Cost Accounting
Prof. Varadraj Bapat
School of Management
Indian Institute of Technology, Bombay

Lecture - 03
Marginal Costing

[FL]. In module 1 that is sections one and two we had discussed about what is Cost Accounting, we had also discussed classification of cost. Today we are going to talk about cost volume profit analysis or Marginal Costing, before that let us do a very brief recap. I hope you still remember various categorization of cost; one way of categorizing of cost was based on the elements. Do you remember what are the elements of costs? I think most of you know it is material, labour or expenses.

That is one of the oldest ways of classifying the cost, then came functional classification. So, as per the functions how do you classify the cost? It can be production cost, admin cost, marketing cost, selling cost R and D cost and so on. Then you also know there is a classification of cost based on direct versus indirect cost.

So, these three are primarily useful for accounting as well as control purposes; for control purposes another useful classification was controllable versus non controllable cost, then product costs versus period costs. When it comes to decision making there where two three cost classifications which are the once which we are going to discuss now.

So, for making decisions or for understanding the cost as per their variability, what are the ways of classifying the costs, do you remember? So, we have got variable cost versus fixed costs and of course, there are same variable costs which bear the nature of variable as well as fixed. There is also one more way of classifying the cost that is based on relevant cost versus sunk costs. Now, these classifications are extremely important for the purpose of decision making, they are not of much use for classification for control purposes or for accounting purposes, but at when it comes to decision making this classifications play a key roles.

So, do you remember now what is a variable cost? I hope most of you know that a cost which changes in the direct proportion with the level of activity is considered as a

variable cost. So, for 100 units if cost is 1000 and for 200 units it becomes 2000; that means, when units increase cost also increase in the same proportion then we call that cost as variable cost. As against these there is another type of cost which does not change with level of activity. So, for 100 units if cost is 1000, for 200 unit also it remains 1000, then that will be considered as fixed cost.

So, classifically classically speaking there are only two types of cost fixed and variable, but you can have some cost which have nature of both to an extent they are variable, but to an extent they are fixed they are called as semi variable costs. I am repeating all these again because what we are going to learn now that is cost volume profit analysis is mainly based on classification of cost as per variability. So, let us go ahead with our module.

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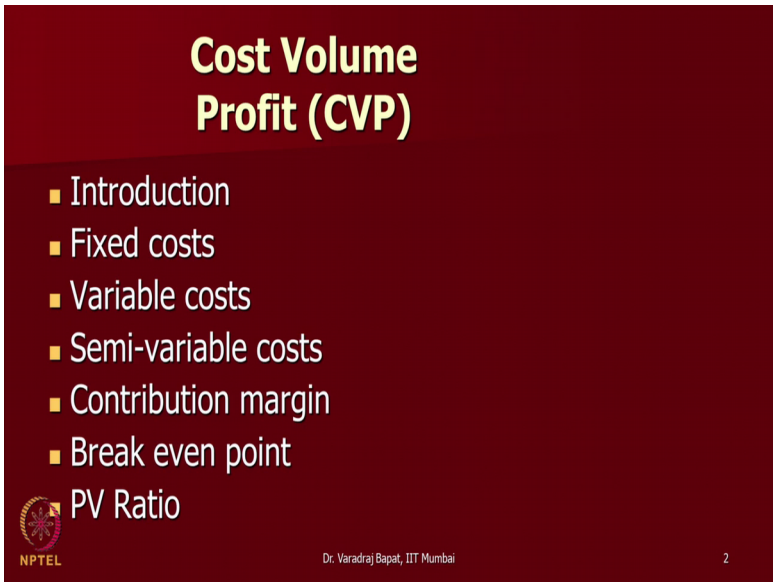

So, here we are going to discuss about fixed variable and semi variable costs which we have just discussed, then we will see what is a contribution margin and then we will also discuss about breakeven point PV ratio and in the next module we will also see how this classifications can be used for decision making.

Today also we will try to solve some small cases based on our understanding of variability of costs. Now, what is CVP analysis? Now, this is the analysis of three variables as the name suggests cost at one end, volume because volume impacts the cost it impacts some cost it does not impact some costs that is fixed and variability as per the

variability of the costs and both of them impact the profits because volume is going to impact revenue as well as cost naturally there will be a result of profit.

So, in this we try to understand the level of activity that is volume its impact on revenues cost and the resultant profit. Ultimately what is our main interest is with the changes in the volume how are the cost and profits going to be affected or going to change.

