DEPRECIATION ACCOUNTING

One of the facts of life that organizations must deal with and account for is that fixed assets lose their value-even as they continue to function and contribute to the engineering projects that use them. This loss of value called **depreciation,** can involve **physical deterioration**

a) *Wear and Tear: the fixed asset naturally wears out from the use of it, thus the value of the fixed asset decreases each year*
b) *Rust, rot and decay: The metals of the fixed asset, e.g. motor vehicles will rust away over the years, thus results in decrease in value* and
c) **obsolescence** *This means out-of-date. For instance, typewriter is replaced by computer due to advanced technology. The value of typewriter thus decreases since it is obsolete*.

The main function of **depreciation accounting** is to account for the cost of fixed assets in a pattern that matches their decline in value over time.

On a project level, engineers must be able to assess how the practice of depreciating fixed assets influences the investment value of a given project. To make this assessment, they need to estimate the allocation of capital costs over the life of the project, which requires an understanding of the conventions and techniques that accountants use to depreciate assets.

The knowledge rules and laws that govern asset depreciation and the methods that accountants use to allocate depreciation expenses will prepare you to assess the depreciation of assets acquired in engineering projects.

Fixed assets are **capitalized;** that is, their costs are distributed by subtracting them as expenses from gross income-one part at a time over a number of periods. The systematic allocation of the initial cost of an asset in parts over a time, known as its depreciable life, is what we mean by **accounting depreciation.** Because accounting depreciation is the standard of the business world, we sometimes refer to it more generally as **asset depreciation.**

The process of depreciating an asset requires that we make several preliminary determinations:

a) What is the cost of the asset?
b) What is the asset's value at the end of its useful life?
c) What is the depreciable life of the asset?
d) What method of depreciation do we choose?

What constitutes a depreciable asset? It is a property for which a firm may take depreciation deductions against income. Depreciable property has the following characteristics.

a) It must be used in business or held for the production of income.
b) It must have a definite service life, which must be longer than one year.
c) It must be something that wears out, decays, gets used up, becomes obsolete, or loses value from natural causes.

Depreciable property includes buildings, machinery, equipment, vehicles, and some intangible properties. If an asset has no definite service life, the asset cannot be depreciated. For example, *you* can never *depreciate land.*

Cost Basis

The **cost basis** of an asset represents the total cost that is claimed as an expense over an asset's life (i.e., the sun1 of the annual depreciation expenses). Cost basis generally includes **the actual cost of an asset** and **all incidental expenses,** such as freight, site preparation, and installation. This total cost, rather than the cost of the asset only, must be the basis for depreciation charged as an expense over an asset's life. Besides being used in figuring depreciation deductions, an asset's cost basis is used in calculating the gain or loss to the firm if the asset is ever sold or salvaged.

Example:
Rockford Corporation purchased an automatic hole-punching machine priced at ₦62,500. The vendor's invoice included a sales tax of ₦3,263. Lanier also paid the inbound transportation charges of ₦725 on the new machine, as well as a labor cost of ₦2,150 to install the machine in the factory. In addition, Lanier had to prepare the site before installation, at a cost of ₦3,500. Determine the cost basis for the new machine for depreciation purposes.

Solution:
Given: Invoice price = ₦62.500
freight = ₦725.
installation cost = ₦2,150.
and site preparation = ₦3,500.
Find: The cost basis.
The cost of the machine that is applicable for depreciation is computed as follows:

Cost of new hole-punching machine	₦62.500
Freight	₦725
Installation labor	₦2,150
Site preparation	₦3.500
Cost of Machine **(cost basis)**	**N68.875**

Useful Life and Salvage Value

The useful life of an asset is its service life or the depreciable life. An asset's depreciable life is the number of years over which the asset is to be depreciated. The salvage value of an asset is an asset's estimated value at the end of its life; it is the amount eventually recovered through sale, trade-in, or salvage. The eventual salvage value of an asset must be estimated when the depreciation schedule for the asset is established.

