**unit 4: accounting for plant assets and depreciation**

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**4.0** **Aims and objectives**

This unit aims at discussing the meaning and nature of plant assets, acquisition costs, and the related cost allocation (depreciation) of plant assets. The units also discuss the different methods of computing depreciation and the accounting procedures involved in recording the transactions relating to disposal of plant assets.

After having studied and worked through this unit, you will able to be:

* determine the acquisition c cost of tangible assets
* compute depreciation for plant assets using various depreciation methods
* record depreciation expense in the accounting records
* distinguish expenses from expenditures that should be capitalized
* differentiate depreciation for financial reporting from depreciation for income tax

**4.1 introduction**

In the previous chapter you have learnt about the accounting for current assets (i.e. accounting for cash, receivables and inventories). In this chapter you will learn about the issues of plant assets and its related depreciation.

Most business enterprise holds such major assets as land, buildings, equipments, furnitures, tools, and etc. These assets help produce revenue over many periods by facilitating the production and sale of goods or services to customers. Because these assets are necessary in a company’s day-to-day operations, companies do not sell them in the ordinary course of business. Keep in mind, though; one company’s long-term asset might be another company’s short-term asset. For example, a delivery truck is a long-term asset for most companies, but a truck dealer would regard a delivery truck as a current asset merchandise inventory.

**4.2 nature and meaning of long-term assets**

Assets that can be used by a business enterprise for relatively long period (usually more than one year) are called ***Long-Term Assets***.

Long-term assets are divided into ***tangible*** and ***intangible*** categories.

Tangible assets (also called plant assets or fixed assets) are assets with physical substance that can be charged in the operations of business for a relatively longer period of time, usually more than one year or one operating cycle whichever is longer. Examples are land, buildings, equipments and machineries, trucks, etc.

In contrast, intangible assets are assets without a physical feature that can be charged in the operations of business for long period of time. They generally consist of rights or advantages held such as goodwill, patents, copyrights, franchise, trade marks, organization costs, etc.

**4.3 determination of the acquisition cost of plant assets**

The acquisition cost of plant (fixed) assets is the cash or cash-equivalent purchase price, including incidental costs required to complete the purchase, to transport the asset, and to prepare it for use.

For example, expenditures related to the acquisition of a plant asset such as freight, insurance while in transit, and installation are included in the cost of the asset because they are necessary if the asset is to function. According to the matching principle, therefore, such costs are allocated to the economic life of the asset rather than charged as expenses in the current period.

***Land***

The acquisition cost of land includes the negotiated cash price plus other costs such as the cost of land surveys, legal fees, title fees, broker’s commissions, co9st of preparing the land to build on, and even the demolition costs of old structures that might be torn down to get the land ready for its intended use.

Under the historical cost assumption, land is reported in the balance sheet at its original cost. Land is not subjected to depreciation because land does not have a limited useful life.

The following illustration will help us how to determine the cost of land.

***Illustration-1***

A business enterprise acquires a piece of land for future site. It pays a cash price of Br. 210,000, pays brokerage fees of Br. 7500 and title fees of Br. 3000, pays Br. 5000 to have unwanted building removed, and pays, Br. 1500 to have the site graded. The business receives

Br. 2000 salvage from the old building. The cost of the land is determined as follows:

Cash prices (negotiated price)…………………………………………Br. 210,000.00

Title Fees……………………………………………………………………..3,000.00

Brokerage Fees………………………………………………………………...7,500.00

Cost of Grading……………………………………………………………..…1,500.00

Cost of removing (demolition) unwanted building Br. 5000

Less: Salvage received……………………………….(2000)…………………3,000.00

Total cost of land…………………………………………………… .….Br. 225,000.00

Generally, land is part of property, plant and equipment. If the major purpose of acquiring and holding land is speculative, it is more appropriately classified as an investment. If the land is held on a real estate concern for resale, it should be classified as inventory. When the land has been purchased for the purpose of constructing a building, all costs incurred up to the excavation for the new building are considered land costs. Removal of old buildings clearing, grading and filling are considered land costs because these costs are necessary to get the land in condition for its intended purpose. Any proceeds obtained in the process of getting the land ready for its intended use, such as salvage receipts on the demolition of an old building are treated as reductions in the price of the land.

***Cost of buildings***

When an existing building is purchased its cost includes, the purchase price plus all repairs and other expenses required to put it in a usable conditions. On the other hand, when a business constructs a new building, the cost includes all reasonable and necessary expenditures, such as those for materials, labor, part of the overhead and other indirect costs, engineers and architects’ fees, insurance during construction, interest incurred on construction loans during the period of construction, lawyers' fees, and building permits. If outside contractors are used in the construction, the net contract price plus other expenditures necessary to put the building in usable condition are included.

***Cost of equipment***

The term “ equipment” in accounting includes office equipment, store equipment, factory equipment, delivery equipment, machinery, furnitures and fixtures, and similar fixed assets. The cost of such assets includes the invoice (purchase) price, transportation and handling charges, insurance on the equipment while in transit, assembling and installation costs, and costs of conducting trail runs. As indicated earlier, all costs of getting an asset ready for its intended use are costs of that asset.

**4.4 NATURE and meaning of depreciation**

As plant assets are used in the operations of a business, their value to provide service decreases through usage and the passage of time.