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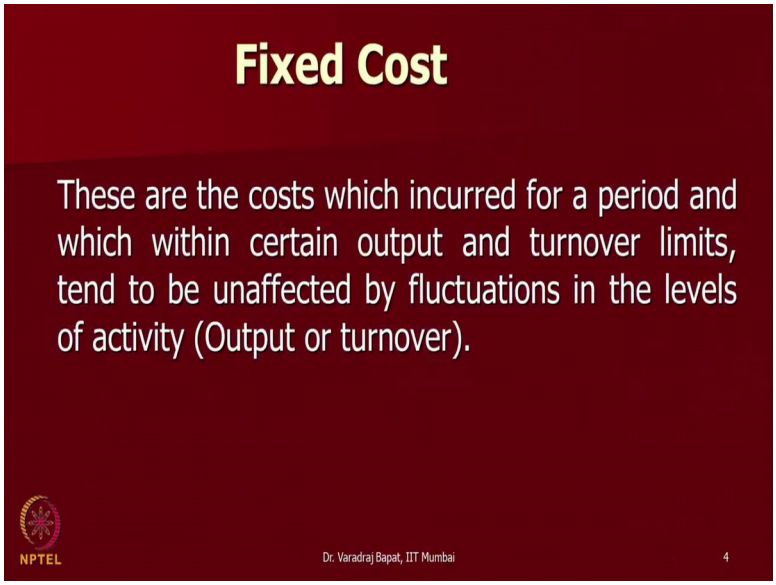

Now, fixed costs, these are the costs which do not change with level of activity or do not change with output or with the turnover. Naturally they are cost pertaining to a particular period they have nothing to do with the production or with the output levels or with the operations levels, they are related to the period, so they are called as fixed cost. Now, can you give some examples of fixed costs? In different industries we can have different examples, but just for simplicity of understanding let us say we have one car which we use a taxi and we are using it for passenger transport.

Now, what will be the fixed costs in your business? I think most of you are able to guess it correctly. If you have a vehicle you have to pay insurance on the vehicle and that insurance will be for 1 month or for 1 year it is a period cost it does not change with number of kilometers you operate, that is why it is considered as a fixed costs. There will also be some costs involved in the registration of car or some taxes which you may have to pay which are time based not based on how much you how much is your use of car they will also be fixed cost.

Then there is depreciation because you have incurred some capital cost on purchase of car which will you will write it off over a period of time. So, every year there will be a charge of depreciation though it is a non cash expense, it is one of the important expenses and that is again fixed in nature. These were some of the examples of fixed costs in this particular industry.

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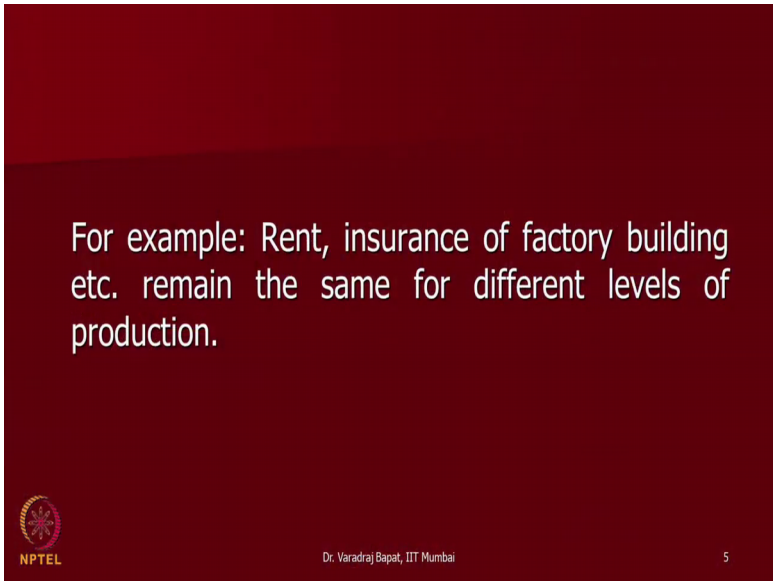

Now, a few more examples are given here let us say if you are operating a factory you may have to pay rent of the factory, issuance of the factory, so, for a factory building these are the fixed costs. Can you think of any other examples? Just think of any industry and I think you will be able to name certain costs which are fixed in nature which do not change irrespective of level of activity those will be considered as fixed costs.

