Chapter 5

DEPRECIATION

What is Depreciation?

- *Depreciation:* Reduction in the value of an asset over a period of time.

Classification Of Depreciation

- Physical Depreciation
- Functional Depreciation
- Physical Depreciation: Is defined as a reduction in assets capacity to perform its intended service due to physical impairment.

E.g. The causes may be due to corrosion, wear & tear.

- *Physical depreciation leads to decline in performance and high maintenance costs.*

Classification Of Depreciation

- Functional Depreciation: It occurs as a result of changes in the organization or in technology that decrease or eliminate the need for an asset.
- *E.g. Obsolescence resulting from the discovery of another asset that is sufficiently superior than existing one.*

Depreciable property:

- It must be used in business or held in production of income.
- It must have a definite service life.
- It must be something that wears out, decays, gets used up, becomes obsolete etc.

Ex: Buildings, machinery, vehicles etc.

- Reasons for depreciation:

Depreciation is viewed as part of business expenses that reduce taxable income.

- Book value and salvage value.

Book value is the value of asset recorded on the accounting books of the firm at a given time period.

Book value at the end of a given year equals the initial cost less the total depreciation amount till that year.

Methods of depreciation

- There are several accounting methods that are used to determine an asset's depreciation expense over the period of its useful life.
  - Straight Line Method
  - Declining Balance Method (DBM)
  - Double Declining Balance Method(DDBM)
  - Sum Of The Years Digits Method (SOYD)
  - Service Output Method
  - Sinking Fund Method

Methods of depreciation

Straight-Line Depreciation

It assumes that the value of an asset decreases at a constant rate.

Straight-line depreciation is calculated by dividing the differences of the purchase price and the salvage value by the years of useful life.

$$\textit{Annual depreciation } (Dt) = \frac{\textbf{Purchase Price} - \textbf{Salvage Value}}{\textbf{Years of useful life}}$$

Expression relating Book value and Depreciation is

$$B_t = B_{t-1} - D_t$$

t is the time period

Or

Straight-Line Depreciation

Example 1: A person started a small business by purchasing a machine. The first cost of machine is $25,000. The useful life of the machine is 5 years and the salvage value is $5,000. Make a straight-line depreciation schedule showing the depreciation on each year.

Solution:

Annual Depreciation = ($25,000 - $5,000)/5 = $4,000

Year	Value before Depreciation	Depreciation	Value after Depreciation (Book value)
1	$25,000	$4,000	$21,000
2	$21,000	$4,000	$17,000
3	$17,000	$4,000	$13,000
4	$13,000	$4,000	$9,000
5	$9,000	$4,000	$5,000

Straight-Line Depreciation

Example 2: A m/c has a first cost of Rs 3,00,000 & salvage value of Rs 60,000 and a life of 5 years. It is being depreciated according to straight line method. The management is trying to find a replacement at the end of 3 years of its useful life. What market value the management should fetch so that the capital invested in the m/c is fully recovered.

Declining Balance Method

1. This method assumes that an asset decreases in value at a faster rate in the early portion of the service life than in the later portion of its life.
2. By this method fixed percentage (R) is multiplied times the book value of the asset.
3. Hence book value of the asset decreases through time, so does the size of the depreciation charge.

End of Year	Depreciation charge during year t	Book value at the end of year, t
0	------	$P = B_0$
1	$R \times B_0 = R \times P$	$B_0 - R \times B_0 = (1-R)\, B_0 = (1-R)P = B_1$
2	$R \times B_1 = R\,(1-R)P$	$(1-R)\, B_1 = (1-R)^2\, P = B_2$
3 . . .	$R \times B_2 = R\,(1-R)^2\, P$	$(1-R)\, B_2 = (1-R)^3\, P = B_3$
t . . .	$R \times B_{t-1} = R\,(1-R)^{t-1}\, P$	$(1-R)\, B_{t-1} = (1-R)^t\, P = B_t$
n	$R \times B_{n-1} = R\,(1-R)^{n-1}\, P$	$(1-R)\, B_{n-1} = (1-R)^n\, P = B_n$