This cost allocation of plant asset, called ***depreciation***, is recorded in the accounting books periodically.

Depreciation is frequently misunderstood. The term depreciation, as used in accounting, does not refer to the physical deterioration of an asset or the decrease in **market value** of an asset overtime.

Depreciation means the allocation of the cost of a plant asset to the periods that benefit from the services of the asset.

The term depreciation is used to describe the gradual conversion of the cost of the asset into an expense.

Depreciation is not a process of **valuation**. Ac counting records are kept in accordance with the cost principle; they are not indicators of changing price levels. It is possible that, through an advantageous buy and specific market conditions the market value of a building may rise. Nevertheless, depreciation must continue too be recorded because it is the result of an allocation, not a valuation process.

**4.5 factors that affect the computation of depreciation**

Four factors affect the computation of depreciation. They are:

1. Cost
2. Residual value
3. Depreciable cost, and
4. Estimated economic (useful) life.

***Cost-*** is the net purchase price plus all reasonable and necessary expenditures to get the asset in place and ready for use.

***Residual value-*** also known as *salvage value*, disposal value, scrape value, or trade-in value represents the estimated market value of the asset at the time of its retirement.

***Depreciable cost*** *-* represents the difference between the asset cost and its estimated residual value. For example, an item of equipment that costs Br. 5000 and has a residual value of Br. 500 would have a depreciable cost of Br. 4500, (Br. 5000 - Br. 500). The depreciable costs must be allocated over the estimated economic life of the asset.

***Estimated economic (useful) life-*** the estimated economic life of an asset is the total number of service units expected from the asset. Service units may be measured in terms of years the asset is expected to be used, units expected to be produced, miles or kilometers expected to be driven, or similar measures. In determining the estimated useful life of an asset, the accountant should consider all relevant information, including (1) past experience with similar repair assets, (2) the asset’s present condition, (3) the company’s repairs and maintenance policy, (4) current technological and industry trends, and (5) local conditions such as whether.

**4.6 methods of computing depreciation**

Depreciation methods differ primarily in the amount of cost allocated to each period. A list of depreciation amounts for each year of an asset’s useful life is called **depreciation schedule**.

The most common methods of computing depreciation for plant assets are:

1. The straight line method
2. The units of production method
3. The double-declining balance method, and
4. The sum-of- the years-digits method.

**4.6.1 Straight-Line Depreciation**

When this method is used to allocate depreciation, the depreciable cost of the asset is spread evenly (uniformly) over the useful life of an asset. The straight-line method is based on the assumption that depreciation depends only on the passage of time. The depreciation expense for each period is computed by dividing the depreciable cost by the number of accounting periods in the asset’s estimated useful life. The depreciation expense to be reported is the same in each year. The following illustration will help us to understand the Straight-Line method of computing depreciation.

***Illustration - 2***

Suppose, for example a business enterprise acquires a new computer (office equipment) at a cost of Birr 6000. It is estimated that the computer has an estimated residual value of Birr 1000 at the end of its estimated useful life of 4 years. The yearly (annual) depreciation would be Birr 1250m computed as follows:

Annual depreciation = Cost - Salvage value

Estimated useful life

= Birr 6000 – Birr 1000 = Birr 1250

4 years

The depreciation to be reported for each of the four years would be as follows:

**Depreciation Method- Straight-Line Method**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Cost** | **Yearly Depreciation** | **Accumulated Depreciation** | **Carrying value (Book Value)** |
| Beginning of first year | Br. 6000 | - | - | Br. 6000.00 |
| End of first year | 6000 | Br. 1250.00 | Br. 1250.00 | 4750.00 |
| End of second year | 6000 | 1250.00 | 1250.00 | 3500.00 |
| End of third year | 6000 | 1250.00 | 3750.00 | 2250.00 |
| End of fourth year | 6000 | 1250.00 | 5000.00 | 1000.00 |

***NB****. There are three important points to note from the depreciation schedule for the straight-line depreciation method. First, the depreciation is the same each year. Second, the accumulated depreciation increases uniformly. Third, the carrying (Book) value decreases uniformly until it reaches the estimated residual value.*

**4.6.2 Units of Production Method**

The production method of depreciation is based on the assumption that depreciation is mainly the result of use and that the passage of time plays no role in the depreciation process. If we assume that the office equipment from the previous illustration has an estimated useful life of 10,000 hours, the depreciation cost per hour would be determined as follows:

Hourly depreciation = Cost – Salvage value = Br. 6000.00 – 1000 = Br. 0.50

Rate Estimated units of useful life 10,000 operating hrs.

If we assume that the use of the equipment was 2800 hours for the first year, 3600 hours for the second, 2400 hours for the third, and 1200 hours for the fourth, the depreciation schedule for the office equipment would appear as follows:

**Depreciation Schedule – Production Method**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Cost** | **Hours** | **Depreciation Per Hour** | **Yearly Depr.** | **Accum.**  **Depr.** | **Carrying value (Book value)** |
| Beginning of the  First year | Br. 6,000 | - | Br. 0.50 | - | - | Br. 6,000.00 |
| End of first year | 6,000 | 2,800 | 0.50 | Br. 1,400.00 | Br. 1,400.00 | 4,600.00 |
| End of second year | 6,000 | 3,600 | 0.50 | 1,800.00 | 3,200.00 | 2,800.00 |
| End of third year | 6,000 | 2,400 | 0.50 | 1,200.00 | 4,400.00 | 1,600.00 |
| End of fourth year | 6,000 | 1,200 | 0.50 | 600.00 | 5,000.00 | 1,000.00 |

Under the production method, there is a direct relation between the amounts of depreciation each year and the units of output or use. Also, the accumulated depreciation increases each year indirect relation to units of output or use. Finally, the carrying amount decreases each year in direct relation to units of output or use until it reaches the estimated residual value.

