$$

$$\text{DDB Rate} = \text{Straight Line Rate} \times 2$$

$$\text{Depreciation expense} = \text{Declining Balance Rate} \times \text{Beginning Book Value}$$

5. Declining balance provides for larger expenses in early years and smaller expenses in later years compared to the straight-line method.
 - The last year(s) of depreciation expense must be adjusted from the formula above so that book value does not go below residual value.
6. Declining Balance is commonly used by companies that experience rapid obsolescence in long-lived productive assets.

C. How Managers Choose

1. Managers should choose a depreciation method that best matches the use of long-lived productive assets relative to the revenues it helps to generate.
2. Straight-line depreciation is the most widely used for financial statement purposes due to its simplicity.
3. Accelerated methods of depreciation
 - a. Assets are more efficient in their early years. Therefore, they help to produce more revenues in those years.
 - b. Repair costs are lower in early years and higher in later years. When the cost of the asset and the cost of repairs for that asset are considered collectively, accelerated depreciation tends to level out the total cost of using an asset over its useful life.
4. Companies may use one depreciation method for some assets and another depreciation method for other assets. Note, disclosure is required for depreciation methods used and estimated useful lives selected.
5. When a depreciation method is chosen for an asset, it should be consistently applied.
6. Companies generally must maintain two sets of accounting records.
 - a. One set is for financial statement purposes according to GAAP.
 - b. The other is for income tax purposes according to Internal Revenue Code.
 - c. It is legal and necessary to keep "two sets of books" for these purposes since financial reporting and income tax determination have different objectives and rules.
 1. Financial reporting is designed to provide economic information about a business so that decision makers can formulate predictions about the future cash flows.
 2. Income tax reporting is driven by the government's focus to secure revenues. Taxpayers are driven by "the least and the latest rule." That is, they want to pay the smallest amount of tax at the latest possible date.
 - d. Depreciation methods for GAAP and income tax purposes are quite different.
 1. The acceptable methods for GAAP are discussed above.
 2. The method used for federal income tax purposes is the Modified Accelerated Cost Recovery System (MACRS). Tax laws mandate the lives and depreciation rates to be used. These are not the same as for GAAP. Note that a disclosure is needed to explain GAAP and tax depreciation differences.
 3. MACRS delays the payment of income taxes, since it allocates more of the depreciable cost in the early years of an asset.
 4. Theoretically, this delay will reverse in the later years of an asset; however, as long as a company continues to purchase new assets, the tax will continue to be delayed.
 5. Straight-line depreciation will generate a higher net income, which is preferable for financial reporting purposes.

V. LO4 EXPLAIN THE EFFECT OF ASSET IMPAIRMENT ON THE FINANCIAL STATEMENTS.

A. Measuring Asset Impairment

1. It is important for management to review long-lived tangible and intangible assets for possible impairment.
2. Impairment occurs when events or circumstances cause the book value of an asset to be higher than estimates of future cash flows (future benefits).
 - a. If the estimated future cash flows are less than the book value of the asset, the asset should be "written down."
 - b. The carrying value is reduced to the fair value and an impairment loss is recognized.

$$\text{Impairment Loss} = \text{Net Book Value} - \text{Fair Value}$$

VI. LO5 ANALYZE THE DISPOSAL OF PROPERTY, PLANT, AND EQUIPMENT.

- A. Disposal of PP&E**
 - 1. Voluntary disposals of assets include sales, trade-ins, and retirements.
 - 2. Involuntary disposals of assets result from casualties such as fires, storms, and accidents.
- B. Recording Disposals**
 - 1. Two journal entries are usually required to record the disposal of depreciable assets.
 - a. Disposals seldom occur on the last day of the accounting period, so the depreciation expense and accumulated depreciation accounts must be updated at the time of disposal.
 - b. The cost of the asset and any accumulated depreciation must be removed from the accounts.
 - 1. If the cash or other consideration received for the asset is greater than its book value, a gain on disposal is recognized.
 - 2. If cash or other consideration received is less than book value, a loss is recognized.
 - 3. Discarded assets
 - i. If a fully depreciated asset (when salvage value is zero) is discarded, no gain or loss results.
 - ii. If it is not fully depreciated, a loss is recognized.

VII. LO6 APPLY MEASUREMENT AND REPORTING CONCEPTS FOR NATURAL RESOURCES AND INTANGIBLE ASSETS.

- A. Acquisition and Depletion of Natural Resources**
 - 1. Natural resources: assets that occur in nature.
 - a. Often referred to as wasting assets since they are depleted or used up when they are extracted for use in products.
 - b. Examples: gold, coal, iron ore, oil, and timber.
 - 2. Environmental considerations are particularly important for companies owning natural resources.
 - 3. Acquisition
 - a. Recorded in conformity with the cost principle when acquired.
 - 4. Depletion
 - a. The action of allocating the cost over the period of its exploitation. [Example: When coal is mined, the mine value is reduced (depleted) and the asset account for coal inventory is increased. The coal is expensed when the coal is sold..]
 - b. The process of periodic cost allocation of the natural resource over the economic life in conformity with the matching principle.
 - c. Computation is similar to the units-of-production depreciation method. It is a systematic and rational allocation of the natural resource's cost.

$$\text{Depletion rate} = \frac{\text{Cost} - \text{Residual value}}{\text{Life in units}}$$

$$\text{Depletion} = \text{Depletion rate} \times \text{Units extracted}$$

- d. Residual value is rarely used for natural resources.
- e. An Accumulated Depletion account may be used; however, usually the natural resource asset itself is reduced directly.
- f. Depletion is not expensed. It is added to the company's inventory as the natural resource is extracted or harvested. When inventory is sold, cost of goods sold is matched to sales revenue.

