Introduction to Accounting and Finance for Civil Engineers

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Lecture-36
Working Capital

Good morning, namaskar and welcome to the course once again, in the last lecture if you remember we presented you a real life example of profit and loss statement and the balance sheet. Towards the end of the lecture we also solve one small example with the help of which you understood how to prepare balance sheet and a profit and loss statement. In this class we are going to learn some issues pertaining to working capital.

Working capital is very important for any business be it manufacturing business or be it construction . It is said that working capital is like blood to the body. So you know blood is important to the body, same way working capital is also important for any business. So in this lecture we are going to learn what is meant by working capital, we will distinguish between gross working capital and net working capital.

We will try to understand the importance of working capital, why it is important subsequently with the help of one small example we will try to determine the total working capital requirement for a particular construction company. We will also see what measures are construction company can take to manage their working capital in an effective manner.

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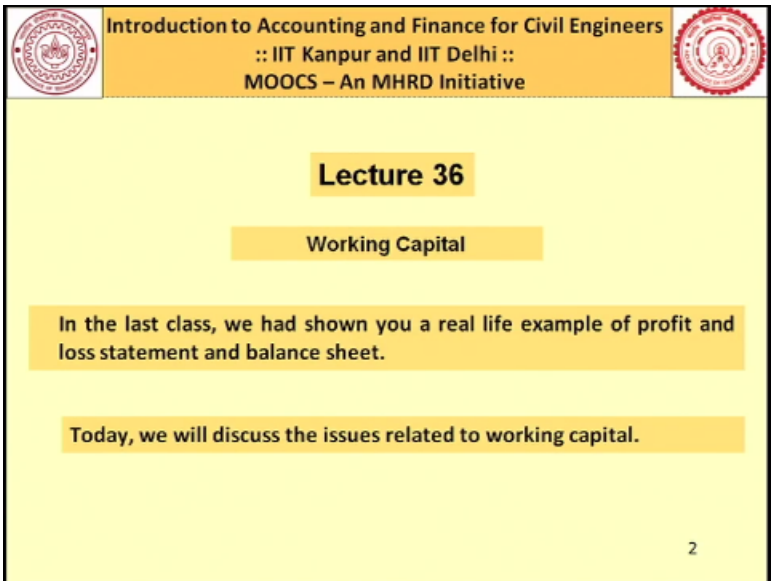

So, let us move on to the working capital definition.

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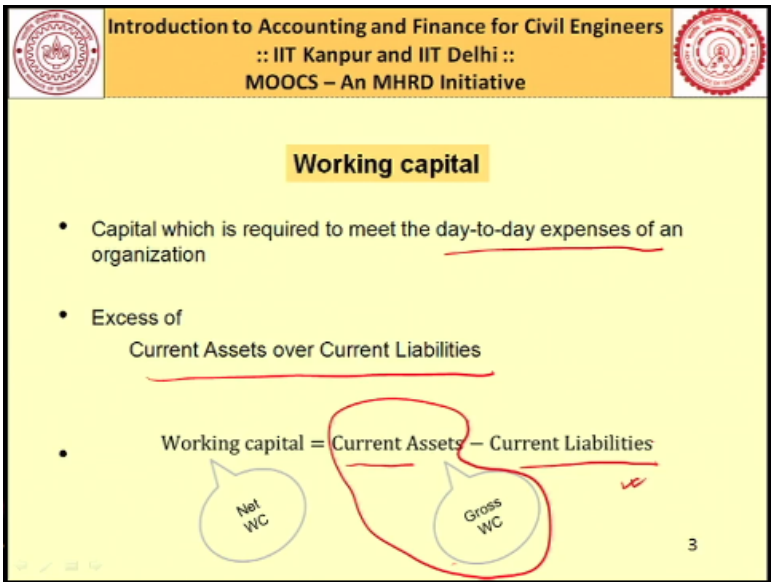

This basically working capital we define it as that capital which is required to meet day to day expenses of an organization, this is important. We are trying to mobilize that capital which you need in order to meet day to day expense of that organization. This is defined as excess of current assets over current liabilities. So working capital is basically current asset-current liability, sometimes this current assets we call them as gross working capital.

