PROFITABILITY, ALTERNATIVE INVESTMENTS, AND REPLACEMENTS

(Peters and Timmerhaus)

The word **profitability** is used as the general term for the measure of the amount of profit that can be obtained from a given situation.

The profits anticipated from the investment of funds should be considered in terms of a minimum profitability standard.

Suppose that two equally sound investments can be made.

BASES FOR EVALUATING PROJECT PROFITABILITY

1

Cost of capital
$100,000

Profit
10,000$/year

Rate of return
10,000/100,000=10%

2

Cost of capital
$1 million

Profit
25,000$/year

Rate of return
$25{,}000/10^{6}=2.5\%$

The second investment gives a greater yearly profit

the annual rate of return on the second investment is lower

BASES FOR EVALUATING PROJECT PROFITABILITY

Because reliable bonds and other conservative investments will yield annual rates of return in the range of 6 to 9 percent, the $1 million investment in this example <u>would not</u> be very attractive.

Thus, for this example, the rate of return, rather than the total amount of profit, is the important profitability factor in determining if the investment should be made.

Mathematical Methods for Profitability Evaluation

The most commonly used methods for profitability evaluation:

1. Rate of return on investment
2. Discounted cash flow based on full-life performance
3. Net present worth
4. Capitalized costs
5. Payout period

Each of these methods has its advantages and disadvantages. Because no single method is best for all situations, the engineer should understand the basic ideas involved in each method and be able to choose the one best suited to the needs of the particular situation.

RATE OF RETURN ON INVESTMENT

In engineering economic studies, rate of return on investment is ordinarily expressed on an annual percentage basis.

The yearly profit divided by the total initial investment necessary represents the fractional return, and this fraction times 100 is the standard percent return on investment.

Profit is defined as the difference between income and expense.

RATE OF RETURN ON INVESTMENT

To determine the profit, estimates must be made of direct production costs, fixed charges including depreciation, plant overhead costs, and general expenses.

Profits may be expressed on a before-tax or after-tax basis, but the conditions should be indicated.

Both working capital and fixed capital should be considered in determining the total investment.

RATE OF RETURN ON INVESTMENT

Returns Incorporating Minimum Profits as an Expense

Assumption: It must be possible to obtain a certain minimum profit or return from an investment.

This minimum profit is included as a fictitious expense along with the other standard expenses.

The result shows the *risk earning rate.*

If the return is zero or larger, the investment will be attractive. This method is sometimes designated as *return based on capital recovery with minimum profit*.