

## Methods of Depreciation

The profession requires the method employed be “systematic and rational.”  
Methods used include;

1. Straight-line method
2. Activity method (units of use or production).
3. Diminishing (accelerated)-charge methods:

Sum-of-the-years'-digits.

Double Declining-balance method.

### 1. Straight-line method:

Under the straight-line method, companies expense the same amount of depreciation for each year of the asset's useful life. It is measured solely by the passage of time. To compute depreciation expense under the straight-line method, companies need to determine depreciable cost. Depreciable cost is the cost of the asset less its salvage value. It represents the total amount subject to depreciation. Under the straight-line method, to determine annual depreciation expense, we divide depreciable cost by the asset's useful life.

$$\frac{\text{Cost} - \text{Residual Value (Salvage value)}}{\text{Estimated Service Life (Useful life)}} = \text{Depreciation Charge}$$

We also can compute an annual rate of depreciation. In this case, the rate is 20% ( $100 \div 5$  years). When a company uses an annual straight-line rate, it applies the percentage rate to the depreciable cost of the asset.

**Example (2):** On January 1, 2025, Iron Mountain Ski Corporation purchased a new snow-grooming machine for \$50,000. The machine is estimated to have a 5-year life with a \$2,000 salvage value. What journal entry would Iron Mountain Ski Corporation make at December 31, 2025, if it uses the straight-line method of depreciation & depreciation schedule

**Solution:**

$$\text{Depreciation expense} = \frac{\text{Cost} - \text{Salvage value}}{\text{Estimated Useful life}}$$

$$\text{Depreciation expense} = \frac{50,000 - 2,000}{5} = \$ 9,600$$

31\12\2025

**Depreciation Expense** **9,600**

**Accumulated Depreciation —Equipment** **9,600**

(To record annual depreciation on snow grooming machine)

Year	Annual Depreciation Expense	Accumulated Depreciation	Book Value End of Year
31\12\2025	9,600	9,600	40,400
31\12\2026	9,600	19,200	30,800
31\12\2027	9,600	28,800	21,200
31\12\2028	9,600	38,400	11,600
31\12\2029	9,600	48,000	2,000

## 2. Activity method (units of use or production):

The activity method (also called the variable-charge or units-of-production approach) assumes that depreciation is a function of **use or productivity, instead of the passage of time**. A company considers the life of the asset in terms of either the output it provides (**units it produces**) or an **input measure such as the number of hours it works**. Conceptually, the proper cost association relies on output instead of hours used, but often the output is not easily measurable. In such cases, an input measure such as machine hours is a more appropriate method of measuring the dollar amount of depreciation charges for a given accounting period

$$\text{Depreciation expense} = \frac{(\text{Cost} - \text{Salvage value}) \times \text{Hours or units This Year}}{\text{Total Estimated Hours or units}}$$

**Example (3):** The Hogan manufacturing company purchased a machine for (250,000). The company expects the service life of the machine to be (five) years.

During that time, it is expected that the machine will produce (140000) units. The anticipated residual value is (40000). The machine was disposed of after five years of use. Actual production during the five years of the assets life was

Year	Unit Produced
1	24,000
2	36,000
3	46,000
4	8,000
5	26,000
Total	140,000

**Required:**

- 1) Compute the depreciation expense under all the depreciation methods for five years
- 2) Compute the depreciation expense under Units-of –Activity methods Was use following formula

**Solution: (1)**

$$\text{Depreciation expense} = \frac{\text{Cost} - \text{Salvage value}}{\text{Estimated Useful life}}$$

$$\text{Depreciation expense} = \frac{250,000 - 40,000}{5 \text{ years}} = 42,000$$

(2):

$$\text{Depreciation expense} = \frac{(\text{Cost} - \text{Salvage value}) \times \text{Hours or units This Year}}{\text{Total Estimated Hours or units}}$$

Year 1

$$\text{Depreciation expense} = \frac{(250,000 - 40,000) \times 24,000}{140,000} = 36,000$$

Year 2

$$\text{Depreciation expense} = \frac{(250,000 - 40,000) \times 36,000}{140,000} = 54,000$$

**Or**

$$\text{Depreciation expense} = \frac{(250,000 - 40,000)}{140,000} = 1.5 \times 24,000$$

### **3. Diminishing (accelerated)-charge methods:**

#### **- Sum-of-the-years'-digits:**

The sum-of-the-years'-digits method results in a decreasing depreciation charge

based on a decreasing fraction of depreciable cost (original cost less residual value). Each fraction uses the sum of the years as a denominator ( $5 + 4 + 3 + 2 + 1 = 15$ ). The numerator is the number of years of estimated life remaining as of the beginning of the year. In this method, the numerator decreases year by year, and the denominator remains constant ( $5/15$ ,  $4/15$ ,  $3/15$ ,  $2/15$ , and  $1/15$ ). At the end of the asset's useful life, the balance remaining should equal the residual value

*sum – of – the*

$$\text{– years' calculation } \frac{n(n+1)}{2}$$

**n= Number of years**

**Example (4):** Wright Company purchased a piece of machinery for \$ 500,000 on January 1. The machinery has an estimated useful life of five years and an estimated salvage value of \$ 50,000.

Required: Compute depreciation expense for year 1 and year 2 using the sum-of-the-years-digits depreciation method.

**Solution:**

$$\text{sum – of – the – years' calculation } \frac{n(n+1)}{2}$$

$$\frac{5(5+1)}{2} = 15$$

Year	Depreciable Base	Depreciation Rate Per year	Depreciation Expense	Accumulated Depreciation	Book Value End of Year
1	450,000	5\15	150,000	150,000	350,000
2	450,000	4\15	120,000	270,000	230,000
3	450,000	3\15	90,000	360,000	140,000
4	450,000	2\15	60,000	420,000	80,000
5	450,000	1\15	30,000	450,000	50,000
total		15\15	450,000		

**- Double Declining-balance method:**

The declining-balance method (often referred to as the reducing-balance method)

utilizes a depreciation rate (expressed as a percentage) that is some multiple of the

straight-line rate. For example, the double-declining rate for a 10-year asset is 20 percent (double the straight-line rate, which is 1/10, or 10 percent). Companies apply the constant rate to the declining book value each year.

**Example (5): Use the information in Example (4):** Required: Compute depreciation expense for year 1 and year 2 using the –Double Declining-balance method

Year	Book Value beginning of Year	Depreciation Rate Per year a	Depreciation Expense	Accumulated Depreciation	Book Value End of Year
1	500,000	40%	200,000	200,000	300,000
2	300,000	40%	120,000	320,000	180,000
3	180,000	40%	72,000	392,000	108,000
4	108,000	40%	43,200	435,200	64,800
5	64,800	40%	14,800 b	50,000	50,000

a Based on twice the straight-line rate of 20% ( $\$90,000 \div \$450,000 = .20$ ;  $.20 \times 2 = .40$ , or 40%).

b Limited to \$14,800 because book value should not be less than residual value.