And the difference of the current assets and current liability sometimes you also refer to them as networking capital. So, gross working capital is your current asset itself and networking capital is the difference of current asset and current liability.

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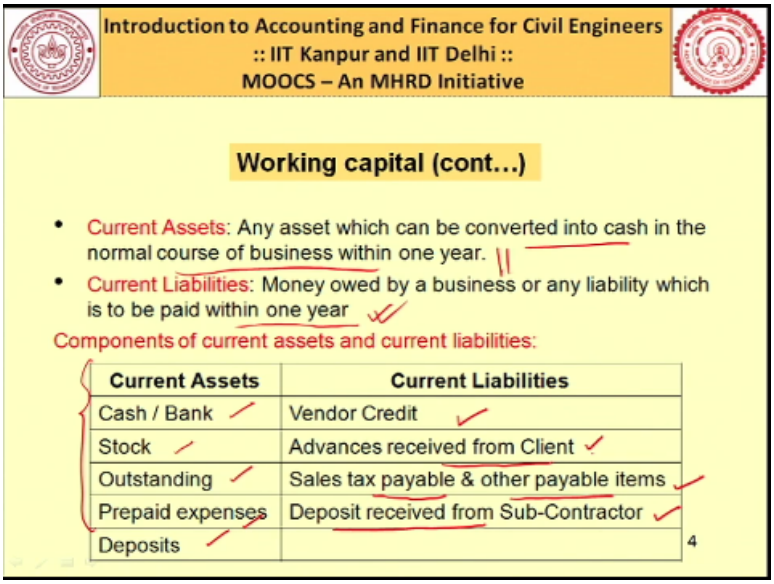

You remember in one of the lectures we discussed in detail what is meant by current assets, what is meant by current liability, just to remind you current asset is basically those assets which can be converted into cash in the normal course of business within 1 year time frame. Likewise current liabilities is the money that you owe and which is to be paid within a time frame of 1 year, some of the examples of current assets and current liabilities are given in this particular slide, cash, bank balance, stocks, outstanding, prepaid expenses, deposits.

These are some of the examples of current assets, on the other hand some of the examples of current liabilities are your vendor credit, advances, maybe mobilization advance or some kind of secured advance. These are again example of current liabilities, the sales tax payable and other payable items are again example of current liabilities. Then the deposit received from sub contractor is again another form of current liabilities, what I have done is I have try to compile all these current assets in this particular slide.

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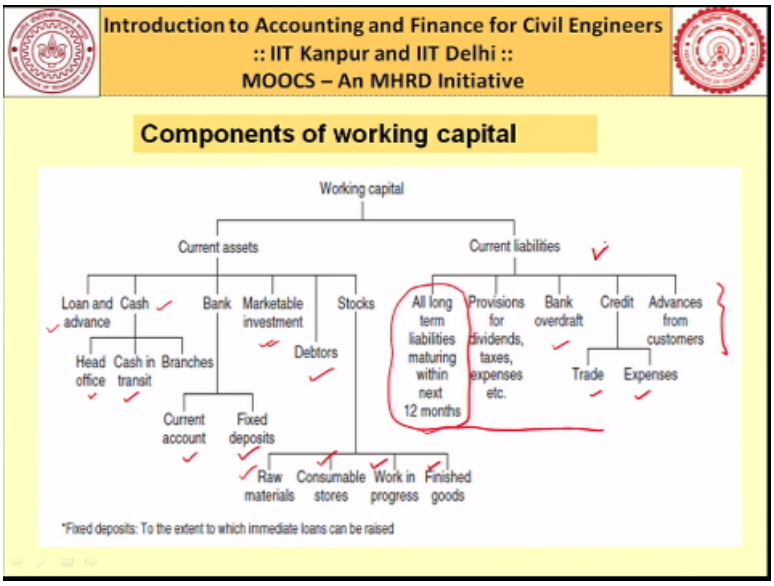

And I have categorize them in different heads, for example you have under current assets, loans and advances, you have cash it is head office cash, cash in transit and cash in some other branches. Then your bank account could be current account as well as fixed deposits, then there are certain marketable investments. Then your debtors are your current assets and some other example of current assets are stocks which could be the stock of raw material, consumables, work in progress and finished goods.