Under the production method, the units of output or use that is used to measure estimated useful fife for each asset should be appropriate for that asset. For example, for one machine number of units produced may be an appropriate measure, for another number of hours may be a better measure. The production method should be used only when the output of an asset over its useful life can be estimated with reasonable accuracy.

**4.6.3 Declining Balance Method**

This method of depreciation results in relatively large amount of depreciation in the early years of an assets life and smaller amounts in later years. This method is based on the assumption of the passage of time. Since most kinds of plant assets are most efficient when new, and so they provide more and better service in the early years of useful life. It is consistent with the matching rule to allocate more depreciation to the early years than to later years if the benefits or services received in the early years are greater.

The declining-balance method is the most common accelerated method of depreciation. Under this method depreciation is computed by applying a fixed rate to the book value of the asset, resulting in higher depreciation charges during the early years of the asset’s life. Though any fixed rate might be used under the method, the most common rate is a percentage equal to twice the straight-line percentage. When twice the straight-line rate is used, the method is usually called the ***double-declining balance method***.

Referring to the previous example, the equipment had an estimated useful life of four years. Consequently, under the straight-line method, the depreciation rate for each year was 25 percent, (100/ estimated useful life of the asset for 100/ 4 years).

Therefore, under the double-declining balance method, the fixed rate is 50 percent (2X 25 percent). This fixed rate of 50 percent is applied to the remaining carrying value at the end of each year. Estimated residual value is not taken into account in computing depreciation except in the last year of an asset’s useful life, when depreciation is limited to the amount necessary to bring the carrying value down to the estimated residual value. The depreciation schedule for this method is as follows:

**Depreciation Schedule, Double-Declining Balance Method**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **Cost** | **Fixed Depr. Rate** | **Yearly Depreciation** | **Accumulated Depreciation** | **Carrying Value (BV)** |
| Date of purchase | Br. 6000 | 50% | - | - | Br. 6000 |
| End of first year | 6000 | 50% | Br. 3000 | Br. 3000 | 3000 |
| End of Second year | 6000 | 50% | 1500 | 4500 | 1500 |
| End of third year | 6000 | 50% | 750 | 5250 | 750 |
| End of fourth year | 6000 | 50% | 250 | 550 | 500 |

***NB****. The fixed rate of 50% is always applied to the Book value at the end of the previous year. The depreciation is greatest in the first year and declines each year after that. Finally, the depreciation in the last year is limited to the amount necessary to reduce book value to residual value, Br. 250 = Br. 750 – Br. 500 (i.e. Previous book value minus residual value).*

**Check Your Progress Exercise -1**

1. What is the major justification of using theproduction method of depreciation?

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**4.6.4 The Sum of The Years Digits Method**

Like the declining balance method, the sum of the years digits method provides a higher amount of periodic depreciation expense in the earlier use of the asset's life and a decline depreciation expense thereafter because a successively smaller fraction is applied each year to the depreciable cost of the asset. Under this method, first we must determine the denominator of the fraction, which is the sum of the digits representing the years of life. While computing depreciation, the denominator of the fraction is unchanged and would remain the same. On the other hand the numerator of the fraction, decreases year by year (4/10,3/10/2/10/1/10). At the end of the asset’s useful life, the balance remaining should be equal to the salvage value. For example, for a plant asset with an estimated life of 4 years, the denominator of the fraction is 4+3+2+1 = 10. The depreciation schedule for this method is as follows:

#### Depreciation Schedule- Sum - of - the - Years - Digits Method

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **Depreciable Cost** | **Rate** | **Yearly Depreciation** | **Accumulated Depreciation** | **Book Value** |
| Date of purchase | Br6000 | - | - | - | Br. 6000 |
| End of first year | 6000 | 4/10 | Br. 2200 | Br. 2200 | 3800 |
| End of second year | 6000 | 3/10 | 1650 | 3850 | 2150 |
| End of third year | 6000 | 2/10 | 1100 | 4950 | 1050 |
| End of fourth year | 6000 | 1/10 | 550 | 5500 | 500 |

# Check Your Progress Exercise -2

* 1. What happens if the estimated economic life of the asset is, let say, 25 years? How would you calculate the sum-of-years-digits?

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**NB**. The above illustration for the sum of year’s digit method is based on the assumption that the first use of the asset concide with the beginning of the fiscal period. When the first use of the asset does not concide with the beginning of a fiscal year, it is necessary to allocate each full year’s depreciation b/n the two fiscal years benefited. Assuming that the asset in the example was placed in service after four months of the fiscal year had been elapsed, the depreciation for that fiscal year would be Br. 1466.67 computed as follows:

First year depreciation = 4/10 X (6000 – 500) X 8/12…………………. Br. 1466.67

Therefore, the depreciation for the second year would be ….Br. 1833.33

Computed as follows:

= 4/10 X (6000 – 500) X 4/12……………….. Br. 733.33

= 3/10 X (6000 – 500) X 8/12……………………. 1100.00

Total, second fiscal year depreciation…………………………… Br. 1833.33

**4.7 comparison of depreciation methods**

The straight-line depreciation provides a uniform or equal depreciation charges to expense throughout the service life of the asset.