B. Acquisition and Amortization of Intangible Assets

1. Intangible assets: assets that have no physical substance. Their value results from certain rights and privileges conferred by law on the owner of the asset. Intangible assets can either have definite lives or indefinite lives.
2. Acquisition
 - a. Recorded in conformity with the cost principle *only* if purchased.
 - b. If they are developed by a company, the development costs are usually recorded as expenses when incurred.
3. Amortization
 - a. If the intangible assets have definite lives, the process of periodic cost allocation of intangible assets over their estimated useful lives in conformity with the matching principle.
 - b. Similar to depreciation for plant assets.
 - c. Computation is a systematic and rational allocation, similar to the straight-line depreciation method when intangible assets have definite lives.

$$\text{Amortization} = \frac{\text{Cost} - \text{Residual value}^*}{\text{Life in years}}$$

*Residual value usually is zero

- d. An Accumulated Amortization account may be used. However, usually the intangible asset itself is reduced directly.
- e. If intangible assets have indefinite lives, they are not amortized.
 1. Such assets are tested annually for impairment.
 2. Impairment occurs when the book value exceeds future cash flows.
 3. As with tangible assets, the impairment loss recognized is the excess of book value over fair value.
4. Examples of Intangible Assets
 - a. Goodwill
 1. Includes aspects of a business such as good reputation, good location, customer loyalty, and quality goods or services.
 2. The only time goodwill is recorded is when one business buys another business.
 - a. It is recorded at its cost.
 - b. The cost of goodwill is the amount paid for the whole business minus the market value of its identifiable net assets.
 - c. Often reported as "cost in excess of net assets acquired."
 - d. Goodwill has an indefinite life and must be reviewed at least annually for possible impairment.
 3. Goodwill that is internally generated is not recorded.
 - b. Trademark
 1. A special name, image, logo, or slogan that is identified with a product or a company.
 2. Among the most valuable assets a company can own.
 3. Since trademarks are normally created internally by a company, they are not recorded. The costs of developing trademarks internally are recorded as expenses.
 4. If a trademark is purchased, it follows the rules for other purchased intangibles.

- c. Copyright
 - 1. The exclusive right to publish, use, and sell a literary, musical, or artistic work for a period generally not to exceed 70 years after the author's death.
 - 2. Should be recorded at cost and amortized over the shorter of their useful life or remaining legal life.
- d. Patent
 - 1. An exclusive right granted by the federal government for a period of 20 years.
 - 2. Enables its owner to use, manufacture, and sell the subject of the patent.
 - 3. Patents encourage the development of new products.
 - 4. If a patent is purchased, it should be recorded at cost and amortized over the shorter of its useful life or remaining legal life.
 - 5. If a patent is internally developed, only the costs associated with registration would be capitalized and amortized.
- e. Technology
 - 1. Includes costs for computer software and Web development.
 - 2. Amortization follows the impairment rules due to the indefinite life of technology.
- f. Franchises
 - 1. May be granted by a government or a business for a specified period and purpose.
 - 2. The life of is usually included in a contract, and the cost is amortized over the appropriate life.
- g. Licenses and operating rights (Examples include radio and television rights)
 - 1. Obtained through agreements with governmental agencies.
 - 2. They permit owners to use public property to provide services.
- h. Research and development costs
 - 1. Generally expensed as incurred.
 - 2. R&D is usually not an intangible asset because of the insufficient probability of measurable future cash flows.

VIII. LO7 EXPLAIN THE IMPACT ON CASH FLOWS OF ACQUIRING, USING, AND DISPOSING OF LONG-LIVED ASSETS.

- A. Purchase (or sale) of an intangible asset is an outflow (inflow) of cash in the Investing section of the Statement of Cash Flows.
- B. Operating Section adjustments (indirect method):
 - 1. Depreciation and amortization expense is added back.
 - 2. Gain on sale of a plant asset or an intangible asset is deducted.
 - 3. Loss on sale of a plant asset an intangible asset is added back.
 - 4. Loss due to asset impairment write-down is added back.

IX. CHAPTER SUPPLEMENT A: CHANGES IN DEPRECIATION ESTIMATES

- 1. The computation of depreciation expense uses two estimates -- useful life and residual value.
 - Since these are estimates, their initial determination may need to be revised as experience with the asset accumulates.
- 2. When management believes it is appropriate to change estimates regarding a depreciable asset, the book value (undepreciated value) less the revised residual value becomes the remaining depreciable amount for the asset. This value should be apportioned over the remaining estimated life of the asset.
- 3. Changes in estimates result because of better measures of the asset's usefulness.
 - a. This is a prospective change that does not involve restatement of prior period statements.
 - b. Note, a disclosure should explain such changes since comparability of financial statements is important to financial analysts and other statement users.
- 4. Changes in depreciation methods require special treatment on the income statement (see Chapter 5) since the consistency principle is violated.