Here are the example of current liabilities all long term liabilities maturing within next 12 months, provision for dividends, taxes, expenses etc., bank overdraft, credit, trade credit, expense credit and advances for customers. These are part of your current liabilities. So, now you get a clear picture what constitutes current assets, what constitutes current liabilities you understand the difference between the current assets and the current liability.

Now you understand the difference between gross working capital and you also understand the net working capital.

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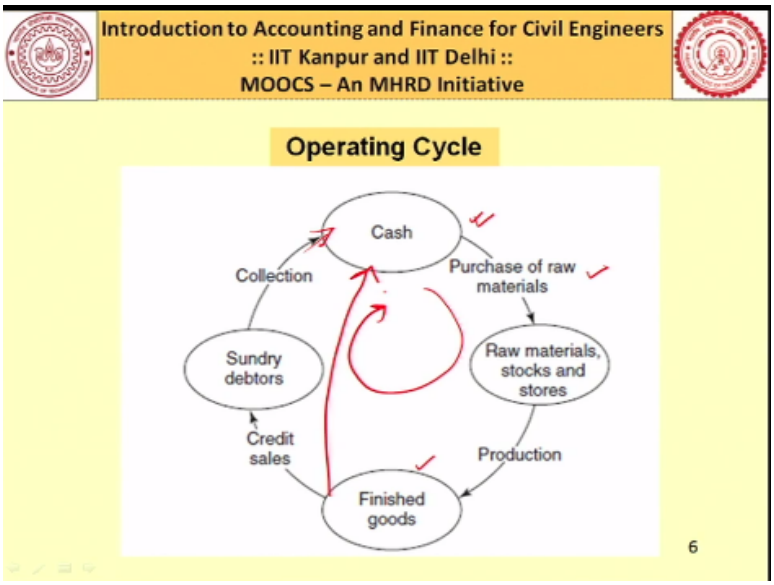

Now we will discuss what is meant by operating cycle, sometimes this is also known as working capital cycle. Now in any manufacturing industry if you see you start with some form of cash, you start the business with some cash. Now with this cash you purchase some raw materials, these raw materials are processed you engage workers on them you put them in different processing units , you produce the finished goods.

Then these finished goods are sold, sometimes directly in the form of cash, sometimes the sales is on credit basis. Now if the sales is directly through cash, straightaway from finished goods you are here. So, cash is realized back, on the other hand if the sale is on credit then you debtors and when the money is collected from these debtors this is again now converted into cash. So the entire process of starting with the cash and again reaching back to the cash generating the cash, we call it as operating cycle or we call it as working capital cycle.

Now if this whole cycle would have been carried out within no time, organizations would not have really required any working capital, see you have the cash with you and your entire business process is carried out within no time. So from the available cash you are generating subsequent cashes, so no need to keep working capital but in real life situation this does not happen this way, what happens?

You start investing the cash in the form of procurement of material, in the form of paying of wages, in the form of hiring charges of equipment. Then you produce certain items those items are sent to the market and then they are sold this collection of money takes time. And by the time you realize this money back you find a number of days are past. So you have to keep the money up to this period, so from the time you were start with cash.

And from the time you again convert the whole cycle into cash we call this as working capital cycle. Now this cycle it is very interesting to see how this cycle takes place in the case of a construction company. So let us say construction company lands up at the site, they have some money with them if not they maybe getting some mobilization advance right, suppose the company has invested it is own money and there is no mobilization advance.

So, this money they are utilizing it to by certain materials to set up the site, establish site offices and so on. Then they take up some contract items like it could be excavation, it could be place cement concrete, anti termite treatment and so on. So the company puts money in the form of labor, in the form of material, in the form of plant an equipment. Then towards the end of the month let us say the contractor submits the bill.