The production method of depreciation provides for periodic charges to depreciation expense that may vary considerably, depending upon the amount of usage of the asset. The production method does not generate a regular pattern because of the random fluctuation of the deprecation from year to year.

The major limitation of the production method is that it is not appropriate in situation in which depreciation is a function of time instead of activity. Another problem in using the production method is that an estimate of units of output or service hours received is often difficult to determine.

Both the declining balance and the sum of the years digits methods are referred to as accelerated depreciation methods, because they provides (report) relatively higher depreciation expense in the earlier uses of the life of the asset and a gradually declining periodic expense thereafter.

The main justification for this approach is that more depreciation should be charged in earlier years because the asset suffers its greatest loss of services in those years.

Accelerated depreciation method also recognizes that changing technologies make some equipment lose their capacity to yield services rapidly. Thus, it is appropriate to allocate more to depreciation in the early years, than in later years.

Another argument in favor of an accelerated method is that repair (maintenance) expense is likely to be greater in later years than in early years. Thus, the reduced amounts of depreciation reported in later years of the asset’s life are offset to some extent by increased repair (maintenance) expense.

A visual comparison may provide a better understanding of the three-depreciation methods disc ribe above. Figure 4-1 compares the yearly depreciation under the four methods.

300

Graphical Comparison of three methods of

Yearly 2500 determining depreciation

Depreciation

2000

1500

**SLD**

1000

**SYD**

500

**DDBD**

1 2 3 4

In the above graph that shows yearly depreciation, straight-line depreciation is uniform at Birr 1375 per year over the four years period. However, the declining balance method begins at an amount greater than straight line (Br.3000) and decreases each year to amounts that are less than straight line (ultimately, Br. 250). The production method does not generate a regular pattern because of the random fluctuation of the depreciation from year to year. In general companies use different methods of deprecation for goods reason. The straight-line method can be advantageous for financial reporting because it can produce the highest net income, and the accelerated depreciation method can be beneficial for tax purposes because it can result in lower income taxes.

#### Check Your Progress Exercise -3

1. Under what situation is the production method of depreciation appropriate?

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. State and describe the draw back of the production method of depreciation?

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**4.8 recording depreciation**

The amount by which a fixed asset decreases is an expense of the business. The amount of depreciation expense should be recorded each fiscal period. If depreciation expense is not recorded, the income statement will not contain all the expenses of the business. This will cause the net income to be reported higher than it should be. Income tax laws allow a business to deduct depreciation as an expense in determining net income. If depreciation expenses are not included on the income tax reports, the business will pay more income taxes than it should be.

Depreciation may be recorded by an entry a t the end of each month, or the adjustment may be delayed until the end of the year.

To record the periodic cost expiration (allocation) of plant asset, the expense account, depreciation expense is debited and the part of the entry that records the decrease in the plant asset is credited to a contra asset account entitled Accumulated Depreciation or Allowance for Depreciation. The use of this contra asset account permits the original cost to remain unchanged in the plant asset account. This facilitates the computation of periodic depreciation, the listing of both cost and accumulated depreciation on the balance sheet, and reporting required for property and income tax purposes.

***NB.*** *An exception to the general procedure of recording depreciation monthly or annually is often made when a plant asset is sold, traded-in, or discarded.*

**Check Your Progress Exercise -4**

1. What would be the journal entry to record the depreciation expense of a machine that costs Br? 3000, with no salvage value and has an estimated economic life of 10 years if the straight-line method is applied? Assuming that the machine was placed in service after two months had been elapsed in the current period

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

#### *Illustrative Problem*

**Tora-Bora** Construction Company acquired a new crane for Birr 360,500 at the beginning of year 1. The crane has an estimated residual value of Birr 35,000 and an estimated useful life of five years. The crane is expected to last 10,000 operating hours. It was used 1800 hours in year 1, 2000 hours in year 2. and 2500 hours in year 3. Based on the information given above:

1. Compute the annual depreciation and the carrying value for the crane for each of the first three years under each of the following methods:
   1. Straight line method,
   2. Units of production method,
   3. Double-declining-balance method, and
   4. Sum-of-the-years-digits method.
2. Prepare the adjusting entry that would be made each year to record the depreciation calculated under the straight line method.

***Solution:***

1. *a) Straight Line Method:*

Annual depreciation = original cost – estimated salvage value

Estimated Economic life

= Br. 36,500 – Br. 35,000

5 years

= Br. 325,500 = Br. 65,100

5

Therefore, deprecation for the first year, second year, and for the third year, is uniformly

Br. 65,100.

