



# dante

Digital Area for Networking  
Teachers and Educators



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# Cost Criteria



## Outline

- **Average annual cost approach**
  - Inaccurate
  - Accurate
- **Equivalent annual cost approach**
- **Discounted costs approach**



## Avg. Annual cost approach – Basics

- comparing similar projects with the similar potential scale of production
- can be applied to the projects with different operating lives – cost are estimated on annual average basis
- the project with the lower average annual cost should be chosen



## Avg. Annual cost method (inaccurate)

$$AAC = D + i * CI + OC - \frac{DV}{n}$$

AAC Average Annual Cost

D Annual depreciation expense

i Required rate of return

CI Capital Investment

OC Annual Operating Cost (depreciation not included)

DV Disposal Value of an asset

n Number of years (Operating time)



## Avg. Annual cost method (accurate)

Key assumptions:

1. Equivalent annual cost (EAC) is the annual cost of owning and maintaining an asset determined by dividing the net present value of the asset purchase, operations and maintenance cost by the present value of annuity factor.
2.  $(D + i \cdot CI)$  is like an ordinary annuity (regular instalment) of a loan, , where depreciation (D) is like a loan amortization, the required rate of return (i) is like an interest rate, and the capital investment (CI) is like a loan.
3. Then the annuity payment can be calculated by multiplying a loan by amortization factor:



## Equivalent Annual cost method (accurate)

$$EAC = \frac{i \cdot (1 + i)^n}{(1 + i)^n - 1} \cdot CI + OC - DV \cdot \frac{1}{(1 + i)^n} \cdot \frac{i \cdot (1 + i)^n}{(1 + i)^n - 1}$$

EAC      Equivalent Annual Cost

I         Required rate of return

CI        Capital Investment

OC       Annual Operating Cost (depreciation not included)

DV       Disposal Value if any

$$\textit{sinking Fund Factor} = \frac{i}{(1 + i)^n - 1}$$



## Discounted cost method

- Compares the individual investment proposals based on a total amount of discounted investment cost and discounted operating costs occurring during the whole operating time of a project,
- The most advantageous project is the one with a lower discounted costs,
- Is not appropriate to apply when comparing two or more projects with different life span. For the projects with unequal operating lives should be used the equivalent annual cost approach.

$$EAC = \frac{\textit{discounted costs}}{\textit{PV annuity factor}} = \textit{discounted costs} * \textit{amortization factor}$$



## Discounted cost method

$$DC = CI + \sum_{n=1}^N \frac{OC}{(1+i)^n}$$

$$DC = CI + OC \cdot PV \text{ annuity factor} - DV \cdot \frac{1}{(1+i)^n}$$

DC	Discounted Cost
i	Required rate of return
CI	Capital Investment
OC	Annual Operating Cost (depreciation not included)
DV	Disposal Value
n	Number of periods (operating time)



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