Working Capital Management
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Lecture - 26
Incremental Inventory- I

Welcome students. So in the process of learning management of inventory as a important current asset, today we will learn a concept which is called as the concept of incremental analysis. How with the help of incremental analysis the inventory can be managed or the investment in the inventory can be managed. Under the incremental analysis what we do that we will have to calculate that for example there is a situation in a company that company want to increase its investment in the inventory because of any reason, there could be any reason.

Maybe the company is losing sales or maybe the company is, is not able to serve the clients. There is always or very frequently there is a stock-out situation or anything because of any valid reason company want to increase the investment in the inventory so the logic as well as the justification for that increased investment should be that increased investment when we increase the investment in the inventory, certainly it will it will increase the cost of funds.

Because we will have to increase the investment in the inventory so it means the cost of funds or the investment cost of the company will go up. Now that increased cost of the inventory has to be compared with the rate of return available by increasing the level of inventory and by increasing the level of sales. So it means under the incremental analysis what we do.

That if we want to increase the level of inventory from the existing to the new one maybe the level of raw material, maybe the level of the finished goods inventory. Especially we do it in case of the say finished goods inventory that if you want to increase the inventory of the finished goods then we can use the incremental analysis or even in case of the raw material also we can use the incremental analysis.

So under the incremental analysis we work out first that how much additional investment is required to be made to raise the level of inventory or to the raise the stock of the inventory and

against that investment increased investment or incremental investment how much profit is going to be there, how much incremental profit the company is going to earn, how much incremental operating profit the company is going to earn. That is a important point of consideration right.

Now in this case, we will have to work out the incremental amount of investment to be made in inventory if we want to increase the level of inventory. After that the second step is we will have to work out the incremental amount of the profit available, amount of the operating profit available because of the incremental investment in the inventory. And then we have to compare these two.

So we will have to try to find out then the expected rate of return from this increased investment in the inventory. So we will have to divide that say changed operating profit or increased operating profit with the increased investment or changed investment in the inventory and then try to find out that what is the expected rate of return available from this increased investment in the inventory right.

And then for taking a decision whether we should go for this investment or not we should compare the expected rate of return with the required rate of return with the required rate of return and if expected rate of return is at least equal to the required rate of return, we will go for this investment or in the other case if the expected rate of return is more than the required rate of return we will go for this investment.

But if the contrary happens that the expected rate of return is less than the required rate of return then we will drop the idea of making additional investment in the inventories.; so with the help of incremental analysis that we are making investment in the inventory at present level. Now if you saving or making investment in the inventory at the given level now if you want to increase the investment in the inventory from the given level so in that case how much increased investment we want to make that is the incremental investment we have to work out.

What is the output of that incremental investment in the inventory, incremental sales and in terms of the profit how much incremental profit and then the comparison of the two; operating profits

comparison with the increased investment or incremental analysis and then the comparison of the expected rate of return from this investment with the required rate of return and then taking a decision about whether we should go for this investment or not right.

So incremental analysis is one such technique with the help of which we can take a decision whether we should increase the investment in the inventory or not and the logic here is that the incremental investment and the cost of that investment and the output of that investment means the profits coming out of that the profits must outweigh the cost so that the required rate of return or the expected rate of return is higher than the required rate of return.

Now I will explain this, this concept with the help of a small case. We will do it here a small case and then we will make some calculations and then we will calculate the expected rate of return from some increased investment and then we will try to find out whether that is acceptable to the company or not or whether the company should increase the investment in the inventory or not. So there is a company, we call it under any name.

Here we have the name of the company that is the Electrocircuit Inc. and they are manufacturing 100 models of electrical products, 100 models of different kinds of the electrical products and the total sales of the company for the coming year that is for the ensuing year are the Rs. 176 crores. These are the expected sales.