*b) Units of Production Method:*

Hourly Depreciation Rate = Original Cost – Salvage value

Estimated Operating Hours

= Br. 360,500 – 35,000

10,000 operating hours

= Br. 32.55

During the first year the crane has been in operation for 1800 hours. Therefore, the depreciation for the first year is Br. 58,590, computed as follows:

Br. 32,55 X 1800 hours = Br. 58,590

Second year deprecation = Br. 32.55 X 2000 hours = Br. 65,100

Third year depreciation = Br. 32.55 X 2500 hours = Br. 81,375

*c) Double-declining- balance Method:*

To proceed with the double-declining-balance method, first we have to determine the rate. The double-declining rate for the asset can be obtained by the following formula:

Rate = 100 X 2

Estimated

Life

Rate = 100 2 = 40%

5 years

Unlike the other methods, in the declining-balance method the salvage value is not deducted in computing the depreciation base. The declining balance rate is multiplied b y the book value of the asset at the beginning of each period. Therefore,

First year depreciation = 40/100 X 36,500 = Br. 144,200

Second year deprecation = 40/100 X (360,500 – 144,200)

= 40/100 X 216,300 = Br. 86,520

Third year depreciation = 40/100 (360,500 – 230,720)

= 0.4 X 129,780 = Br. 51,912

*d) Sum-of-the-years-digits Method*

To work with this method, we must determine the denominator of the fraction,

The denominator or the fraction for an asset with an estimated economic life of 5 years is 5+4+3+2+1 = 15

* Depreciation for year 1 is therefore, 5/15 x (OC – Salvage value)
* Which is 5/15x (325,500) = Br. 108,500
* Second year depreciation = 4/15 x (325,500) = Br. 86,800
* Third year depreciation= 3/15 x 325,500 = Br. 65,100

**4.9 special depreciation methods**

Some times each of the four depreciation methods discussed so far may not b e suitable because the assets involved have unique characteristics, or the nature of the industry requires that a special depreciation method be use of these methods, the group and composite methods are discussed below:

**4.9.1 Group And Composite Methods**

Depreciation methods are usually applied to a single asset. Under some circumstances, however, a number (group) of asset accounts are depreciated using one rate. For example, an enterprise such as Ethiopian Telecommunication Corp. might depreciate telephone poles, microwave systems, or switchboards by groups.

***Group depreciation*** - the term “group” refers to a collection of assets that are similar in nature. The group method is frequently used when the assets are fairly homogeneous and have approximately the same useful lives. The group method more closely approximates a single-unit cost procedure because the dispersion from the average is not as great.

***Composite-rate depreciation*** - the term “composite” refers to collection of assets that are not similar (or dissimilar) in nature.

The composite method is used when the assets are heterogeneous and have different lives.

When depreciation is computed on the basis of a composite group of assets of differing life spans, a rate based on averages must be developed. This is done by (1) computing the annual depreciation for each asset, (2) determining the annual depreciation, and (3) dividing the sum thus determined by the total cost of the assets.

***Illustration - 3***

**Tana** Transport share Co. depreciates its group of cars, buses, and trucks on the basis of composite-depreciation method. The composite-rate depreciation is computed in the following manner:

***Original Residual Depreciable Estimated Annual Dep.***

***Asset Cost Value Cost Life*** ***(straight line method)***

Cars Br.400,000 Br. 80,000 Br. 320,000 8 years Br. 40,000

Buses 2,400,000 240,000 2,160,000 10 years 216,000

Trucks 1,500,000 150,000 1,350,000 9 years 150,000

Br. 4,300,000 Br. 470,000 Br. 3,830,000 Br. 406,000

Composite depreciation rate = Br. 406,000 = 9.44%

Br. 4,300,000

If no change exists in the asset account, the group of assets will be depreciated to the residual or salvage value at the rate of Br. 406,000 (Br. 4,300,000 x 9.44%) a year.

The composite depreciation rate may be applied against total asset cost on a monthly basis, or some reasonable assumption may be made regarding the timing of increases and decreases in the group. A common practice is to assume that all additions and retirements have occurred uniformly throughout the year. The composite rate is then applied to the average of the beginning and ending balances of the account. Another acceptable averaging technique is to assume that all additions and retirements during the first-half of the year occurred as of the first day of the year, and that all additional and retirements during the second half of the year occurred on the first day of the following year.

**NB.** If an asset within the composite group is retired before, or after, the average service life of the group is reached, the resulting **gain** or **loss** should not be recognized. This practice is justified because some assets will be retired (disposed) before the average service life of the group and others after the average life. For this reason, the debit to Accumulated Depreciation is the difference between original costs and cash received.

***Illustration - 4***

Suppose that TANA Transport share Co. in the previous example, sold one of the trucks with the cost of Br. 75,000, at a selling price of Br. 40,000, at the end of the fourth year. Therefore, the entry to record the disposal would be:

***Solution:***

Original cost of the asset………………………………………..Birr 75,000

**Less**: cash receipts from sale of asset………………………………..40,000

Accumulated Depreciation of the asset…………………………Birr 35,000

Accumulated Depreciation……………35,000

Cash…………………………………...40,000

Cars, Buses, and Trucks……………….75,000

4.**10 Revision of Depreciation Rates**

When a plant asset is acquired, depreciation rates are carefully determined based on past experience with similar assets and other relevant information. The provisions for depreciation are only estimates, however, and it may be necessary to revise the estimated economic life and that of salvage value during the life of the asset. Unexpected physical deterioration or unforeseen obsolescence may make the useful life of the asset less than originally estimated. Good maintenance procedures, revision of operating procedures, or similar improvements may prolong the life of the asset beyond the original estimate.