So this bill of various items which was executed during that particular period is submitted to the client, client goes through that bill, it has not release the payment immediately, it will take some time, the time is known as certification process. Then after let us say a month the payment is made to the contractor. So in the form of cash let us say, so the entire cycle, entire time which it took from the moment you started the cash operation and from the moment you receive the cash back in your hand we are calling it as working capital cycle.

Now here again if this all events that in done a fraction of time, no company would require any working capital. But in real life situation it does not happen that way, so this is how this whole working capital cycle looks like, you start with cash and then you are again getting back to the cash. So this whole cycle we are calling it as working capital cycle or sometimes operating cycle.

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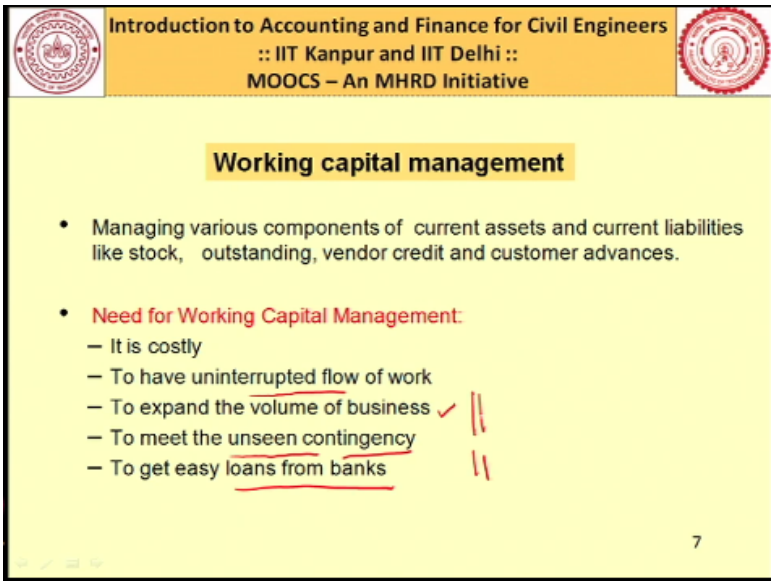

Now we will try to understand why this working capital is so important, as I told you, you would not have needed any money if this whole cycle would have been completed within no time. But as I told you this does not happen in that manner, so it takes time. So you need to invest your money because your money is blocked in material, your money is blocked in labor wages, your money is blocked in plant and equipment hire charges.

And client does not paid you immediately, some outstanding is always there with the client. So, because of these factors contractor has to keep lot of money with themselves, that is what we are calling it as working capital. This working capital is needed to fund the day to day operation of the contractor, for example payment of wages to the workers, payment to the suppliers, payment to the various sub contractors, payment to your employees, paying for your conveyance and so on.

So, you find since this money is costly you need to manage these working capital in an effective manner. Now you also want to keep this working capital because you want uninterrupted flow of work, you would also like to increase the volume of your business, so you need to keep a good amount of working capital with you. You also need to keep the money with you because you want to avoid any unforeseen measures, you want to make sure that even in the event of emergency you are able to take care of that.

And you keep working capital sometimes to get easy loans from banks also because banks would like to see your working capital and then they would like to extend you some more money.

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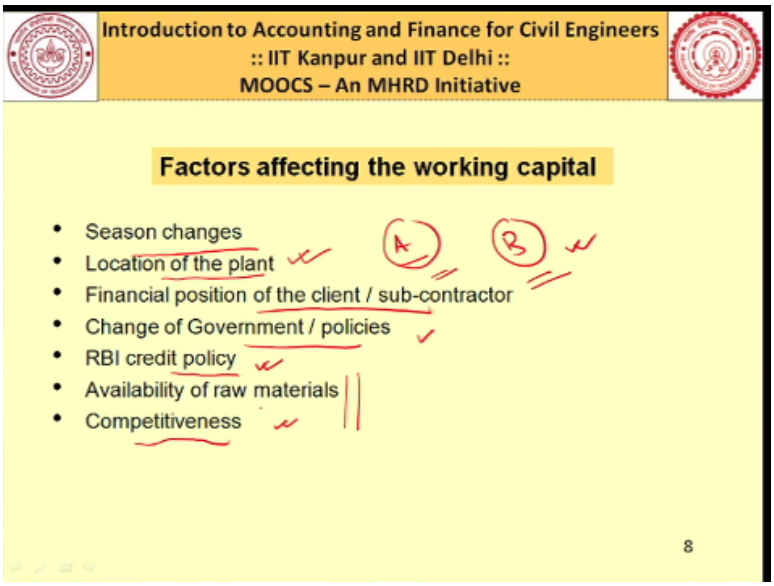