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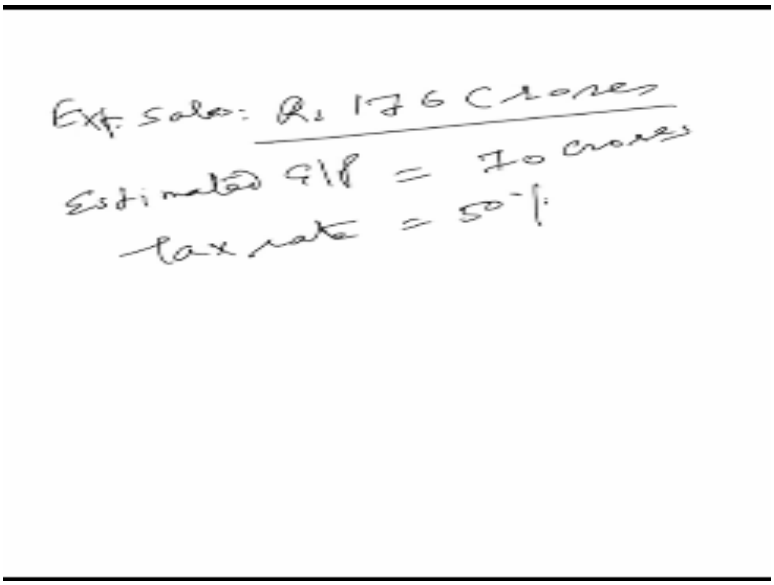

So let us note down the data. These are the expected sales and the estimated, estimated gross profit is about 70 crores, is 70 crores. So we will have to now go for this analysis here. This is this analysis we will be making here. So this is the sales, expected sales, 176 total sales 176 crores. Estimated gross profit is 70 crores and tax rate is, tax rate is 50%. For the sake of simplicity we have assumed the tax rate as 50% right.

And now we are given the other information also. If you look at the other information we are given the level of current assets, existing level of current assets and these current assets are given in the absolute amount as well as, a percentage of the forecasted sales also because we are making a working capital analysis. So we have only that part of the balance sheet here which is only depicting the working capital position that is the level of current assets and current liabilities and as percentage to the sales also these assets and liabilities are given to us.

So let us see how much these assets and liabilities are. So first we go for the, this is the balance sheet and we take it as this is in the particulars. We will write here.

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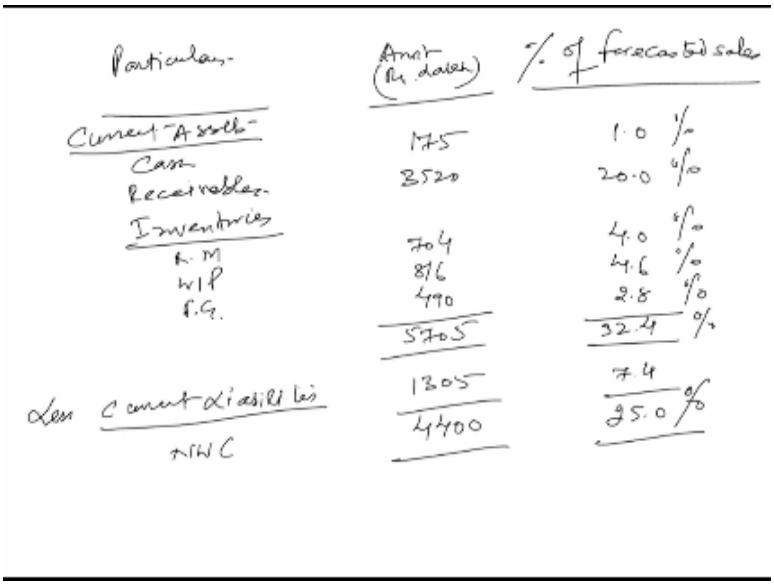

This is the amount, Rs, lakh and this is the percentage of forecasted sales, percentage of forecasted sales. So these are the 3 columns. These are the 3 different types of information is available to us. So if you talk about the particulars first we have the current assets. First we have the current assets and these assets are current assets are first is cash. Then we have receivables. Then we have inventories and inventories are of 3 types right. Inventories are of 3 types.

First we have raw material inventory then we have WIP inventory and then we have the finished goods inventory. These are the 3 inventories available with us. Then we have the let us see now put the figures here before we move to the current liabilities. So in case of the first say this part we have the cash is 175 lakhs and receivables are 3520 lakhs. Receivables are 3520 lakhs, 3520 lakhs. So as a percentage of sales the cash is you can say it is 1%.