***Illustration - 5***

Assume that a delivery truck originally acquired for Br. 75,000 is estimated to have a 16-year life with a residual value of Br. 3000. However, after 10 years of intensive use, it is determined that the delivery truck will last only 4 more years, (instead of 6 years) but its estimated residual value at the end of the four years will be Br. 6000, (instead of Br. 3000).

***Solution:***

Before the revision of the estimated life and the residual value of the asset at the beginning of the 11th year, the asset ac count and its related accumulated depreciation account would appear as shown below:

Delivery Trucks Accumulated Depr- Delivery Truck

Cost 75,000

45,000 Balance at the end of the 10th Year

After the revision, at the beginning of the 11th year, the remaining depreciable cost and the revised annual depreciation by the straight-line method are computed as follows.

Original Cost of the truck…………………………………………….Birr 75,000

**Less**: Accumulated depreciation already taken………………………………… 45,000

Remaining cost of the delivery truck…………………………………Birr 30,000

**Less**: Revised estimated salvage value…………………………………………...6,000

Revised annual depreciation 30,000 - 6000

4 years …………………….Birr 6,000

The new annual periodic depreciation expense is computed by dividing the revised depreciable cost of Br. 24,000 by the remaining revised useful life of 4 years. Therefore, the new periodic depreciation charge is Br. 6000. The annual adjusting entry for depreciation for the next two years would be as follows:

**Year 11**

Dec. 31, Depreciation Expense - Delivery Truck………………..6000

Accumulated Depreciation - Delivery Truck………………6000

**Year12**

Dec. 31 Depr. Expense-Truck…………………………….6000

Accum. Depreciation-Truck……………………………60000

**Depreciation of partial years**

So far, the illustrations of the depreciation methods have assumed that the plant assets were purchased at the beginning or end of the accounting period. However, business does not often buy assets exactly at the beginning or end of the accounting period. In most cases, they acquire the assets when they are needed and sell or discard them when they are no longer useful or needed. The time of year is normally not a factor in the decision. Thus, it is often necessary to calculate depreciation for partial years.

***Illustration - 6***

Assume that a piece of equipment is purchased for Br. 5000 and that it has an estimated useful life of five years, and an estimated residual value of Br. 500. Assume further that the equipment is purchased on October 2 and that the yearly accounting period ends on December 31. Depreciation must be recorded for three months, October through December, or 3/12 of a year. This factor is applied to the calculated depreciation for the entire year. The three months’ depreciation under the straight-line method is calculated as follows:

***Solution:***

Annual depreciation = Original cost – Estimated Salvage value

Estimated useful life

= Br. 5000 – Br. 500 = Birr 900

5 years

Depreciation for partial year (Oct – Dec. 31) is therefore, Br. 900 x 3/12 = Br. 225

If the company used the double declining balance method on the above equipment, the depreciation on the asset would be: Br. 5000 x 40/100 x 3/12, = Br. 500, depr. For three months,

If the company used the sum-of-years-digits method, the depreciation on the asset would be:

Birr (5000 – 500) x 5/15 x 3/12 = Birr 375, and the depreciation for the second year would be:

(5000 – 500) x 5/15 x 9/12 = Br. 1125

(5000 – 500) x 4/15 x 3/12 = 300

Therefore, total 2nd year depreciation Br. 1425

**NB**. In this specific example depreciation was recorded from the beginning of October. If the equipment had been purchased on October 16, or thereafter, depreciation would be calculated beginning November 1, as if the equipment were purchased on that date.

**4.11 capital and revenue expenditures**

**Capital Expenditures**- are expenditures that improve the operating efficiency (or capacity) or costs incurred to achieve greater future benefits.

In addition to the acquisition of plant assets, capital expenditures included additions and betterments.

**An addition** is an enlargement to the physical layout of a plant asset. Suppose for example, if a new wing is added to a building, the benefits from the expenditure will be received over several years, and the amount paid for it should be debited to the asset account.

**A betterment,** on the other hand, is an improvement that does not add to the physical layout of the asset. Installation of an air conditioning system is an example of betterment, Replacement of a concrete floor for a wooden floor is also betterment that will provide benefits over a number of years, so its cost should be charged (debited) to an asset account.

Another types of capital expenditures include **extraordinary repairs**. Extraordinary repairs are repairs of amore significant nature. They affect the estimated residual value or estimated useful life of an asset. For example, a boiler for heating a building may be given a complete overhaul, at a cost of Br. 3000 that will prolong its economic life by 5 years.

Extraordinary repairs are recorded by debiting the accumulated depreciation account, under the assumption that some of the depreciation previously recorded has now been eliminated. The effect of this reduction in the accumulated depreciation account is to increase the book value of the asset by the cost of the extraordinary repair. As a result, the new book value of the asset should be depreciated over the new estimated useful life.

