

Section 2

## DEPRECIATION UNDER GAAP (FOR BOOK PURPOSES)

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### Introduction

Most plant and equipment assets wear out or become obsolete over the years. Similarly, although land is not depreciated (because it does not wear out), improvements to land, such as paving or fences, are depreciated because these improvements wear out or become obsolete over time. The portion of the asset “used up” (worn out) each year is referred to as depreciation. Depreciation for each asset is usually calculated separately and is based on four factors:

- a. the asset’s cost;
- b. the asset’s estimated life;
- c. the asset’s residual value (its book value after being fully depreciated); and
- d. the method of depreciation selected.

### Determining the Asset’s Cost

For depreciation purposes, the cost (*historical cost, original cost or acquisition cost*) is more than just the invoice price. It includes *any cost incurred to acquire, transport and prepare the asset for its intended use*, such as sales tax, commissions, title fees, transportation, and installation.

**EXAMPLE 1:** CuCo purchases a machine that has the following breakdown of costs: Invoice price, \$20,000, sales tax, \$1,500, freight, \$500, outside contractor to install the machine, \$200. For depreciation purposes, the cost of the machine is \$22,200, computed as follows:

\$20,000	invoice price
1,500	sales tax
500	freight
<u>200</u>	set-up (contractor)
<u>\$22,200</u>	total cost

Thus, CuCo records acquisition of the machine as follows:

Asset—Machine	22,200
Cash	22,200

### **Group Purchases**

Sometimes a company pays a single price for a group of assets and cannot tell from the invoice how much of the freight, installation and other costs are attributable to each asset. Moreover, because one asset may have a life of three years, another five years and so on, and because other assets in the group may not even be depreciable (such as the land in an acquisition of five adjacent buildings), the company allocates a separate cost for each asset.

The price of each asset in a group purchase is computed as follows:

$$\frac{\text{Specific asset's fair market value (FMV)}}{\text{Total FMV of all assets acquired}} = \text{rate} \times \text{total acquisition cost} = \text{specific asset's acquisition cost}$$

**PROBLEM 1:** MiCo's purchase of a computer, printer and a copier has an acquisition cost of \$6,000. The invoice does not separately list the cost of each item. What is the acquisition cost of each asset?

**SOLUTION 1:** MiCo estimates, or obtains from a formal appraisal, the FMV of each asset, as follows:

<u>Asset</u>	<u>FMV</u>
Computer	\$4,000
Printer	1,000
Copier	<u>3,000</u>
Total FMV	<u>\$8,000</u>

Next, MiCo computes each asset's portion of the total \$6,000 acquisition cost, as follows:

1. To compute the acquisition cost of the computer:

$$\frac{\$4,000 \text{ computer FMV}}{\$8,000 \text{ total FMV}} = 0.5 \text{ rate} \times \$6,000 \text{ total acquisition cost} = \$3,000 \text{ acquisition cost for the computer}$$

2. To compute the acquisition cost of the printer:

$$\frac{\$1,000 \text{ printer FMV}}{\$8,000 \text{ total FMV}} = 0.125 \text{ rate} \times \$6,000 \text{ total acquisition cost} = \$750 \text{ acquisition cost for the printer}$$

3. To compute the acquisition cost of the copier:

$$\frac{\$3,000 \text{ copier FMV}}{\$8,000 \text{ total FMV}} = 0.375 \times \$6,000 \text{ total acquisition cost} = \$2,250 \text{ acquisition cost for the copier}$$

To summarize the acquisition cost of each asset, individually:

<u>Asset</u>	<u>Acquisition cost</u>
Computer	\$3,000
Printer	750
Copier	<u>2,250</u>
Total cost	<u>\$6,000</u>

**PROBLEM 2:** SaCo's purchase of a building and land has a total original cost (acquisition cost) of \$100,000. The purchase contract does not separately list the price of the building and the land. The company estimates the following FMVs for the building and land:

<u>Asset</u>	<u>FMV</u>
Building	\$ 75,000
Land	<u>50,000</u>
Total FMV	<u>\$125,000</u>

What is the acquisition cost of the building for depreciation and recordkeeping purposes? What is the original cost of the land (for recordkeeping purposes only, because land cannot be depreciated)?

