

L9 APSC221 - Depreciation

Depreciation

Physical assets lose value or depreciate over time.

Depreciation comes from:

1. Use-related physical loss (wear and tear)
2. Time-related loss
3. Functional loss

Modeling

Depreciation models are used to estimate the valuation of assets at a given point in time.

Common terms include:

Market value is the value of an asset on the open market (sale value).

Book value is the value of an asset for accounting purposes.

Estimating Market Value

Salvage value is the actual or estimated value at the end of its useful life.

Scrap value is the actual or estimated value at the end of its physical life.

Estimating asset values is important to support business transactions (i.e. loans), planning replacement decisions, and for taxes paid on net income (revenue - expenses)

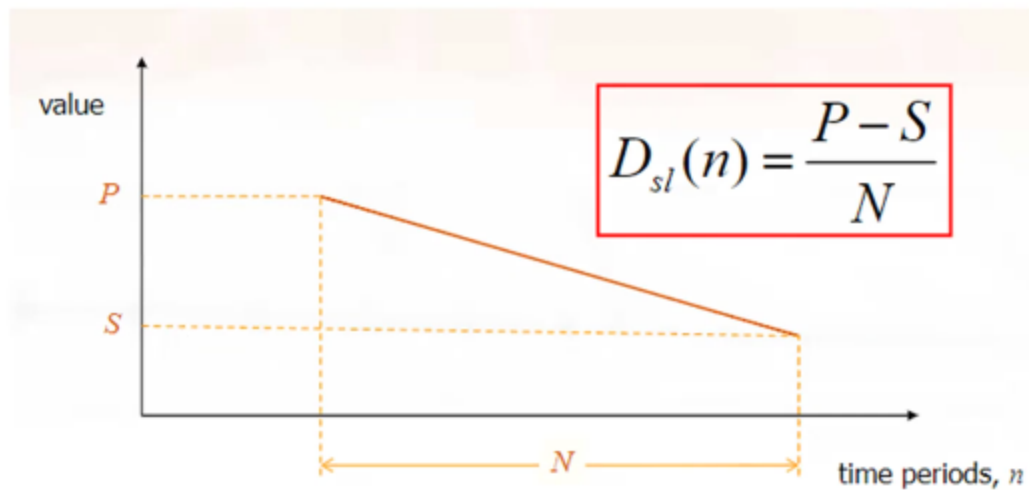
Depreciation Models

2 are used in Canada: **Straight Line Depreciation** and **Declining Balance Depreciation**

Straight Line Depreciation

SLD assumes a constant rate of value loss over the life cycle.

Not very realistic.



$$D_{sl}(n) = \frac{P - S}{N}$$

P rep. purchase price

S rep. salvage value at time N

N rep. useful life of N periods

Example

An asset purchased 7 years ago for \$10,000 has a service life of 10 years. It can be sold at the end of its service life for \$2,000.

What is the book value today using SLD?

$$D_{(n)} = \frac{P - S}{N}$$

$$\begin{aligned} BV_{(7)} &= P - D_{(7)} \\ &= P - 7 \times \left(\frac{P - S}{N} \right) \\ &= 4400 \end{aligned}$$

Declining Balance Depreciation

DBD models loss at a constant **proportion of value (%)** loss over the life cycle.

More realistic. This is the mandated depreciation model by the CRA.

$$D_{db}(n) = BV_{db}(n - 1) * d$$

BV(n) rep. book value at time n

d rep. fixed depreciation percentage rate

If the percentage rate of DBD is not specified, we need to determine the appropriate depreciation rate.

$$BV_{db}(N) = S = P(1 - d)^N$$

$$d = 1 - \sqrt[N]{\frac{S}{P}}$$