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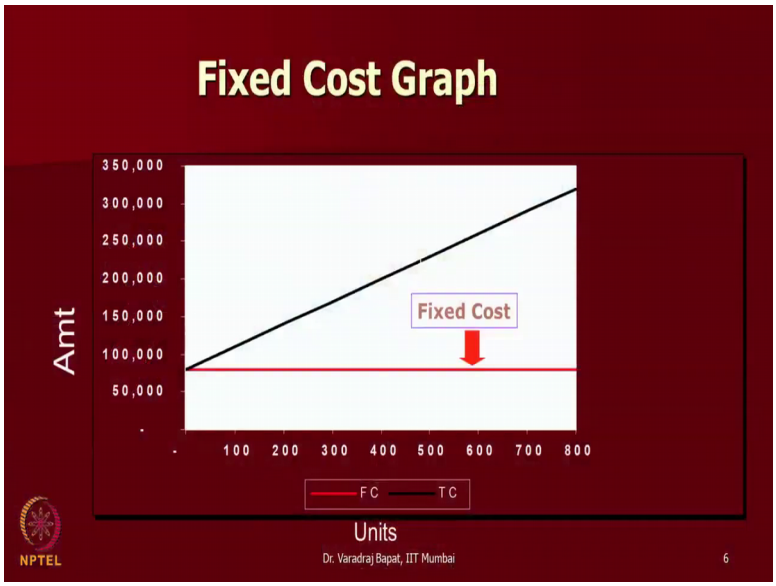

Now, if you try to plot this costs, this is how they look like are you getting it? So, you have got this red line which is totally horizontal you can see the number of units are changing from 0 to 800. At 0 the cost is something like 80,000 and even at 800 it remain at 80,000. Theoretically fixed costs are not suppose to change at any point of time of course, it may not be true let us say in this example if number of units go up to say 5000 fixed costs may increase, but its a different issue within a given range they do not change.

So, whatever is your setup capacity either you produce 0 or you go up to the capacity or say 100 percent or 120 or 130 percent of your capacity fixed costs do not change its a horizontal line, you can see there is a black line which is going up that is a total cost line that is a total cost they have a fixed component which do not change with the level of activity.

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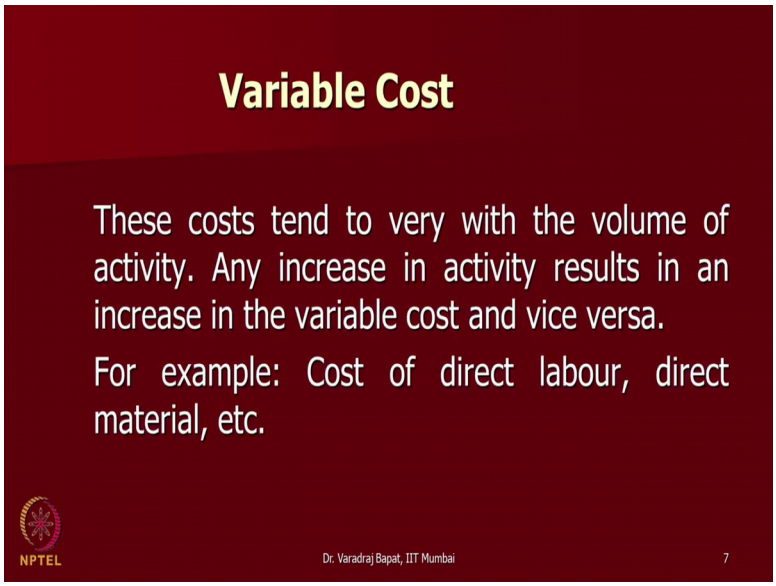

Now, the other cost is variable, but before going to that cost does it mean that fixed costs never changes? It is not true although in the graph you can see that it is totally flat or horizontal theoretically it does not change here because with level of activities does not change. But my question was does it mean that fixed cost never changes at all? It is not true because its can change from time to time for example, our examples were rent and insurance.

Now, this year rent say 10 lakhs next year rent can increase, next year insurance can increase, taxes can increase because of change in tax law not necessarily next year even in the current year some of the fixed cost may increase because of certain other things, but the point is they do not change with the level of activity got it. Now, the other type of costs are variable cost these are the ones which change in the direct proportion to level of activity. So, some of the examples of them are cost of direct labour or direct material.

Suppose you are producing some item it is consuming direct material. Normally when you increase your output the raw material consumption will also increase in the same proportion, if output increases by 20 percent, raw material consumption will also increase by 20 percent that will become a variable cost. If you take our example of operating a taxi service we have one car we are operating a taxi service, what will be the variable cost? In all probability the petrol or the fuel cost will be variable. As you run

your car for more number of kilometers, the consumption a fuel will also increase in more or less the same proportion, so we call it as a variable cost got it?