Roughly it is 1% and receivables are 20% right. Receivables are 20%. Now we talk about the inventories. When you talk about the inventories we have inventory of raw material of 704 lakhs. Then we have WIP of 816 lakhs and then it is 490 lakhs. In percentage terms it is 4%, it is 4.6% and it is 2.8% of the sales. So total if you work out this works out total works out as how much that is 5705. This is 5705 and this works out as 4.2.

This amount is given to us 1%, then 20%, 4%, 4.6%, 2.8. So this works out as 32.4%. This amount is 32.4% this is 2, then it is 6, then 10, 12 ya 32.4%. This is in the percentage of the

forecast of sales and now we are given the current liabilities; less current liabilities, less current liabilities. So current liabilities given to us are 1305 and they work out as 7.4% of the sales. So then you can calculate as net working capital.

Net working capital is now it is 4400 lakhs 4400 lakhs and this works out as how much 25%. This is 25% and these all are in the percentage terms. This is now the picture with regard to the working capital and the inventory and apart from this information we are given some other information also. This information is also given to us. But before that I will tell you about the company.

What is the problem of this company is, what is the situation in this company is that this company has the total expected sales of 176 crores in the coming year and then the profit is 70 crores in the coming year that is of the forecasted sales and tax rate is 50% as we have seen in the previous slide. Problem in this company is that this company is suffering from the problem of continuously lost sales.

Means on the continuously basis they are losing the sales because one problem is that there is a stock out of the finished goods and company is not able to serve the client's needs or to fulfill the client's requirements and many a times there is a shortage of the finished goods in the warehouse and when the company receives the order they are not able to fulfill the order because of the shortage of the goods available in the warehouse or non-availability of the goods in the warehouse.

When this problem was analyzed by the company they found that recently the company had introduced or sometime back the company had introduced the policy of very tight inventory means a tightened inventory policy was introduced by the company that we will not keep much very high amount of inventory and we will keep the amount of inventory under control or lesser than the say even the optimum level of inventory.

And to avoid the additional inventory cost or the carrying cost as well as the handling cost it is better not to keep the high amount of inventory. But as a result of that as a result of the tightened

inventory policy company is losing the sales on the frequently on the frequent basis. When they are receiving the orders they are not able to serve the client's needs so there is a problem and this lost sales or this amount of the lost sales is forcing the company to lose the profits also.

So this entire situation was asked to be studied by the company and companies director of finance, marketing, and production when they studied the problem existing in the company they found out that this all is happening the company is losing the sales or is not able to fulfill the requirements of the customers on the regular basis because there is a shortage of the say finished goods available in the inventory.

And this has happened because of the tight very tight inventory control or a tightened inventory control policy which the company has introduced in the past and because of a very tight inventory level of the finished goods company is not able to make the sales and the profits and at the same time company is suffering from the indirect cost also, say loss of the reputation and that is a very huge indirect cost.

So then the company thought of improving this situation and they asked the finance department to do analysis that if we lose or if we say little means not to say follow the present policy of the inventory if we lose the control upon the inventory if we loosen the inventory policy and if we increase the level of inventory by increasing the investment of investment in the inventory in the finished goods of inventory so what is going to happen.

Means that increased investment in the inventory is going to give what kind of results. Whether we are going to earn additional operating profit and whether that additional operating profit is sufficient to justify that investment. So that entire analysis was asked to be done by the company's top management by the finance department and when the finance department did the analysis they found out certain things that yes they move they thought of moving step by step.

That if we loosen the inventory policy from present level to little say furthermore level how much increased sales we are going to make. How much increased cost we are going to have and what is going to be the impact upon the operating profit. Then we move to the next step. That

from the first to second we move, how much increased investment is required, how much cost will increase, and what will be the impact of on operating profit.

Then they move from the second to third to fourth to fifth. So that way they moved rather than moving straightaway from the one level to a very high level immediately that may be a disaster or that may prove to be disastrous for the company. So they thought of analyzing the situation in a way that if we move from the present policy to the next policy by loosening the say inventory policy to some extent what will happen in terms of investment and in terms of the cost.

Similarly, the next, next, next level they went out to 5, 6 levels and then the entire analysis was made and then with the help of incremental analysis, incremental level of investment, incremental level of cost, and incremental level of revenue was worked out and finally the decision was taken or means is about to be taken by the company that where or to what extent the inventory policy should be loosened. To what extent or to what mark the control upon the inventory policy should be loosened that was tried to be worked out.