Methods of Depreciation

i. The **straight-line method** (SL) of depreciation interprets a fixed asset as an asset that provides its services in a uniform fashion. That is, the asset provides an equal amount of service in each year of its useful life. In other words, the depreciation rate is $1/N$, where N is the depreciable life. **Example:** The cost basis of an automobile is ₦ 1,000,000 the service life is 5years while the salvage value is ₦ 200,000. Compute the annual depreciation allowances and the resulting book values using the straight-line method.

Solution:

Given: Cost basis (I) = ₦ 1,000,000, *Salvage value (S)* = ₦200,000, and N = *5* years.

Find: *Depreciation* (D_n), and Book value (B_n), for $\boldsymbol{n}$ = 1 to *5*.

The straight-line depreciation rate is $1/5$ or 20%. Therefore, the annual depreciation charge is

$\boldsymbol{D_n}$ = (0.20)(₦1,000,000 - ₦200,000) = ₦160,000.

Then the asset would have the following book values during its useful life? Where B_{an}, represents the book value before the depreciation charge for year *n*.

$$B_n = I - (D_1 + D_2 + \ldots.. + D_n)$$

Year (n)	Depreciation $[D_n = \frac{I-S}{N}]$	Book value $[B_n = I - (D_1 + D_2 + \ldots.. + D_n)]$
0	-	₦1,000,000
1	₦160,000	₦840,000
2	₦160,000	₦680,000
3	₦160,000	₦ 520,000
4	₦160,000	₦ 360,000
5	₦160,000	₦ 200, 000

ii. **Declining-Balance Method (DB)**

The second concept recognizes that the stream of services provided by a fixed asset may decrease over time: in other words, the stream may be greatest in the first year of an asset's service life and least in its last year. This pattern may occur because the mechanical efficiency of an asset tends to decline with age, because maintenance costs tend to increase with age, or because of the increasing likelihood that better equipment will become available and make the original asset obsolete. This reasoning leads to a method that charges a larger fraction of the cost as an expense of the early years than of the later years. The **declining-balance method** is the most widely used.

The declining-balance method of calculating depreciation allocates a fixed fraction of the beginning book balance each year. The fraction α is obtained using the straight-line depreciation rate ($\frac{1}{N}$) as a basis:

$\alpha = \frac{1}{N}(multiplier)$**, The most commonly used multipliers in the United States are 1.5 (called 150% DB) and 2.0 (called 200% DDB. or double-declining-balance). So, a 200%-DB method specifies that the depreciation rate will be 200% of the straight-line rate.** As N increases, α decreases, thereby resulting in a situation in which depreciation is highest in the first year and then decreases over the asset's depreciable life. **Example:** The cost basis of an automobile is ₦ 1,000,000 the service life is 5years while the salvage value is ₦ 200,000. Compute the annual depreciation allowances and the resulting book values using the double-declining-balance method.

Solution:

Given: Cost basis (I) = ₦ 1,000,000, *Salvage value (S)* = ₦200,000, and N = *5* years.

Find: *Depreciation (D_n),* and Book value (*B_n),* for ***n*** = 1 to *5*.

The double-declining balance- depreciation rate, $\alpha = \frac{1}{N}(multiplier)$ is $\frac{1}{5}(2) =$ 0.4 or 40%.

Therefore, the annual depreciation charge is

$\boldsymbol{D_n}$ = (0.40)(₦1,000,000) = ₦400,000.

Then the asset would have the following book values during its useful life? Where B_n, represents the book value before the depreciation charge for year *n*.

$B_n = I(1-\alpha)^n$ and $D_n = \alpha I(1-\alpha)^{n-1}$

Year (n)	Depreciation $D_n = \alpha I(1-\alpha)^{n-1}$	Book value $B_n = I(1-\alpha)^n$
0	-	₦1,000,000
1	₦400,000	₦600,000
2	₦240,000	₦360,000
3	₦144,000	₦ 216,000
4	₦86,400 **(16,000)**	₦ 200,000
5	₦0	₦ 200, 000

Note: In year 4, B4 would be less than (salvage value) S = ₦200, 000 if the full deduction (₦86,400) is taken. Tax law does not permit us to depreciate assets below their salvage value. Therefore, we adjust D4 to ₦16, 000 making B4 = ₦200,000. D5 is zero, and B5 remains at ₦200.000.