Now, how you will be able to chart it I will just show you the fixed costs graph once again. Now, if you want to draw a variable cost graph how will you draw it? I think most of you are able to guess it correctly, it will start with 0, because by definition it changes with level of activity, so it will be 0 and it will go up as a straight line with number of units produced I will just show you.

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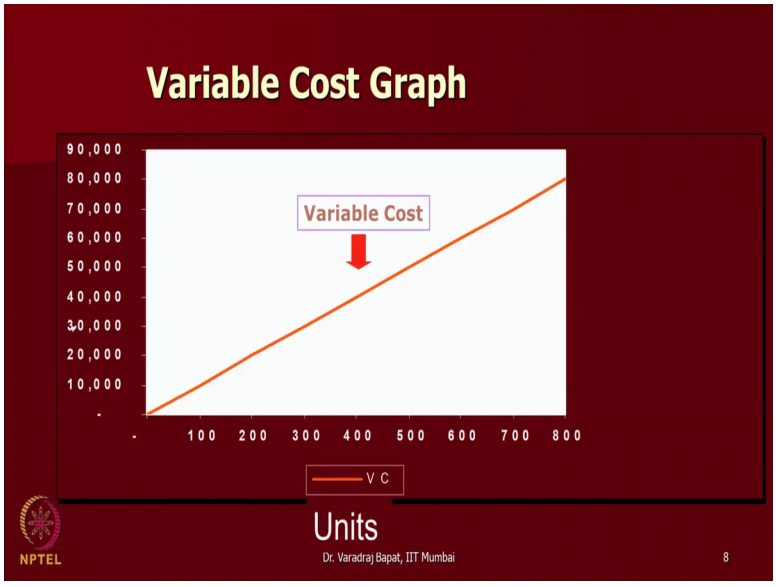

So, you can see the red line here it is starting from 0, it cannot start with some amount that if it starts with some amount even at 0 it will mean that it. As a fixed component as per definition it should change with the level of, so it starts with 0. And it goes up in a linear form, so this is a variable cost graph.

Now, there are semi variable costs, now what happens is in theory there are only two types of cost one are fixed flat one are variable, but in real life most of the costs do change with level of activity, but they may not change in the direct proportion. So, they are neither variable completely nor fixed completely such costs are called as semi variable costs.

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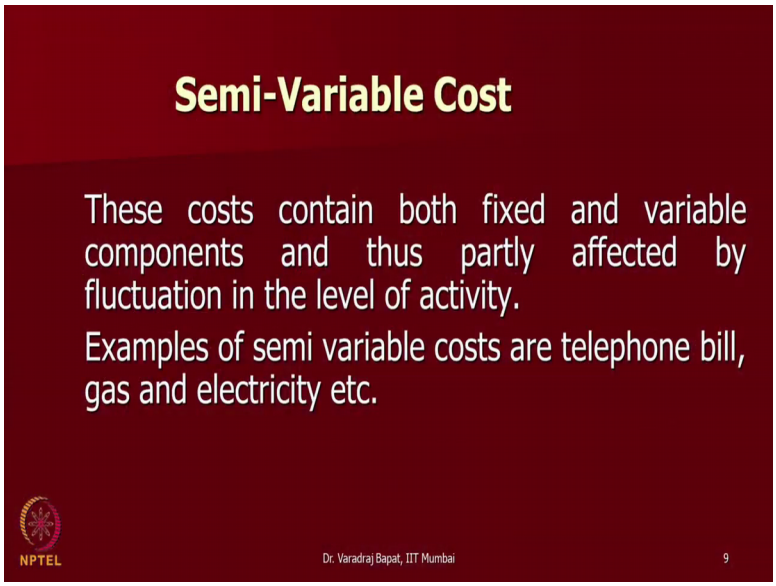

Now, example is telephone bill, nowadays of course, there are different types of plans, but traditionally telephone been used to have a component of rent and there will be call charges as you increase the number of calls there will be more and more call charges. So, telephone bill was a good example of semi variable cost I am saying was because nowadays there are so many packages where call charges are free.

Let us say there we have a package where call charges are free you can make any number of calls, then telephone bill will fall in what type of example? I think you are right it becomes a fixed costs because it becomes a cost for a period for 1 month or for 10 weeks or for 15 weeks or so on. It does not change with number of calls, then it becomes fixed cost, but in this case we have given it as a semi variable cost because traditionally it used have a rent plus call charges.

Same way gas or electricity bills they also have a rent component and usage component, so they are semi variable, can you give any other example. For our taxi business can you give any example of semi variable costs just think over. I think you are able to guess it correctly maintenance is an important example of semi variable cost because even if you parked a car in the parking lot without using it for whole month you will need some maintenance just to keep the car in a running condition it requires regular maintenance, but if you use the car the maintenance costs goes up and more and more the use the maintenance cost will also increase with usage.