Now there are certain factors which affect the working capital we will see that for example the season changes. This will be more clearer in the context of let us say manufacturing industry, say for example during Diwali time or during some other festival time the company would like to increase it is production. So when you are increasing the production naturally you applying with volumes, so the more volume you are targeting.

So, that would require more cost towards the labor wages, more cost towards the filament of material and so on. So, you will find you need more working capital likewise whether your plant is located in location A or B that would also affect the requirement of working capital suppose the plant is located in a locality which is quite accessible, it does not take much time to reach there you may like to work with less working capital.

On the other hand if the plant is located in remote area, reaching there is difficult you may like to keep more working capital. Because you would like to keep more stock, you would like to engage more labors and so on. Then apart from these there are these factors also financial position of the client and the subcontractor affects the working capital. If there is a change in the government policies again it leads to different working capital.

If the RBI changes the policy that may again lead to different kinds of working capital requirement, how easily or how difficult it is to get your raw materials that would again affect the requirement of working capital. And again this competitiveness how competitive you are will decide how much working capital you need to have with you, what we will do?

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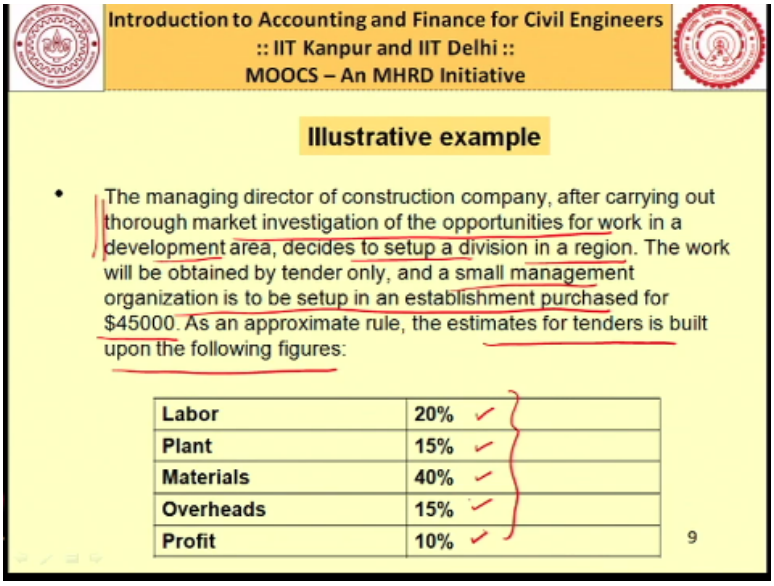

We will try to illustrate the requirement of working capital with the help of one small example in this example it is given that the managing director of a construction company after carrying out thorough market investigation of the opportunities for work in a development area besides to set up a division in a region. So, the company wants to establish a division in a particular area.

The work will be obtained by tender only as is the case in most of the cases and a small management organization is to be set up in an establishment which has been purchased for 45000 dollars. So the company has invested 45000 dollar to purchase a small management organization right in a particular locality. Now the estimates what tenders is built upon the following figures in general out of the total bid prize labor constitutes 20%, plant 15%, materials 40%, overheads 15% and profit is 10%, this is in general the company is expected to have in it is future bid.