Depreciation for previous year, $D_t = R \times B_{t-1}$

Where D_t = depreciation charge for year t

B_{t-1}= Book value for year (t-1)

Expression to determine book value for the year t, $B_t = B_{t-1} - D_t$

Therefore, $B_t = B_{t-1} - R\,B_{t-1}$

$B_t = B_{t-1}\,(1-R)$

Using this expression it is possible to determine the general expression,

Depreciation at any time t,

Book value at any time t, $D_t = R\,(1-R)^{t-1}\,P$

$B_t = (1-R)^t\,P$

Therefore, $1- R=\sqrt[t]{B_t/P}$

Numerical

1. An asset costs Rs.5000 now and a salvage value is Rs.1000 at the end of its service life and a depreciation rate of 30% per year. Determine the depreciation charges for 3 years and its book value at the end of each year.

End of Year	Depreciation charge during year t	Book value at the end of year, t
0	0	5000
1	R* P= 5000*0.3= 1500	5000-1500 = 3500
2	3500*0.3= 1050	3500-1050= 2450
3	2450*0.3=735	2450-735= 1715

- An asset was purchased for 2,50,000 Rs. It has an expected life of 10 years and a salvage value of Rs.50000 at the end of 10th year. What will be the undepreciated amount of capital remaining in the asset at the end of 6th year. If the asset is being depreciated according to the declining balance method. Also calculate the depreciation charge for the 8th year.

$$R = 1 - (B_t / P)^{1/t}$$

1- (50000/2,50,000) ^ (1/10)

= 0.1487 = 14.87%

Undpreciated amount at the end of 6th year, **B_t = (1-R)^t P = (1-0.1487)^6 x 250000**

Depreciate charge during year 8
=R (1-R)^t-1 * P
=0.1487(1-0.1487)^(8-1) * 250000

Double Declining-Balance Depreciation

Straight-line depreciation uses the same amount of depreciation each year, double declining-balance depreciation uses the same rate of depreciation each year.

To find the rate for double declining-balance depreciation, divide 2 by the years of useful life.

Annual rate of decrease = 2 / years of useful life

To find the depreciation, multiply this rate by the current value.

Depreciation

Double Declining-Balance Depreciation

Example :An asset was purchased 10 years ago for Rs 5,00,000. It is depreciated according to DDB for an estimated life of 20 years. The salvage value is Rs 50,000 . calculate its current book value.

- An asset has a first cost of Rs. 48,000 with an estimated life of 20 years. What is the total accumulated depreciation charge during the first 5 years of the asset life if it is depreciated according to DDM Method?

Depreciation

Straight-Line Depreciation

Example 4: You started a small business and rent an office. You furnish the office with $25,000 worth of office furniture. The useful life of the furniture is 7 years and the salvage value is $4,000. Make a straight-line depreciation schedule showing the depreciation you are to expense each year.

Depreciation

Straight-Line Depreciation

Example 4: You started a small business and rent an office. You furnish the office with $25,000 worth of office furniture. The useful life of the furniture is 7 years and the salvage value is $4,000. Make a straight-line depreciation schedule showing the depreciation you are to expense each year.

Annual Depreciation = ($25,000 - $4,000)/7 = $3,000

Depreciation

Straight-Line Depreciation

Year	Value Before Depresciation	Depreciation	Value After Depreciation
1	$25,000	$3,000	$22,000
2	$22,000	$3,000	$19,000
3	$19,000	$3,000	$16,000
4	$16,000	$3,000	$13,000
5	$13,000	$3,000	$10,000
6	$10,000	$3,000	$7,000
7	$7,000	$3,000	$4,000

Depreciation

Double Declining-Balance Depreciation

Example 5:

Make a double declining-balance depreciation schedule for the office furniture in example 1 using a useful life of 7 years and a salvage value of $4,000.

Depreciation

Double Declining-Balance Depreciation

Example 5:

Make a double declining-balance depreciation schedule for the office furniture in example 1 using a useful life of 7 years and a salvage value of $4,000.

Annual rate of depreciation = 2/7 = 28.571428571 4%