***Illustration - 7***

Suppose for example, a machine costing Br. 35,000 had no estimated residual value and an original estimated useful life of ten years, has been depreciated for 7 years. At the very beginning of the 8th year, the machine was given a major overhaul costing Br. 3000. This expenditure extended the useful life of the machine 3 years beyond the original estimate. The computation of the new book value and the entry for the extraordinary repair would be as follows:

***Solution***

To record extraordinary repair

Jan. 4. Accumulated Depreciation – Machinery……………3000.00

Cash …………………………………………………………3000.00

*Extraordinary repair to machinery*

The revised annual depreciation for each of the six years remaining in the machine’s useful life would be calculated as follows:

Cost of Machine……………………………………… Birr 35,000

Accum. Depreciation before extraordinary repair Br. 24,500

**Less:** extraordinary repair (Debited to Accum. Depr.)….3000 21,500

Book value (carrying value) after extraordinary repair… Br.13,500

Revised Annual periodic depreciation= 13500……………………….2,250

6 years

**Revenue expenditures**

***Revenue expenditures*** are expenditures incurred in order to maintain the normal operating efficiency of the asset.

Among the more usual kinds of revenue expenditures for plant asset are the repairs, maintenance, lubrication, Cleaning and inspection necessary to keep an asset in good working condition.

***Ordinary repairs*** are expenditures that are necessary to keep an asset in good operating conditions. Trucks must have tune-ups, their tires and batteries must be replaced regularly, and other routine repairs must be made. Offices and halls must be painted regularly, and broken tiles or woodwork must be replaced. Such repairs benefits only the current period and therefore must be charged against the revenue in the current fiscal period.

**Check Your Progress Exercise -5**

1. Discuss the difference between ordinary repairs and extraordinary repairs?

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**4.12 summary**

Almost all business enterprises of any size or activity use assets of a durable nature. Such assets, commonly refereed to as property, plant, and equipment, plant assets, or fixed assets, support the operating activities in every business organization, instead of being a part of the operating activities. Such assets include land, building, and equipments (machinery, furniture, tools).

The major characteristics of plant (or fixed) assets are:

1. they are acquired for use in the operations of a business, they are not intended for resale purpose. If the business holds them for resale they are categorized under the caption 'Inventories', in the balance sheet.
2. they are long-term in nature and usually subject to depreciation long-term assets are capable of repeated usage in the operating activities of the business, and
3. they posse’s physical features.

One of the big issues in accounting for plant assets is the determination of cost. The acquisition cost of a plant asset includes the cash or cash equivalent purchase price of obtaining the asset and bringing it to the location and condition necessary for its intended use.

***Cost of Land:*** Includes the negotiated cash price plus other costs such as the cost of land surveys, legal fees, broker’s commissions, title fees, cost of preparing the land to build on, and the cost of tearing-down (or razing) old building, and any expenditures associated with the acquisition of land that are necessary to get the land ready for its intended use.

***Cost of buildings****:* Includes the purchase price plus all repairs and other expenses requited to put it in a usable condition. When a business constructs a new building, the cost includes all reasonable and necessary expenditures, such as materials, labor, part of the overhead and other indirect costs, engineers and architects’ fees, insurance during construction period, lawyers fees, and building permits.

***Cost of Equipments****:* Includes the invoice price, transportation and handling costs, insurance on the equipment while in transit, assembling and installation costs, and costs of conducting test (trail) runs.

As plant assets are used in the operation of a business, their value to provide services decreases through usage and the passage of time. This cost allocation of plant asset through usage and the passage of time are called ***depreciation***.

Depreciation is frequently misunderstood. The term doesn’t refer to the decrease in market value of an asset overtime; no it is a process of valuation. Instead, the term is used to describe the gradual conversion of the cost of the asset into an expense account. Four factors affect the computation of depreciation. They are:

* + 1. cost, (2) residual value, (3) depreciable cost, and (4) estimated useful life of the asset. Business may be different methods to compute depreciation

The most common methods of computing depreciation for plant assets are (1) straight line method, (2) production method, (3) double-declining balance method, and (4) sum-of-years-digits method.

After the determination of periodic depreciation, the amount of depreciation expense should be recorded each fiscal period by debiting the depreciation expense and crediting a contra asset account called Accumulated Depreciation. The use of this contra asset account permits the original cost to remain unchanged in the plant asset account.

Sometimes each of the four depreciation methods may not be appropriated because the assets involved have unique characteristics or the nature of the industry requires that a special depreciation method be used. Of these methods, the group and composite methods are often used by business enterprises.

When a plant asset is acquired, deprecation rates area carefully determined based on past experience with similar assets and other relevant information, however, it may be necessary to revise the estimated economic life and that of salvage value during the life of the asset. Unexpected physical deterioration or unforeseen obsolescence may make the useful life of the asset less than originally estimated. Good maintenance procedures, revision of operating procedures, or similar improvements may prolong the life of the asset beyond the originals estimate.

After plant assets are acquired and ready for use, additional costs are incurred that range from ordinary repairs to significant additions. The major problem is allocating these costs to the proper time periods. These costs are divided into two major categories: capital, and revenue expenditures.

Capital expenditures are expenditures that improves the operating capacity (or efficiency) or expenditure that increases the useful life of the asset beyond the original estimate. The most common capital expenditures are (1) additions, (2) betterments, and (3) extraordinary repairs.

Revenue expenditures, on the other hand, are expenditures incurred in order to maintain the normal operating efficiency of the asset. The most usual kinds of revenue expenditures for a plant asset are the repairs, maintenance, lubrication, cleaning, and inspection necessary to keep an asset in good working condition. Such expenditures benefits only the current period and therefore must be charged against the revenue in the current fiscal period.

**4.13 answers to check your progress exercises**

***Check Your Progress Exercise - 1***

1. The justification for using the production method is that, it assumes that depreciation is a function of use or productivity instead of the passage of time. Moreover, under the production method there is a direct relation between the amounts of depreciation each year and the units of output or use.