So how that was worked out and let us see that when the finance department was means passed on this responsibility what they did and how they studied the present situation and what is the outcome of that situation.

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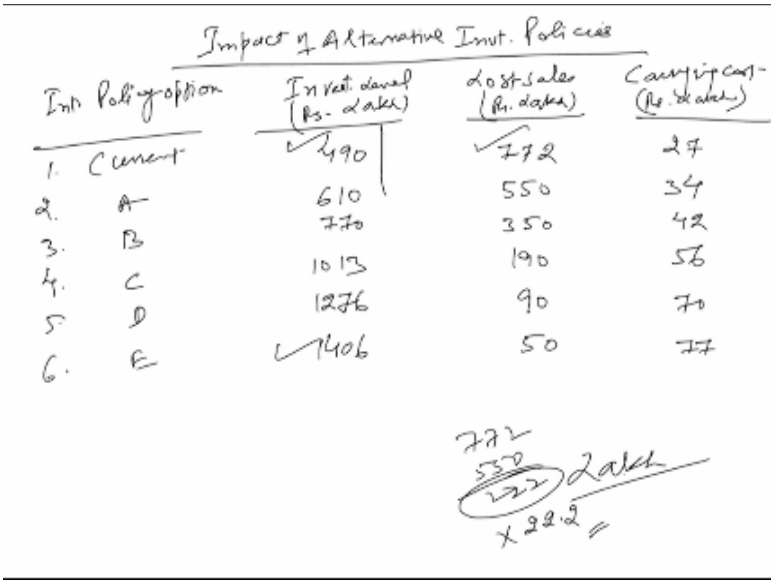

So they have given us the information in terms of impact of impact of alternative, impact of alternative inventory policies; impact of alternative inventory policies and here first column is inventory policy, inventory policy option. Then second information available to us was inventory level; that was in Rs, lakhs. Then it was lost sales; Rs, lakhs again. And then it was carrying cost, carrying cost again in Rs, lakhs right. So this is the situation here.

Inventory policy option. They devised it into the 6 parts. First thing was that current policy, current policy; at the current policy level. The policy which I say or which the company itself observe that it is a tight inventory policy. So in this case the inventory level which was or the investment in the inventory level was found to be as 490 lakhs. Sales lost at this level of inventory was 772 lakhs and the carrying cost was 27 lakhs. It was also in Rs, lakhs.

So this is the 27 lakhs. The carrying cost was also worked out as 27 lakhs. Now in the second case when they moved or they think of moving from the current policy to policy A then the investment in the inventory was expected to go up to 610 lakhs. Level of lost sales will come down because of the increased level of inventory to 550 and the carrying cost will go up that is up to 34 lakhs.

Then in the third case, policy B that from the current to B if they go from say current to A, A to B so at this policy level at the B policy level the inventory level will be or the investment in the inventory will become 770 lakhs and lost sales will be 350, will seriously come down, 350 lakhs. But the carrying cost will go up to 42 lakhs. And then from the at the fourth level from the B to C say if they go from B to C in that case say inventory level will go up to 1013 lakhs.

Lost sales will seriously come down to 190 and the carrying cost will be 56 lakhs. Then they go from the C to D, so here it is 1276 inventory level will become investment in the inventory will go up to 1276 lakhs and lost sales will seriously come down to 90 lakhs but the carrying cost will go up to 70 lakhs. And in the last case E here E so it was 1406. Lost sales are 50 and then the carrying cost will be 77 lakhs.

This was the situation worked out that if this happens then certainly we are going to have the increased level of sales at this level. The lost sales are maximum that is 772 lakhs if you bring it down. So over a period of time or maybe immediately if you change the policy from the current we can change from the current to A to B to C to D to E. Say for example go from the A to current to E then the investment will go up or the total investment in the inventory will be 1406.

And the lost sales will seriously come down to 50 lakhs and the carrying cost will be 77 lakhs. Now we will have to see, we will have to decide that whether it is worthwhile to loosen the inventory policy from the present one or we should not do this. If we do that then certainly we are going to say avoid the situation of the lost sales but if we do not do that then certainly we are at the current situation and we are losing sales so it is not only the question of losing sales but the question of losing revenue also.