So, maintenance becomes a very good example of semi variable cost. How will you draw a graph for it? Just think over, maybe at 0 you will have to incur some semi variable costs and will it go up in the straight line it will go up, but not in the direct proportion it may be a curve or it can be in the form of steps.

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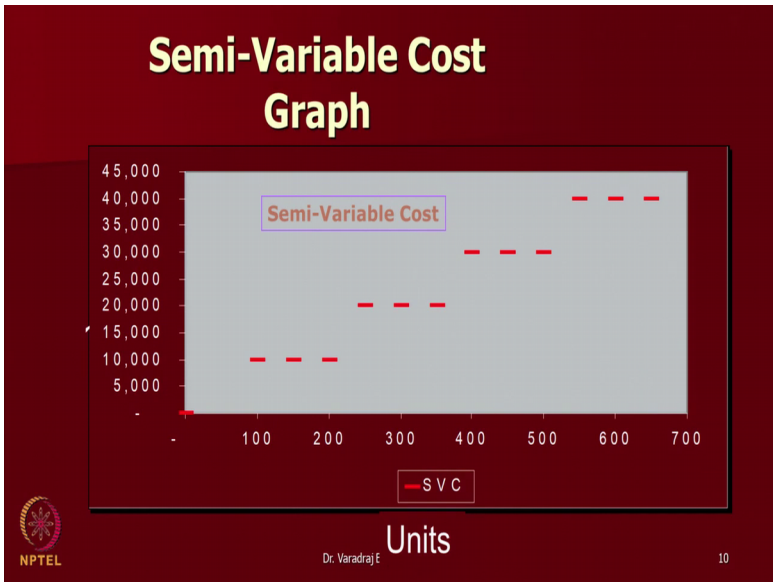

Usually semi variable cost is in a step form. Why it is in a step form? Because from 0 to 100 or let us say 200 as per this graph semi variable costs are at a particular level. Once you cost 200 or 225 suddenly they zoom up here you can see that there were at 10,000 from 0 to 200 beyond 200 they became 20,000, then they are again flat up to 400.

So, let us say you have to change tyres after every 300 hundred kilometers; that means, in the beginning you have to get new tyres the cost will remain constant up to 300 kilometers after that you change the tyres. So, you have to go up to the next step, then again it remains fat say at 600 kilometers you change it again; again it zoom up, then again its go it remains flat.

This is how normally semi variable cost operate. I am saying normally because there can be curves of various shapes also; it is not a straight line. Variable cost is a straight line, semi variable cost and fixed cost is a flat straight line, semi variable cost is somewhere in between it can be curve also.

But as per as the CVP analysis is concerned normally we assume them to be straight lines either fixed, variable or semi variable. So, typically we are looking at step wise semi variable cost getting it. Now, going to cost volume profit analysis let us understand what does it take into account?

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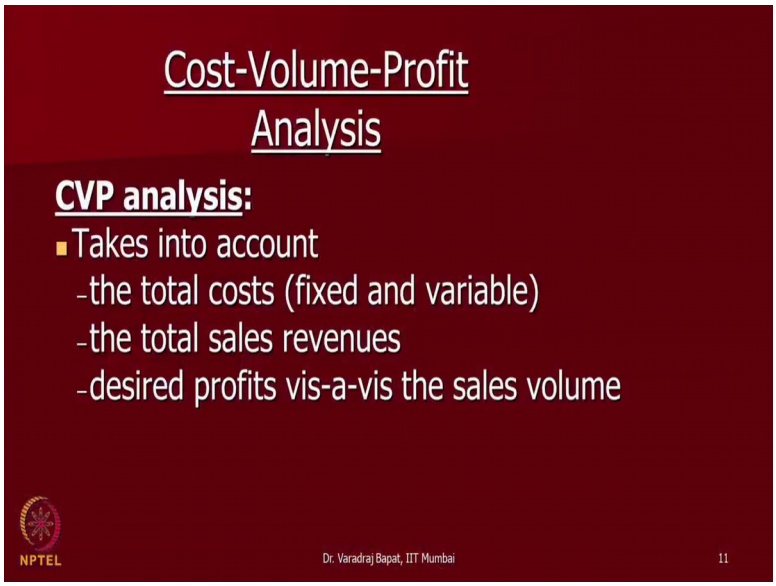

So, in CVP analysis we look at the total cost divided into fixed and variable we look at the total revenue then we look at the desired profit vis a vis various levels of sales volume at a certain level of volume there will be some profit. So, either we take some level of sales may be based on our market research or we go by the profit as expected by management and based on that go back to what level of activity we have to achieve for the desired profit this is how normally we use our CVP analysis.

