

A market area near major road has serious road safety concern for pedestrian crossing. Two road safety features (RSF) are proposed, one is A: Construction of steel foot over bridge and B: Improve pedestrian crossing facility. Decide which road safety feature should be chosen based on B/C ratio and Net present value. Following information is given:

Expenditure or cost			
Steel foot over bridge (A)		Improvement pedestrian crossing (B)	
Foundation cost	4,00,000 BDT	Road painting in one way	50,000 BDT
Concrete works	4,00,000 BDT	Rumble strip installation in one way	10,000 BDT
Steel works	8,00,000 BDT	Road sign	5,000 BDT/sign
Finishing, painting, canopy and others	2,00,000 BDT	Flushing light installation	15,000 BDT/light
		Footpath improvement (lump sum)	5,00,000 BDT
		Guard rail installation	2,00,000 BDT

Benefit from accident reduction based on survey information and accident analysis			
Original accident occurrence rate in 1,00,000 pedestrian crossing as per survey report		Average accident cost (BDT)	
Fatal	1	Fatal	5,00,000
Non-fatal injury	5	Non-fatal injury	50,000
Property damage only (PDO)	10	Property damage only (PDO)	20,000
Probable accident occurrence rate in 1,00,000 pedestrian crossing after construction of steel foot over bridge (A)		Probable accident occurrence rate in 1,00,000 pedestrian crossing after improvement pedestrian crossing (B)	
Fatal	0	Fatal	0
Non-fatal injury	1	Non-fatal injury	2
Property damage only (PDO)	2	Property damage only (PDO)	6
Average pedestrian crossing volume = 2,000 person/day.			

1

Soln:

Cost: (C)

A:

F.C. = 4,00,000

C.C. = 4,00,000

S.W. = 8,00,000

K.O. = 2,00,000

18,00,000 BDT

B:

R.P. = 50,000 x 2 = 1,00,000

R.S. = 10,000 x 2 = 20,000

R.S. = 5,000 x 4 = 20,000

F.L.I = 15,000 x 2 = 30,000

F.I. (L/S) = _____ = 3,00,000

G.R. = _____ = 2,00,000

8,70,000 BDT

Benefit: (B)

Total pedestrian = 2000 x 365

= 7,30,000 per year

~~A:~~

Base case:

	As nos. (per 7,30,000)	Cost	
F	7.3 x 1 = 7.3	5,00,000	= 36,50,000
I	7.3 x 5 = 36.5	50,00,000	= 18,25,000
P	7.3 x 10 = 73	2,00,000	= 14,60,000

69,35,000 BDT

Both projects cost are less than base case benefit. So A and B are feasible to adopt. 2

A:

	no. of Accident reduction / 1,00,000	Total no. of accident reduction	Cost
F	1-0 = 1	7.3 X 1 = 7.3	7.3 X 5,00,000 = 36,50,000
I	5-1 = 4	7.3 X 4 = 29.2	29.2 X 5,00,000 = 14,60,000
P	10-2 = 8	7.3 X 8 = 58.4	58.4 X 20,000 = 11,68,000
			<u>62,78,000</u> BDT

$$B/C \text{ ratio} = \frac{62,78,000}{18,00,000} = \boxed{3.49}$$

$$\begin{aligned} NPV &= B - C = \text{inflow cash} - \text{outflow cash} \\ &= 62,78,000 - 18,00,000 \\ &= \boxed{44,78,000 \text{ BDT}} \end{aligned}$$

B:

	no. of accident reduction / 1,00,000	Total no. of accident reduction	Cost
F	1-0 = 1	7.3 X 1 = 7.3	7.3 X 5,00,000 = 36,50,000
I	5-2 = 3	7.3 X 3 = 21.9	21.9 X 5,00,000 = 10,95,000
P	10-6 = 4	7.3 X 4 = 29.2	29.2 X 20,000 = 5,84,000
			<u>53,29,000</u> BDT

$$B/C \text{ ratio} = \frac{53,29,000}{8,70,000} = \boxed{6.13}$$

$$\begin{aligned} NPV &= B - C = 53,29,000 - 8,70,000 \\ &= \boxed{44,59,000 \text{ BDT}} \end{aligned}$$

B/C ratio ~~the~~ > 1, so both RSF are feasible
 $NPV_A > NPV_B$, so, A i.e. construction of steel footover bridge is most considerable.