

B/C Classifications

First step is to identify cash flows as either benefits, disbenefits, or costs

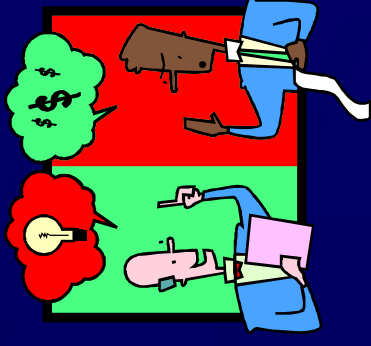
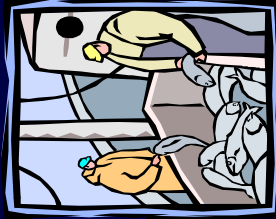
Benefits(B)--Advantages to the people
Disbenefits--Disadvantages to the people
Costs--Expenditures by the government

$$\text{Conventional B/C ratio} = \frac{B - D}{C}$$

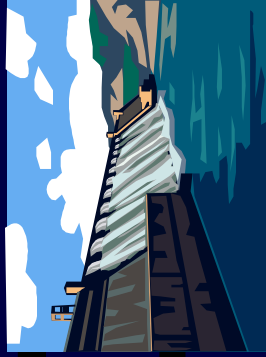
Note 1: All terms in equation must be expressed alike(P,A, or F)

Note 2: Do not use minus sign for costs

Note 3: Savings to gov't are subtracted from costs



B/C for Single Project



$$\left. \begin{aligned} \text{Conventional B/C ratio} &= \frac{B - D}{C} \\ \text{Modified B/C ratio} &= \frac{B - D - \text{M\&O}}{C} \end{aligned} \right\}$$

(M & O cost subtracted from numerator rather than added to denominator)

If $B/C \geq 1$, accept project
For $B/C < 1$, reject

Example: A flood control project will have a first cost of \$1.4 million with an annual maintenance cost of \$40,000 and a 10 year life. Reduced flood damage is expected to amount to \$175,000 per year. Lost income to farmers is estimated to be \$25,000 per year. At an interest rate of 6% per year, should the project be undertaken?

Solution: Express all values as A and then find B/C ratio:

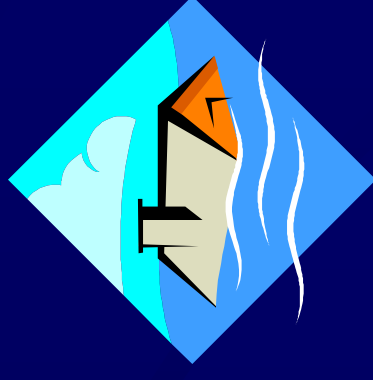
$$B = \$175,000$$

$$D = \$25,000$$

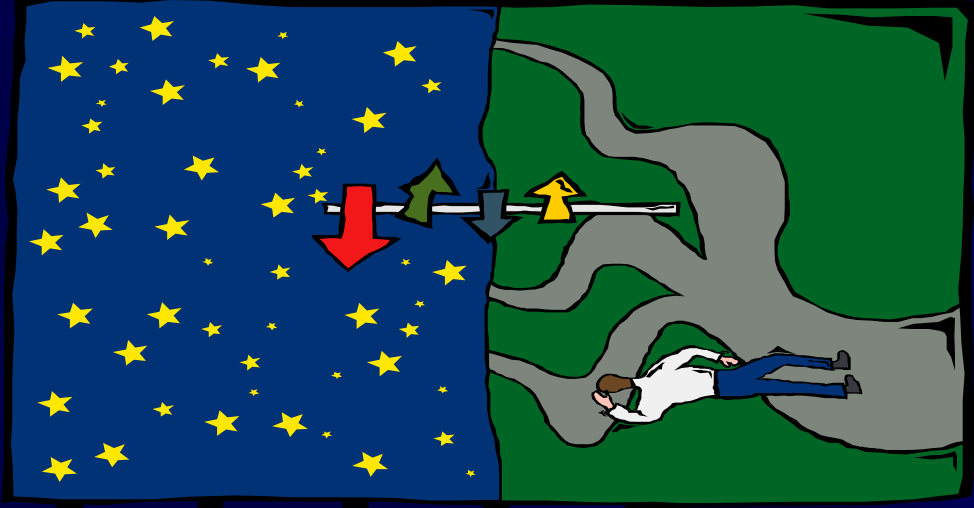
$$C = 1,400,000(A/P, 6\%, 10) + 40,000 = \$230,218$$

$$\begin{aligned} B/C &= (175,000 - 25,000)/230,218 \\ &= 0.65 \end{aligned}$$

Therefore, do not build project



Alt Selection by B/C Ratio



Two types: independent and mutually exclusive

For independent, compare alts against DN and select all that have $B/C \geq 1$

For mutually exclusive, first rank alternatives according to increasing total cost (add DN for stand alone alternatives)

Next, compare first two alts incrementally

Then, eliminate one and compare survivor w/ next alt

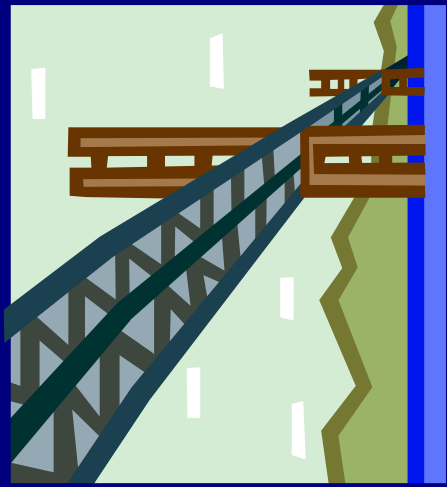
Finally, continue comparing alts until only 1 remains

B/C Ratio-Multiple Alts



Example: The benefits, disbenefits, and costs shown below are for mutually exclusive alternatives. At an interest rate of 6% per year, which one, if any, should be selected?

<u>Project ID</u>	<u>Benefits, \$/yr</u>	<u>Disbenefits, \$/yr</u>	<u>Costs, \$/yr</u>
A	615,000	36,000	500,000
B	200,000	30,000	150,000
C	400,000	25,000	290,000



Solution: The alternatives are stand alone(i. e. each has benefits) Therefore, add DN and rank according to cost: DN, B, C, A

Compare DN vs B: $B/C = (200 - 30)/150 = 1.1$ eliminate DN

B vs C: $[(400 - 200) - (25 - 30)]/(290 - 150) = 1.5$ eliminate B

C vs A: $[(615 - 400) - (36 - 25)]/(500 - 290) = 0.8$ eliminate A

Only one alt remains. Therefore, *select alt C*