So we will have to see and evaluate the whole situation that what should we do in this case. So let us now this is the situation or this is the information given to us by the company. This is the working capital position in the company. This is the say inventory policy position which has been worked out in in the company and in the other case we have the initial say information about the company that is the expected sales are 176 crores.

Estimated gross profit is 70 crores and tax rates are 50%. Up till this point we are given the information or we have fetched the information from the company records and now we have to apply the concept of the incremental analysis and with the help of the incremental analysis we will have to work out 2 things now. One thing will be that we will have to work out the incremental investment in the inventory and as a result of that how much incremental sales we are going to have.

How much incremental profit we are going to have and what is the position with regard to the expected rate of return and the required rate of return. So in this situation let us go for the incremental analysis and try to understand that how this all say this situation works out and how we move forward.

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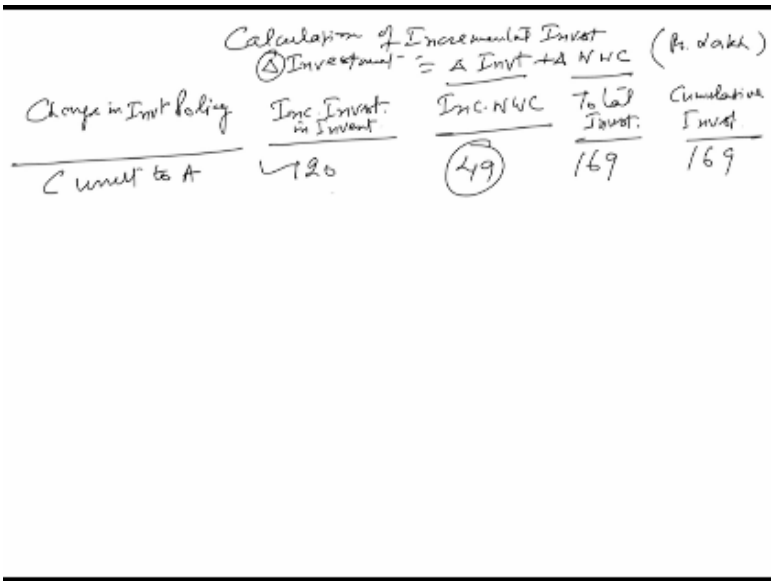

So now we will have to see that say calculation of incremental, calculation of incremental investment in, calculation of incremental investment you can say, not in inventory but I think in total. We will have to work out the total investment and that will be indicated with the help of that is delta investment, you can signify like this; delta investment that will be equal to the delta investment in inventory plus delta investment in the net working capital right.

So we will have to work out this say changed investment. So investment in the inventory we will have to calculate. We will have to calculate the total investment in the inventory so this is going to be what that is the investment and investment in the inventory we will have to calculate. So here it is we say that this is the investment or you can call as delta investment. In this investment or how much increased investment we are going to make we will have to think about it and then this is the investment we are making.

This is investment so what delta signifies here? Delta means change in the investment. How much change in the investment is going to be there. So that is going to be as a result of that, that will depend upon the change in the inventory level plus the change in the net working capital of the company. Because we have seen here that the net working capital position of the company here is something like this. So what will happen?

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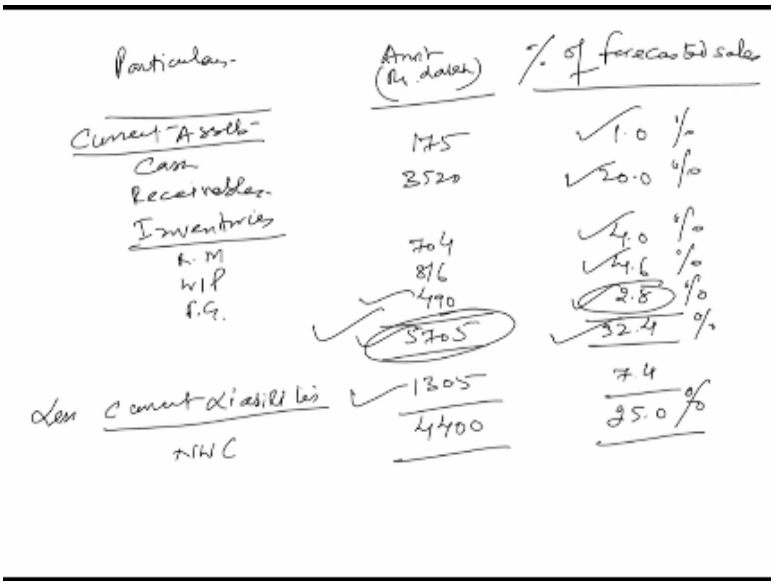