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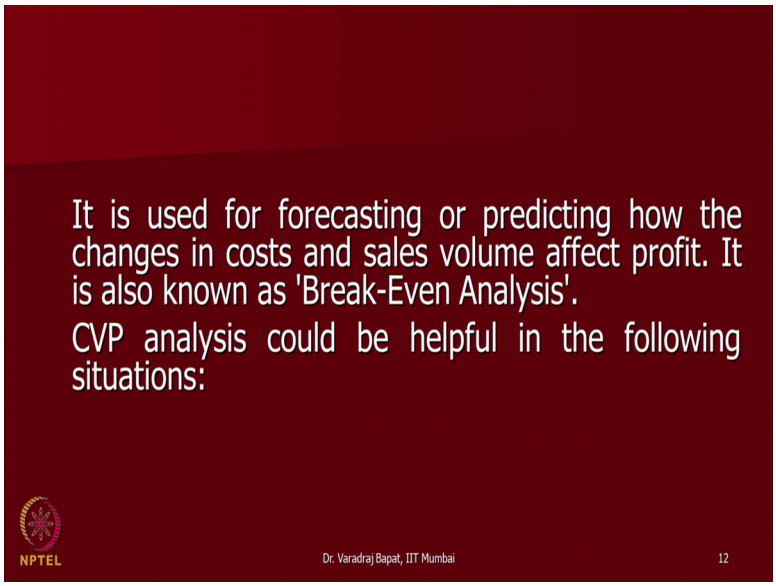

So, here we do one more thing, we also calculate breakeven point. So, we try to predict a level of activity where cost and sales exactly match, in other words there is no profit or no loss and we try to predict various levels of activities at various levels of sales which is known as profit planning.

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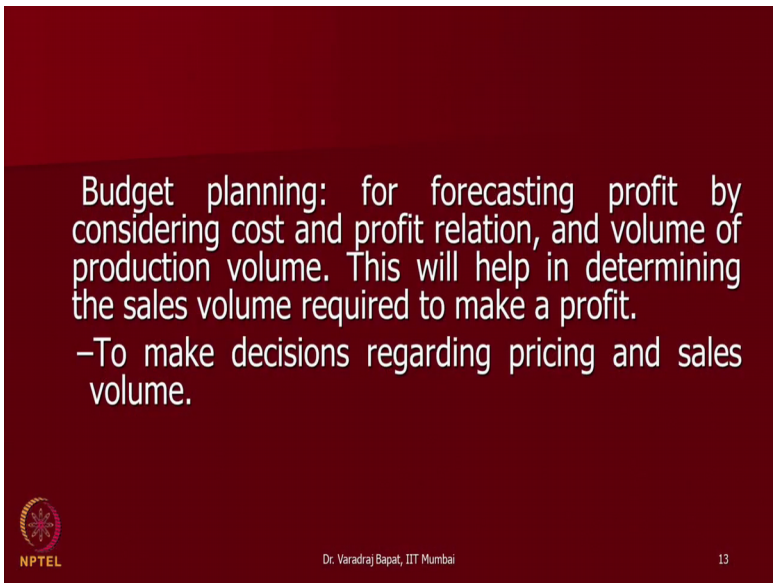

So, in various scenarios it is quite useful one is for budget planning. So, we would like to know the forecast profits at various levels of sales for that it is quite useful. It is very

much useful for making decisions especially pricing decision because we will have to calculate the cost based on use of various methods will arrive at the cost.

Now, on that cost the question is how much profit margin we should charge which becomes a pricing decision? And in pricing decision the CVP analysis plays a very important role because as per the level of sales we will have to decide the prices. Further for certain specialized categories of customers we will have to offer various levels of discounts or we will have to change our pricing strategy for that also CVP becomes very important.

