SUBJECT: Construction Financial Management

I.D No: 14816

30th June, 2020

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Problem 1: A construction company will replace an excavator after 5 years. A new one costs $250,000. How much is the end-of-year annual uniform payment the company has to put into a bank in order to save enough money in five years' time for purchasing the equipment if the bank is offering an interest rate of 4% per annum?

Solution 1:

Principal amount = S = $250,000
Number of periods = n = 5
Interest rate in % per period (nominal or apparent rate) = i = 4% = 0.04
Annual uniform payment = A =?

Fig. 1. – Sum of $ 250000 accumulated by five uniform periodic (annual) payments.

Using Formula:
S = A x [{(1+i)^n -1}/i]
A = S x [i/{(1+i)^n -1}]

250000 = A x [{(1+0.04)^5 – 1}/0.04]
250000 = A x [{1.21665 -1}/0.04]
250000 = A x [0.21665/0.04]
250000 = A x 5.4163
A = 250000/5.4163
A = 46156.78
A = $ 46157
Therefore Annual uniform payment is $ 46157.

Problem 2: A construction material company makes and sells window panels. The selling price per panel is $900. The variable cost for making the window panels is $500 per unit. The fixed cost is $8,000,000. Find the BEP (break-even point)?

Solution 2 Given Data:

Selling Price per unit = p = $900 Variable cost per unit = v = $500
Fixed Cost = FC = $8,000,000 Break-even point = BEP =?
Number of units = x

a) The above problem can be solved using the following table:

Cost-volume-profit analysis (or Break-even analysis				
Volume	x=18000	x=20000	x=22000	x=25000
Total Revenue	16200000	18000000	19800000	22500000
Variable Cost	9000000	10000000	11000000	12500000
Fixed Cost	8000000	8000000	8000000	8000000
Total Cost	17000000	18000000	19000000	20500000
Net Income	-800000	0	800000	2000000
	Loss	BEP	Profit	

At x = 20000, the company is at BEP that is the company is neither making profit nor making loss. The company has to increase its production capacity more than BEP = 20000 in order to gain profit. Production less than 20000 units would be a loss to the company. Assuming maximum capacity of the company as 25000 units then the company's maximum profit is $ 2,000,000.

BEP % = [BEP/Maximum Capacity] x 100
BEP % = (20000/25000) x 100
BEP % = 80%

b) Mathematical Presentation:

TR = a + b + c + Profit
Total Cost (TC) = Variable Cost (VC) + Fixed Cost (FC)
Where as
TR = total revenue
a =Direct cost
b = Cost of administering the company
c = Costs of marketing/advertisements
At break-even point (BEP)
TR = a + b + c
TR = TC
TR = px (a)
TC =VC + FC
TC = vx + FC (b)
Equating (a) and (b)
Px =vx +FC
Hence, at BEP, x = FC/ (p – v) (c)

Putting the values in equation (c)
x = 8000000/ (900-500)
x = 8000000/400
x = 20000 units
Therefore Break-even point (BEP) = 20000 units
Let x = 18000, 20000 and 22000

Graphical presentation – Break-even chart:

The Break-even is a graphical presentation of TR, VC, FC and TC. The Fig.2 below shows the break-even chart of problem 2.

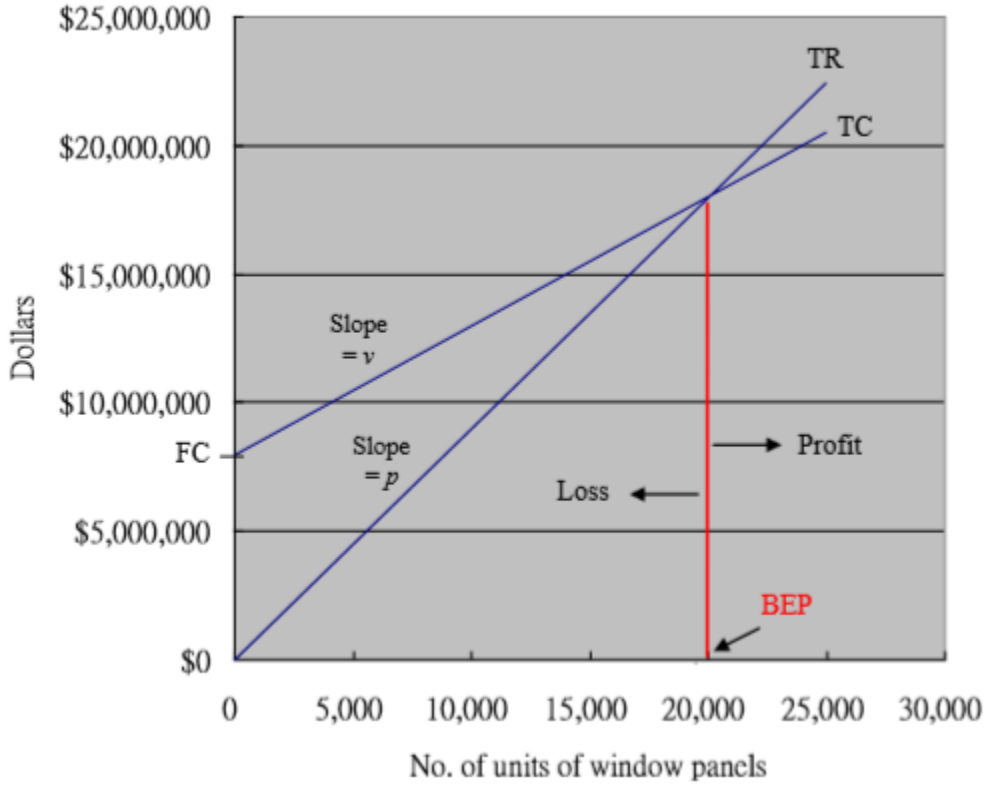

Fig. 2. - The break-even chart for problem 2.