**SOLUTION 2:** SaCo allocates the original cost of the building and land as follows:

1. To compute allocation of the original cost of the building:

$$\frac{\$75,000 \text{ building FMV}}{\$125,000 \text{ total FMV}} = 0.6 \times \$100,000 \text{ total original cost} = \$60,000 \text{ original cost of building}$$

2. To compute allocation of the original cost of the land:

$$\frac{\$50,000 \text{ building FMV}}{\$125,000 \text{ total FMV}} = 0.4 \times \$100,000 \text{ total original cost} = \$40,000 \text{ original cost of land}$$

### **Contributed Assets**

It is common practice in startup and even in established companies for owners to contribute assets rather than cash in exchange for stock. The computations and journal entries for contributed assets under GAAP or tax rules are done by a CPA and are not included in this course.

### *Determining the Asset's Estimated Life*

The estimated life is the number of years the company expects the asset to last or the amount of production it expects from the machine measured in hours, miles, units produced, or any other standard. For example, a machine's life may be measured in years, units produced or hours used; an automobile in years of use or miles driven; and a building in years of use.

### *Determining the Asset's Residual Value (or Scrap Value or Salvage Value)*

The residual value is an estimate made by company management of the dollar amount that can be recovered for the asset at the end of its useful life when it is disposed of (sold or traded in). This amount cannot be depreciated. When the residual value is subtracted from the acquisition cost, the remainder is the full amount that can be depreciated and is referred to as the *depreciable base*.

$$\text{Acquisition cost} - \text{residual value} = \text{depreciable base}$$

To put it another way, when total depreciation taken on an asset equals the depreciable base, the asset has been fully depreciated.

For example, if XyCo buys a \$20,000 packaging machine and estimates that at the end of the machine's useful life it will have a residual value of \$1,000, the machine's depreciable base is \$19,000. XyCo can take a total of \$19,000 in depreciation expense over the machine's useful life. If, instead, XyCo estimates that the machine will have no residual value at the end of its life, then the original cost of \$20,000 is the depreciable base, and XyCo can take \$20,000 in depreciation expense over the machine's useful life.

### *Selecting a Depreciation Method*

Under GAAP, a plant or equipment asset can be depreciated using one of four basic methods:

**1. The straight-line (SL) method.** The asset is depreciated by dividing the depreciable base (acquisitions cost – residual value) by the number of years in the estimated life to determine each year's depreciation expense. Thus, under SL, each year's depreciation expense is the same.

**2. The units of production (UOP) or units of output method.**

The asset is depreciated each year according to the number of units produced, total hours used, total miles driven, or other measure of production. Thus, under UOP, the amount of annual depreciation fluctuates by output or use.

**3. The accelerated methods.** There are two methods of accelerated depreciation. They are called accelerated because they provide more annual depreciation expense in the earlier years of the asset's life and less depreciation expense in the later years. The two accelerated methods are the *declining balance* (DB) method and the *sum-of-the-years'-digits* (SYD) method, which are explained in this course in Sections 5 and 6 respectively.

*Regardless of the depreciation method selected or annual depreciation taken, total depreciation over the life of the asset is the same.*

### *How Depreciation Is Recorded*

When depreciation expense is recorded at the end of the year, quarter, month or other period, the same accounts are debited or credited in the adjusting journal entry regardless of the method used; only the amount of depreciation will be different. Depreciation expense is generally recorded just before a company prepares its financial statements. Although some companies prepare statements quarterly, and therefore record depreciation expense quarterly, most firms prepare their statements annually. As noted in Section 1, the journal entry used to record depreciation is:

Depreciation Expense  
    Accumulated Depreciation

Often, there is only one Depreciation Expense account, but a separate Accumulated Depreciation account for each group of assets that a firm presents on its balance sheet, such as Accumulated Depreciation—Equipment and Accumulated Depreciation—Vehicles. This is the method used in this course. (Some firms may have an accumulated depreciation account for each asset, such as Accumulated Depreciation—Boiler or Accumulated Depreciation—Crane, then group the accumulated depreciation accounts at the end of the period for the balance sheet.)

The depreciation expense account is an income statement account and, reflects the total cost of plant assets expensed (allocated) against revenue for the *current* period.

The accumulated depreciation account is a balance sheet account. It increases each time depreciation is recorded. It represents a running total of all depreciation taken to date for plant assets which remain on hand (have not been disposed of) including *prior and current* periods.