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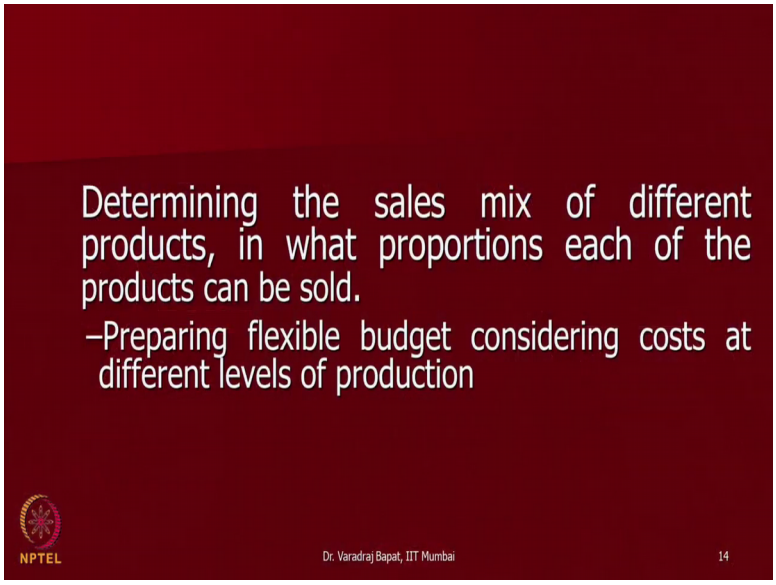

It is also important for determining sales mix of various products. It is also useful for sales mix decisions because we are not operating in only one type of product, we may be operating in different products where in we will have to decide, which product we need to emphasize on, which product we should give more focus on that is a sales mix decision or suppose we are operating a retail store we have to decide that we are having a limited space for display.

So, which product should get more space on display? A product which gives us more margin we will try to push that product for that we need to know the margins which are available on different products, we should know that right now which product company should focus on all these are called as sales mix decision. Based on these it is also useful for making a flexible budget because as per the different levels of activities our cost will

change. So, we will have to make a flexible budget and use that budget for various decision making scenarios.

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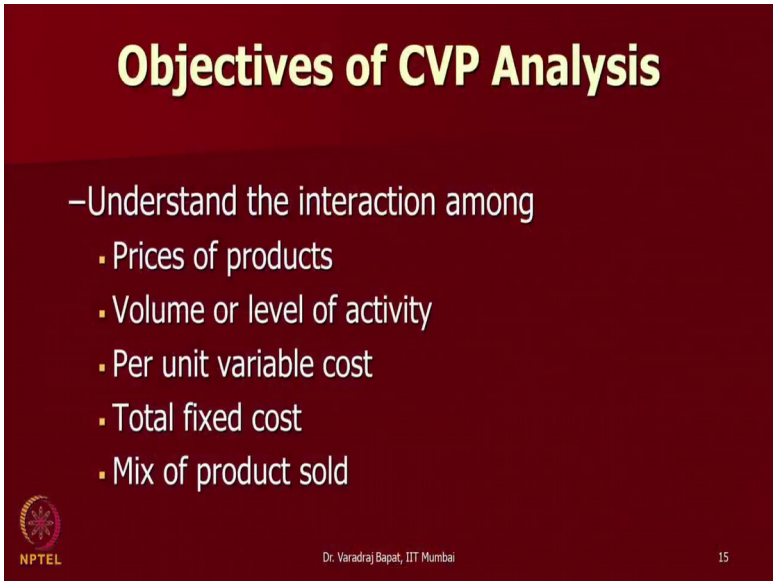

Now, the objectives of CVP. In CVP analysis we understand the interaction between various things one is for price volume or level of activity per unit variable cost, see variable cost can also be given as a total variable cost, but since it is going to change on a per unit basis it make sense to calculate per unit variable cost. Then total fixed costs even total even fixed cost can be calculated on per unit basis, but it is misleading because it is not going to change on unit basis it will keep on changing on per unit basis.

So, what we will do is it is better to take total fixed cost we will also look at the mix of products which are sold. So, suppose we are dealing in product a b c we will have to look at in what different mixes they can be sold because some of the products may be competing with each other, some of the products may be complementary to each other. So, we will have to look at various sale mixes which are available.

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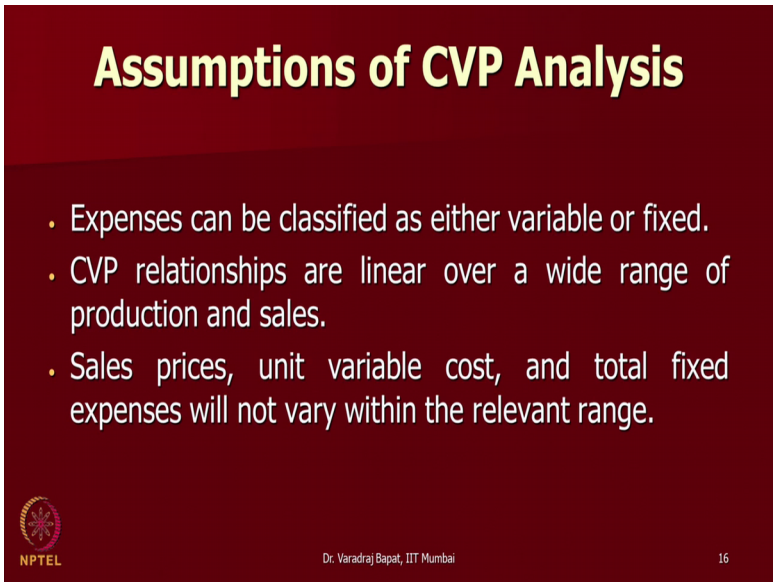