Here we have the cash. We will have the receivables. We have the inventories here. So for example we have inventory of raw material, WIP, and finished goods. We can keep the amount of cash same. We can keep the amount of receivables same, not change it. Raw material also same, this also same but stock out is the result of or is the, the cause of the stock out or the say lost sales is the stockouts an stockouts are because of the low level of the finished goods inventory.

So if you increase the finished goods inventory it means investment in the finished goods inventory has to be increased. And if you increase the investment in the finished goods inventory so what will happen? Level of the current assets will go up. This will not be this much but this will certainly go up and this will not be 5705 but will increase and as a result of that we will have if we for example assume that this current liabilities are going to remain the same.

It means this increased investment in the inventory is to be found out or to be arranged from some other sources and as a result of that as a consequence of the increased investment inventory is when you increase the investment in the finished goods inventory certainly there is going to be a change in the investment, automatic, I am not saying that we will make any change. Automatic change is going to be there in the cash level also, in the receivables level also, in the raw material level also, and in the WIP level also.

Because it is not possible that simply by increasing the level of finished goods inventory we can increase the sales. Automatically the, we will have to work at the higher level of the working capital where we require more cash, where more receivables will come up and certainly more inventory of all kinds will be there.

So we see that by changing the level of investment in the finished goods inventory by moving from the policy 1 to the policy next policy what increased investment in the finished goods inventory is required to be made and as a result of that how much increased investment in the other say current assets or in the net working capital takes place.

So that way increased investment in the inventory plus increased investment in the net working capital that is current assets minus current liabilities we will have to work out and as a result of that total of this, investment in the inventory plus investment in the net working capital will give us the figure of the investment in the that is the figure of total investment right. So now we are going to calculate the calculation of incremental investment.

And this will be the result of say delta investment, incremental investment, delta means incremental, investment will be the function of delta inventory means change in the inventory level of finished goods plus change in the net working capital. So inventory level of finished goods we will change ourselves and other net working capital, means other current assets and current liabilities will automatically change.

If we are increasing the finished goods inventory others will also change. So maybe going up so it will also go up. Going down it will also go down. So we will see that what happens with the say entire this process and we will have to work out that how this incremental investment can make the difference. So here we will have to see that for example change in the inventory policy. We will have to make the columns. Change in the inventory policy.

First column is change in inventory policy, change in inventory policy. This is one. Then it is the incremental investment in inventory, incremental investment in inventory we are going to make. Then is the incremental net working capital; then will be the incremental net working capital,

incremental net working capital other than the investment in the finished goods. Incremental net working capital how much it will change?

So then we will work out the total investment, total investment and then we work out the cumulative investment, cumulative investment. So we will have to work out this way right. We are starting with the change in the inventory policy, incremental investment in the inventory and then incremental investment in the incremental net working capital total investment this plus this and then it is going to be the cumulative investment.

So let us move from the policy current to A, current to A, policy current to A. So this is how much incremental investment in inventory we are going to make; how much incremental investment in the inventory. Inventory level is this much that is 490 and if you move from the current to A the investment in the inventory will go up from the 490 to 610. So how much increase we are going to have here.

That increase we are going to work out here and that increase will be 120 lakhs right. This is rupees in lakhs you can say this is the, I will write here rupees in lakhs. So for 120, when you move from the say now we will change the policy here. So current way investment in the inventory is 120. Net working capital is going to be how much? Net working capital is going to be how much?

So for example for finding out the, I say the net working capital, change in the net working capital is going to be 49. Total investment is going to be 169 and cumulative investment is also going to be 169. Now you must be wondering how this 49 has been found out right. So when we have to find out the 49 here if you go back in the previous details if you look at these things given to us here just simply you take out this level of finished goods inventory which is 2.8% as a percentage.