The typical balance sheet shows property and equipment separately under the heading "Plant, property and equipment," so the typical company will have at least two accumulated depreciation accounts: Accumulated Depreciation—Buildings, and Accumulated Depreciation—Equipment (equipment is plant). Many firms also have accumulated depreciation accounts for subcategories of assets, such as vehicles (Accumulated Depreciation—Vehicles). The accounts might appear in the general ledger as follows:

Asset—Office Building  
 Asset—Garage  
 Asset—Warehouse  
 Accumulated Depreciation—Buildings  
 Asset—Truck  
 Asset—Auto  
 Asset—Forklift  
 Accumulated Depreciation—Vehicles  
 Asset—Computer  
 Asset—Drillpress  
 Accumulated Depreciation—Equipment

**PROBLEM 3:** On January 3, 19X5, HaCo purchases a computer for \$10,000 cash, then takes \$1,000 depreciation in 19X5, the year of purchase, and \$1,000 in 19X6. In which accounts does HaCo record the acquisition? The 19X5 depreciation expense? The 19X6 depreciation expense?

**SOLUTION 3:** HaCo records the acquisition as follows:

<u>January 3, 19X5</u>		
Asset—Computer	10,000	
Cash		10,000

HaCo records the 19X5 depreciation expense as follows:

<u>December 31, 19X5</u>		
Depreciation Expense	1,000	
Accumulated Depreciation—Computer		1,000
<i>To record depreciation expense</i>		

HaCo records the 19X6 depreciation expense as follows:

<u>December 31, 19X6</u>	
Depreciation Expense	1,000
Accumulated Depreciation—Equipment	1,000
<i>To record depreciation expense</i>	

Note that after recording the 19X6 depreciation expense, the balance in Accumulated Depreciation—Equipment is \$2,000 (\$1,000 depreciation for 19X5 + \$1,000 depreciation for 19X6).

### *Computing Book Value*

Book value, or net book value, does not necessarily represent an asset's value. Instead, it represents the undepreciated cost of the asset as it appears on the company's books and balance sheet. Book value is the acquisition cost less accumulated depreciation (accumulated depreciation is all depreciation expense taken on the asset to date). To put it in a simple formula:

$$\text{Acquisition cost} - \text{accumulated depreciation} = \text{book value}$$

For instance, for HaCo in the example above, the book value of its computer at the end of 19X6 is \$8,000. To compute:

$$\begin{aligned} &\$10,000 \text{ acquisition cost} - \$2,000 \text{ accumulated depreciation} = \$8,000 \\ &\text{book value} \end{aligned}$$

### *How Manufacturing Companies*

#### *Record Depreciation*

Manufacturing companies record depreciation in two ways:

1. Depreciation for machines, buildings, or other fixed assets used in the manufacture of products is recorded in the Inventory account (*not* in Depreciation Expense) as follows:

Inventory—Work-In-Process OH\*  
    Accumulated Depreciation—(Buildings or Equipment, etc.)

\*overhead

**Note:** In actual practice, manufacturers record depreciation for the period in the Manufacturing Overhead account. As items are produced, depreciation related to the manufactured items is transferred from Manufacturing Overhead to Inventory—Work-In- Process. However,

because a detailed understanding of depreciation for manufacturers is not required for this course, we record depreciation related to manufacturing in the account Inventory—Work-In-Process OH (overhead). As work in process is completed and sold, a proportional amount of the depreciation expense will be transferred to Finished Goods Inventory and then to Cost Of Goods Sold.

2. Depreciation for machines, buildings, or other fixed assets used by a manufacturing company for nonmanufacturing activities, such as office furniture, is recorded in Depreciation Expense, as follows:

Depreciation Expense  
 Accumulated Depreciation—(Buildings or Equipment, etc.)

When assets are used for both manufacturing and nonmanufacturing purposes, such as a building that holds both administrative and production facilities or an air-conditioning system that cools both production and office space, depreciation is allocated proportionally between Inventory and Depreciation Expense as follows:

Inventory—Work-In-Process OH  
 Depreciation Expense  
 Accumulated Depreciation—(Category of Asset)

When work in process is eventually completed and sold, the depreciation will be transferred to Finished Goods Inventory and then to Cost Of Goods Sold.

