Capital recovery factor:
Commonly used to determine the revenue requirements needed to address the upfront capital costs for projects.

Annuity:
An annuity is essentially a level stream of *cash flows* for a fixed period of time.

Capital Costs versus Operating Costs

When only costs are involved, the AE method is sometimes called the **annual equivalent cost (AEC)** method. In this case, revenues must cover two kinds of costs: **operating costs** and **capital costs**. Operating costs are incurred through the operation of physical plant or equipment needed to provide service; examples include items such as labor and raw materials. Capital costs are incurred by purchasing assets to be used in production and service. Normally, capital costs are nonrecurring (i.e., one-time) costs, whereas operating costs recur for as long as an asset is owned.

Capital Recovery Cost

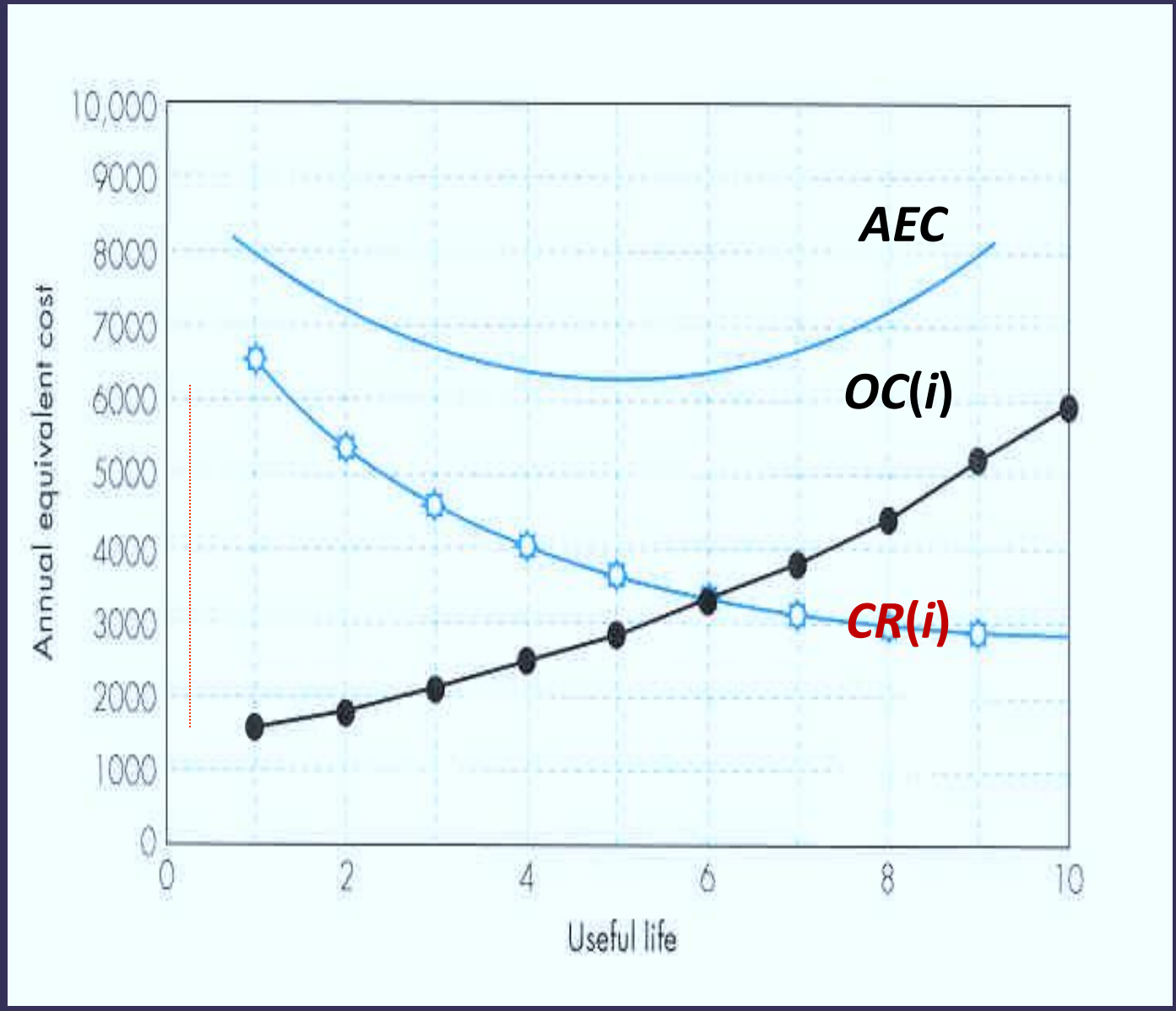
$$CR(i) = I(A/P,i,N) - S_N(A/F,i,N)$$

Operating Cost

$$OC(i) = \sum_{n=1}^{N} OC_n(P/F,i,n)\,(A/P,i,N)$$

Total Cost: Annual Equivalent Cost

$$AEC = CR(i) + OC(i)$$



Capital recovery cost:

The annual payment that will repay the cost of a fixed asset over the useful life of the asset and will provide an economic rate of return on the investment. It is designated CR(i).

Two general monetary transactions are associated with the purchase and eventual retirement of a capital asset: its initial cost (I) and its salvage value (S). Taking into account these sums, we calculate the capital recovery factor as follows:

$$CR(i) = I(A/P, i, N) - S(A/F, i, N).$$

I = Initial cost or Investment and S= Salvage value

Then we may rewrite CR(i) as

$$CR(i) = (I - S)(A/P, i, N) + iS$$

CR(i) is the annual cost to the firm of owning the asset.

The owner of a business is considering investing $55,000 in new equipment. He estimates that the net cash flows will be $5,000 during the first year, but will increase by $2,500 per year the next year and each year thereafter. The equipment is estimated to have a 10-year service life and a net salvage value of $6,000 at that time. The firm's interest rate is 12%.

(a) Determine the annual capital cost (ownership cost) for the equipment.
(b) Determine the equivalent annual revenue
(c) Determine whether this is a wise investment.

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Emerson Electronics Company just purchased a soldering machine to be used in its assembly cell for flexible disk drives. The soldering machine costs $250,000. Because of the specialized function it performs, its useful life is estimated to be five years. It is also estimated that at that time its salvage value will be $40,000. What is the ownership cost for this investment if the firm's interest rate is 18%?

Sunbelt Corporation, an investment company, is considering building a 50-unit apartment complex in a growing area near Tucson, Arizona. Since the long-term growth potential of the town is excellent, it is believed that the company could average 85% full occupancy for the complex each year. If the following financial data are reasonably accurate estimates, determine the minimum monthly rent that should be charged if a 15% rate of return is desired:

a. Land investment = $1,000,000
b. Building investment = $2,500,000
c. Annual upkeep = $150,000
d. Property taxes and insurances = 5% of the total investment
e. Study period = 25 years
f. Salvage value of the land cost can be recovered in full.

A construction firm is considering establishing an engineering computing center. The center will be equipped with three engineering workstations that cost $35,000 each, and each has a service life of five years. The expected salvage value of each workstation is $2,000. The annual operating and maintenance cost would be $15,000 for each workstation. At a MARR of 15%, determine the equivalent annual cost for operating the engineering center.

You are considering purchasing a dump truck. The truck will cost $45,000 and have an operating and maintenance cost that starts at $15,000 the first year and increases by $2,000 per year. Assume that the salvage value at the end of five years is $9,000 and interest rate is 12%. What is the equivalent annual cost of owning and operating the truck?