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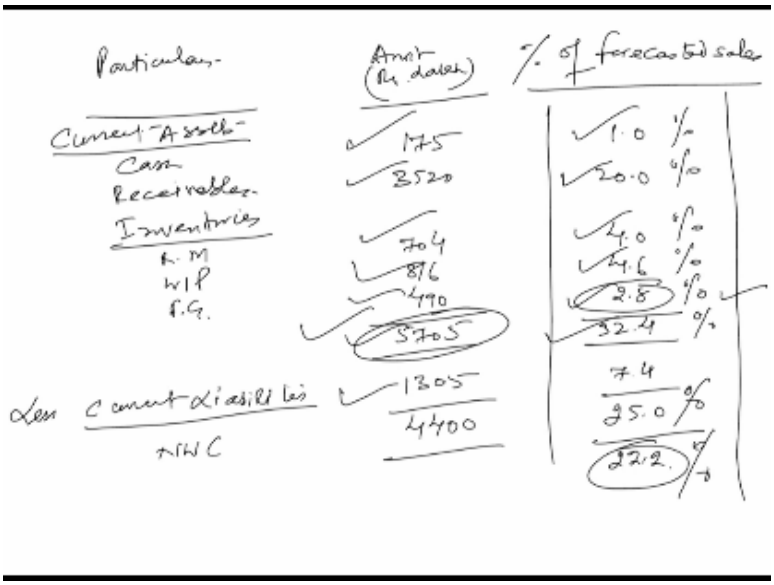

Look at this column and finished goods inventory just 2.8% of the sales right. If you because we have already taken this 2.8% so we already have taken the finished goods inventory here 120. So we will not take it again now. So it means this is 2.8 if it is taken out. So how much is left, the balance left with us is total amount of this 2.8 and then if you calculate this means the net working capital again if you work out. So it means this will be total 32.4 - 2.8 right?

And then minus 7.4. So net working capital will be 22.2. Net working capital will be 22.2 because we have taken out 2.8. it means when we have segregated this investment of 2.8 then it means the remaining level of the current assets will be 32.4 - 2.8 and then funds coming from the current liability is 7.4%. So it means out of the total net working capital 25%. Now your changed net working capital will be how much 22.2% and if it is 22.2% this 22.2% is of what.

It is of the sales. So here also we are going to find out that when you are moving from the policy A current to A how much investment in the inventory we are going to make? That is from 490 to 610. It means incremental investment in the inventory will be 120 lakhs and because of that or as the increased investment in the inventory how much additional sales we are going to make? If you talk about the sales we are going to make is that the change in the sales will be will have to if we work out the change in the sales will be how much 772 - 550.

So it will be 222 lakhs of the sales we are going to increase and as a result of this multiplied by 22 point this increased sales if you find it out then changes in the net working capital. So it means the 22.2% if you make the changes in this incremental net working capital so incremental net working capital will be 22.2% and that 22.2% of 222 will be how much? That will work out as 49 lakhs. So this will be, this we have worked out how this 49 lakh has come from.

This is the 22.2%. This is the 22.2% of the increased sales. Net working capital here we have calculated as the percentage of the forecasted sales. So if your sales are going to increase by say net working capital is not going to go down. If you take out the finished goods inventory by 2.8% then the new net working capital is 22.2% and in this case increased sales we are going to have from here is that is 772 is the lost sales. New lost sales will be 550.

So it means the increase in the sales will be 222 and when there is a increase in the sales by 222 lakhs so as a result of that net working capital will also increase at the rate of 22.2% and the net change in the net working capital will be 49 lakhs. So the change in the investment that is delta investment equal to delta inventory plus delta net working capital will be from current to A investment in the inventory will be increased by 120 lakhs.

Investment in the net working capital will increase by 49 lakhs and total investment will increase by 169 lakhs and cumulative investment will also be 169 lakhs. So this way we will calculate the say change in the investment for all the policies from current to A, A to B, B to C, C to D, D to E and then we will see how much incremental investment is there, how much incremental profit is there, and how much say is the difference between the expected rate of return as compared to the required rate of return and whether we should go for any policy change or not.

And if you go then from where, from current to where; A, B, C, D or E that will be the say the question to be answered after this detailed analysis. So I will stop here and in the next class we will continue with the same problem and we will move up to the say final decision making of the say of this analysis; what kind of the change in the inventory policy should be introduced. Thank you very much.