CAPITALIZED COSTS

The basic equation for capitalized cost for equipment was developed in Chap. 7 as Eq. (28), which can be written as follows:

$$K = C_V + \frac{C_R}{(1 + i)^n - 1} = \frac{C_R(1 + i)^n}{(1 + i)^n - 1} + V_s$$
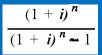
capitalized-cost factor

- K = capitalized cost
- C_V = original cost of equipment
- C_R = replacement cost
- Vs = salvage value at end of estimated useful life
- n = estimated useful life of equipment
- i = interest rate

Inclusion of Operating Costs in Capitalized-Costs Profitability Evaluation

The capitalized-costs concept can be extended to include operating costs.

Each annual operating cost is considered as equivalent to a necessary piece of equipment that will last one year.

The procedure is to determine the present value of each year's cost. The sum of these present values is then capitalized by multiplying by the capitalized-cost factor.

$$\frac{(1 + i)^n}{(1 + i)^n - 1}$$

Inclusion of Operating Costs in Capitalized-Costs Profitability Evaluation

Capitalized present value of cash expenses is determined as follows:

Let Cn' be the annual cash expense in year n' of the project life. The present value of the annual cash expenses is then

$$\sum_{n'=1}^{n'=n} C_{n'} \frac{1}{(I + i)^{n'}}$$

Inclusion of Operating Costs in Capitalized-Costs Profitability Evaluation

and the capitalized present value is

$$\frac{(1 + i)^n}{(1 + i)^n - 1} \sum_{n'=1}^{n'=n} C_{n'} \frac{1}{(1 + i)^{n'}}$$

If $C_{n'}$ is constant, the capitalized present value becomes (annual cash expenses)/i. Therefore,

$$\text{Capitalized cost} = \frac{C_R(1 + i)^n}{(1 + i)^n - 1} + V_s + \frac{\text{annual cash expenses}}{i} + \text{working capital}$$

- n = service life
- i = annual rate of return
- C_R = replacement cost
- V = salvage value

PAYOUT PERIOD

Payout period, or *payout time,* is defined as the minimum length of time theoretically necessary to recover the original capital investment in the form of cash flow to the project based on total income minus all costs <u>except</u> depreciation.

Original capital investment means only the original, depreciable, fixed-capital investment, and interest effects are neglected.

$$\text{Payout period in years (no interest charge)} = \frac{\text{depreciable fixed-capital investment}}{\text{avg profit/yr} + \text{avg depreciation/yr}}$$

PAYOUT PERIOD

Another approach to payout period takes the time value of money into consideration and is designated as *payout period including interest.*

With this method, an appropriate interest rate is chosen representing the minimum acceptable rate of return.

The annual cash flows to the project during the estimated life are discounted at the designated interest rate to permit computation of an average annual figure for profit plus depreciation which reflects the time value of money.