**PROBLEM 4:** For 19X5, SyCo Manufacturing allocates \$10,000 of depreciation as follows: \$2,000 for manufacturing machinery and \$8,000 for a building. Syco determines that 75% of the building is used for manufacturing. What adjusting entries does SyCo record at year end to recognize depreciation?

**SOLUTION 4:** First, Syco must compute how much of the \$8,000 depreciation for the building to allocate to manufacturing v. office use. To compute: \$8,000 building depreciation x 75% manufacturing use = \$6,000 of depreciation allocated to manufacturing. The remaining \$2,000 is recorded in Depreciation Expense (\$8,000 building depreciation x 25% office use = \$2,000).

Therefore, SyCo records the year-end adjusting entries for depreciation as follows:

Depreciation Expense	2,000*
Accumulated Depreciation—Building	2,000

\*This is the \$2,000 of the building's depreciation allocated to office use.

Inventory—Work-In-Process OH	8,000**	
Accumulated Depreciation—Equipment		2,000
Accumulated Depreciation—Building		6,000

\*\*\$6,000 of the building's depreciation allocated to manufacturing + \$2,000 depreciation for the manufacturing machinery.

### *Depreciation on the Financial Statements*

**Reporting on the income statement.** Nonmanufacturing companies report depreciation expense on the income statement under operating expenses as a selling and administrative expense. Manufacturing companies report some depreciation as an operating (selling and administrative) expense and include some in the expense cost of goods sold in the year that the products it manufactures are sold.

**Reporting on the balance sheet.** Plant and equipment assets appear on the balance sheet in the property, plant and equipment section. For example, buildings might be presented as follows:

Buildings at acquisition cost
<u>– Accumulated depreciation</u>
Book value

As accumulated depreciation increases over the years or other periods, the asset's current book value decreases. An illustration of plant assets on the balance sheet would appear as follows:

Property, plant and equipment (PP&E):		
Land—at cost		75,000
Buildings—at cost	1,000,000	
Less: Accumulated depreciation	<u>100,000</u>	<u>900,000</u>
		975,000

*Land—at cost.* Land is not depreciated, so this amount does not change from year to year.

*Buildings—at cost.* This is the acquisition cost of *all* buildings, the total of the balances in all the building accounts (Asset—Building, Asset—Warehouse, etc.). The acquisition cost appears unchanged on the balance sheet year after year until the asset is sold or traded.

*Accumulated depreciation.* This is the balance in the account Accumulated Depreciation—Buildings.

Although the words “book value” do not appear, the book value, or net book value of the property, plant and equipment is the \$975,000 total and the book value of the buildings is \$900,000. Thus, having an accumulated depreciation account for each group of assets presented on the balance sheet provides an easy way to compute and show the net book value for that group of assets.

Equipment assets are presented in a similar way:

Equipment at acquisition cost  
– accumulated depreciation  
 current book value     (as of the balance sheet date).

The building and equipment assets appear on the balance sheet as follows:

Property, plant and equipment (PP&E):		
Land—at cost	75,000	
Buildings—at cost	1,000,000	
Less: Accumulated Depreciation	<u>100,00</u>	900,000
 Equipment—at cost	 25,000	
Less: Accumulated depreciation	<u>4,400</u>	<u>20,600</u>
Total PP&E		995,600

*Equipment—at cost.* This is the acquisition cost of *all* the equipment, the total of the balances in all the equipment accounts (Asset—Truck; Asset—Computer; Asset—Drillpress; etc.). The acquisition cost appears unchanged on the balance sheet year after year until the asset is sold or traded.

*Accumulated depreciation.* This is the balance in Accumulated Depreciation—Equipment.

Although the words “book value” do not appear, the book value, or net book value, does appear. The current net book value of all equipment is \$20,600, and the current net book value of all property, plant and equipment is \$995,600.

Sometimes the balance sheet will show assets *at net* (that is, the accumulated depreciation was subtracted from the original cost before the amount was presented on the balance sheet):

Property, plant and equipment (PP&E):		
Land—at cost	75,000	
Buildings—at net	900,000	
Equipment—at net	<u>20,600</u>	
Total PP&E		<u>995,600</u>

**QUIZ 1 DEPRECIATION UNDER GAAP (FOR BOOK PURPOSES).**

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*Problem I.*

Mark each statement True or False.