Now, normally CVP analysis is based on certain assumptions, the foremost assumption is all expenses can be classified either as variable or as fixed. Now, as I have told you most of the real life costs are actually semi variable, they may not be fully variable or fixed, but what we do is if it is a semi variable cost we break it down into variable component and fixed component and one of the assumption is it is possible to break down all the cost into variable and fixed.

Just keep in mind that some of these assumptions may not hold fully true there might be 5 percent cost maybe which cannot be classified, but it does not reduce the correctness of our calculation because we have to take decision in a uncertainty scenario, we do take these assumptions into mind and do our calculations and they would be more or less correct decisions that is why this assumptions are very much useful and to an extent they can be violated, it does not affect the correctness or fairness of a decision.

The next one is CVP relationships are linear over a wide range of production and sales, I will just go back, you can see here we had seen this fixed cost graph where we had assumed it to be a flat line or variable cost assuming it as a line vertically going up this is as per the assumption of CVP that this costs are linear.

In nature in reality they might be curves they may slightly go up or down, but again for the purpose of our calculation we will have to assume a linear relationship and please bear in mind that within a reasonable range they are actually linear. For example, from 0

to 800 they will be linear may be beyond that there might be slight shifts, but CVP analysis is a extremely useful for a short term decision making which is within reasonable range.

So, suppose you are making 700 units you have to decide should you make next 100 or not make next 100 for such decision CVP is useful and our linear assumption does not affect the correctness. Suppose, you want to take decide whether to make 5000 units or not, then you will have to go for different methods or different types of techniques ok. So, our next assumption we have seen the first two assumption is that, sales prices, variable costs and total fixed cost do not vary within a relevant range again this assumption is true for a reasonable range.

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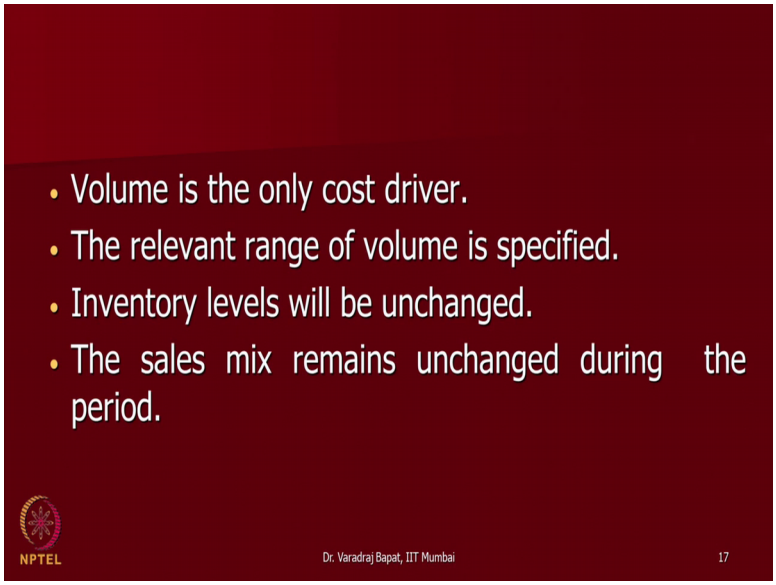

Next three assumptions are volume is the only cost driver. So, we do not take into account other costs changes like changes in the price levels or changes in the cost of some raw material etcetera, here we assume that cost change mainly because of volume the relevant range of volume is specified. So, we know that within 0 to 1200 units let us say we operate, so in that range our calculations are true. Inventory levels are ignored here they are assume to remain unchanged.

We also assume that sales mix does not change in that period, so for a given sales mix we which we calculate this period. Now, though this assumptions are taken into account do not be discouraged that what will happen if assumptions go wrong. First of all based on

assumptions we make certain calculations, then we can loosen or we can allow one by one some assumption to change and accordingly we can do sensitivity analysis.

So, we can change our calculation a bit and for a particular case we will be arriving certain decisions which will be reasonably correct. So, CVP analysis is extremely useful for short term decision making. We will continue our discussion in the next session. [FL].