***Check Your Progress Exercise - 2***

1. There is an easy means of computing the denominate of the fraction.

It is: n(n + 1) = 25 (25 + 1) = 325

2 2

***Check Your Progress Exercise - 3***

(1) Where loss of services is a result of activity or productivity, the production method will be best match costs and revenues. And, when the units of output or use that is used to measure estimated useful life for each asset is reasonably determined.

(2) The major limitation (or drawback) of the production method is that it is not appropriate in situations in which depreciation is a function of time instead of activity. For example a building is subject to a great deal of steady deterioration from the elements (time) regardless of its use. Another drawback in using the production method is that an estimate of units of output or service hours received is often difficult to determine.

***Check Your Progress Exercise - 4***

1. Annual deprecation = original cost - salvage value

Estimated life

Since the asset had been placed in service after two months had been elapsed, only depreciation for 10 months will be recognized.

Therefore, 10 x 300 = Br. 250.00

2

Depreciation Expense……….. 250.00

Accumulated Depreciation……250.00

***Check Your Progress Exercise – 5***

1. Ordinary repairs: are expenditures made to maintain plant assets in normal operating condition, they are charged to an expense account in the period in which they are incurred on the basis that is benefits on one accounting period. Ordinary repairs affect the expenses of one accounting period only.

***Extra ordinary repairs*** - on the other hand, are repairs of a more significant nature. They affect the estimated residual value or estimated useful life of the asset. Extraordinary repairs increase the life of the asset beyond the original estimate. Hence, it benefits the operating activity of the business for several years. Extraordinary repairs should be debited to the Accumulated Depreciation account instead of debiting to an expense account.

**4.14 Model examination questions**

**type a: Answer the following questions:**

1. Explain the meaning of deprecation
2. Describe in detail the major characteristics of plant (fixed) assets.
3. Briefly describe the factors that affect the computation of depreciation.
4. Distinguish between an addition to plant assets and a betterment.
5. What accounting treatment is normally given to the following items in accounting for plant assets?

a) Additions

* 1. Extraordinary (major) repairs.
  2. Betterments.

**Type b: For each of the following questions choose the best answer from the given**

**alternatives.**

1. Which of the following statements best describe the purpose of accounting for

depreciation?

* 1. Depreciation is an attempt to measure the decrease in market value of an asset during a period of time.
  2. Depreciation is the allocation of the cost of a natural resource over its useful life as it is used up.
  3. Depreciation is the allocation of an equal amount of cost of a tangible asset to each year of its economic life.
  4. Depreciation is the allocation of the cost of a tangible asset over its useful life.
  5. None of the above

1. Which of the following expenditures incurred in connection with the acquisition of equipment is not a proper charge to the asset account?
   1. Freight or transportation costs.
   2. Cost of test runs to ready the machine for operation
   3. Taxes and tariffs
   4. Cost of vandalism
   5. B and D
2. If the Double-declining depreciations rate of a plant asset is 50%, then its estimated life will be:
   1. 50 years. B) 10 years C) 5 years D) 4 years E) None of the above
3. Which of the following methods will yield the highest deprecation expense during the first year of an asset’s life?
   1. Straight line method
   2. Sum-of-years-digits method
   3. Double-declining balance method
   4. All of the above
   5. None of the above
4. If the adjusting entry to record depreciation expense was overlooked, then:
   1. Total assets will be understated
   2. Liabilities would be overstated
   3. Owner’s capital would be overstated
   4. Net income would be overstated
   5. C and D

**Type c: Work out the following questions:**

On October 5, 2001, NOON C. acquired a new machine at a cost of Birr 250,000. the machine has a useful life of 5 years and scrape value of Br. 10,000. it is estimated that the equipment will produce 2,000,000 units of products throughout its life. The equipment produced 95,000 units and 300,000 units of products during the fiscal periods ending December 31, 2001 and December 31,2001 respectively. On the basis of the above date, compute deprecation expense to be recorded on Dec. 31, 2002.

* + 1. Under the units of production method.
    2. Under the declining-balance method.
    3. Under the sum-of-years-digits method
    4. Under the straight-line method.

**4.15 recommended (REFERENCE) BOOKS**

1. Fees and Warren : Principles of Accounting, 16th

Edition.

2. Horngren, Sundem, and Elliot. : Introduction to Financial Accounting,

8th Edition. Pearson Educational Inc.

New Delhi, 2002

3. Roger H. Hermanson, :

Jems D, Edwards and : Accounting principles 4th Edition,

R.F Salmonson (1989) IRWIN Inc.

**4.16 glossary**

1. **Accumulated Depreciation:** The cumulative sum of all depreciation recognized since the date of acquisition of the particular assets.
2. **Book Value, (net book value):** The balance of an account shown on the book, net of any contra accounts. For example the book value of equipment is its acquisition cost minus accumulated depreciation.
3. **Capitalized:** A cost that is added to an asset account, as distinguished from being expensed immediately.
4. **Contra account:** A separate but related account that offsets or is a deduction from a companion account. An example is accumulated depreciation.
5. **Depreciable Value:** The amount of the acquisition cost to be allocated as depreciation over the total useful life of an asset. It is the difference between the total acquisition cost and the predicted residual value.