1. The total amount of depreciation taken over the life of the asset is the same regardless of which depreciation method is selected.
  - a. True
  - b. False
  
2. Net book value is a year-end estimate of the fair market value of a company's depreciable assets.
  - a. True
  - b. False
  
3. The balance sheet shows the acquisition cost and the accumulated depreciation of each asset.
  - a. True
  - b. False

*Problem II.*

Multiple choice. Circle the correct answer.

1. Which of the following assets is *not* depreciable?
  - a. building
  - b. machine
  - c. fence
  - d. land
  
2. Which of the following is an income statement account?
  - a. Asset—Machine
  - b. Accumulated Depreciation—Equipment
  - c. Depreciation Expense
  - d. Inventory—Work-In-Process OH

- 3.** Which depreciation method is *not* based on the number of accounting periods in which an asset is used?
- straight line
  - units of production
  - declining balance
  - sum-of-the-years'-digits

*Use the following information for Questions 4-7:* SuCo pays \$50,000 cash for a machine, \$3,500 cash in sales tax and \$1,500 cash for shipping and set up.

- 4.** What is the machine's cost for depreciation purposes?
- \$10,000
  - \$50,000
  - \$53,500
  - \$55,000
- 5.** What is the journal entry (omitting dollar amounts) to record the purchase of the machine?
- Asset—Machine  
Accumulated Depreciation—Equipment
  - Depreciation Expense  
Accumulated Depreciation—Equipment
  - Asset—Machine  
Cash
  - Asset—Equipment  
Depreciation Expense
- 6.** If a nonmanufacturing company can take \$5,000 in depreciation for the year, what is the journal entry to record the depreciation?
- Asset—Machine 5,000  
Accumulated Depreciation—Equipment 5,000
  - Depreciation Expense 5,000  
Accumulated Depreciation—Equipment 5,000
  - Depreciation Expense 5,000  
Asset—Machine 5,000
  - Accumulated Depreciation—Equipment 5,000  
Depreciation Expense 5,000

- 7.** If a manufacturing company can take \$5,000 in depreciation for a machine used totally for the production of inventory, what is the journal entry to record the depreciation?

a.	Inventory—Work-In-Process OH	5,000	
	Accumulated Depreciation—Equipment		5,000
b.	Inventory—Work-In-Process OH	5,000	
	Asset—Machine		5,000
c.	Depreciation Expense	5,000	
	Inventory—Work-In-Process OH		5,000
d.	Inventory—Work-In-Process OH	5,000	
	Depreciation Expense		5,000

## **QUIZ 1 Solutions and Explanations**

### *Problem I.*

- 1. True**  
Although some methods result in the same amount of depreciation in each year of an asset's life, other methods take more depreciation in the early years, less in the later years. Still other methods result in depreciation varying from year to year depending on usage. Regardless of which method is used, however, *total* depreciation over an asset's life is the same under all methods.
- 2. False**  
Book value, or net book value, is shown on the company's books (acquisition cost less accumulated depreciation) and is unrelated to the asset's fair market value.
- 3. False**  
The balance sheet shows the *total* acquisition cost and the *total* accumulated depreciation of company assets.

### *Problem II.*

- 1. d**  
Land is not depreciable (it is not subject to wear and does not have a limited life).
- 2. c**  
Depreciation Expense is an income statement account. Asset—Machine, and Inventory—Work-In-Process OH are assets and therefore balance sheet accounts. Accumulated Depreciation, the contra account to Equipment, is also a balance sheet account.
- 3. b.**  
The units of production method is based on an asset's usage and not on the number of periods (years, quarters, etc.) in which the asset is used.

**4. d**

An asset's acquisition (or original or historical) cost for depreciation purposes includes the invoice price plus all costs related to the purchase plus all costs required to put it into use. To compute:  
\$50,000 invoice price + \$3,500 sales tax + \$1,500 shipping =  
\$55,000 acquisition cost.

**5. c**

**6. b**

**7. a**

Depreciation of assets used to manufacture inventory is allocated to Inventory—Work-In-Process OH rather than to Depreciation Expense to account for the portion of the machine's cost used to produce the inventory.

**QUIZ 2      DEPRECIATION UNDER GAAP (FOR BOOK PURPOSES)**

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**NOT SHOWN**