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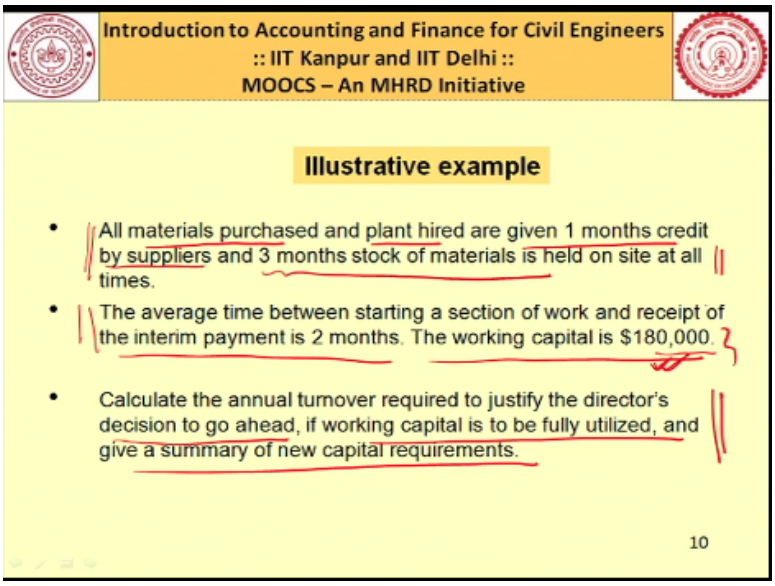

Some more information is available, all materials purchased and plant hire, so you know different types of cost now. Material and the plant and machinery there whatever you are hiring they are given 1 months credit by suppliers right. So, that means you are purchasing the material today you are suppose to pay them in a 1 month's time, likewise it is also given that you have to keep a stock of 3 month of material at all times, so that your production does not suffer.

So 3 months stock of material is to be kept at the site all the time, the average time between starting a section of work and receipt of the interim payment is 2 months. So that means you started the work and you get the payment it takes about 2 months time and the working capital has estimated to be 180,000 dollars. Now it says calculate the annual turnover required to justify the director's decision to go ahead if working capital is to be fully utilized right.

And you have to also give a summary of new capital requirements, so the director would like to justify his or her decision because they are going to invest 180,000 here and 45,000 dollar to set up the establishment. So they would like to know how much business they should be doing on an annual basis, so that it justifies the expense of this 180,000 dollar here and 45,000 dollar as given to you in the earlier slides.

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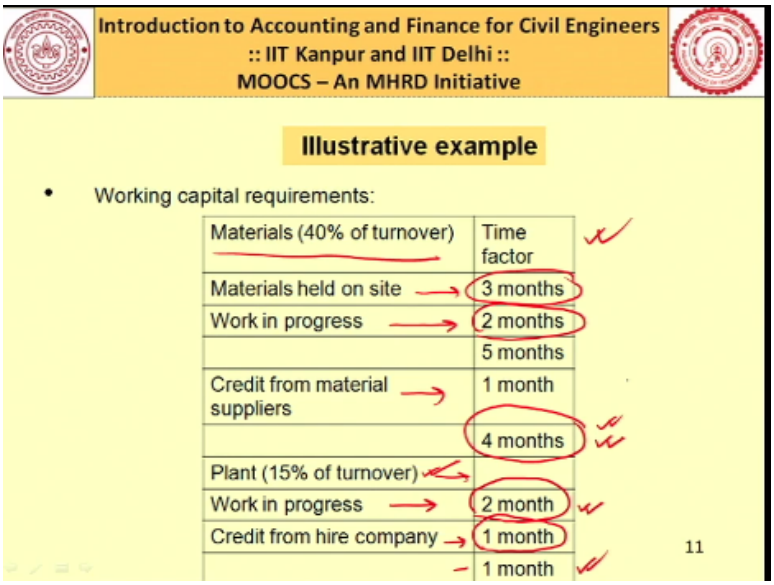

So, how do we calculate this, now it is given that material constitutes 40% of the turnover and the material that you need to keep at site is 3 months stock. So, 3 months stock anyway you have to keep the at the site, then it is also given that it takes 2 months from the time you have start the work and the time you realize the payment. So, 3+2 5 months and your suppliers are giving you 1 month credit, so that means you need to require a working capital equivalent to 4 months as for as material is concern.

Likewise if you look at the plant it constitutes 15% of the turnover and as I told you it takes 2 months time from the time you have start the work and the time you get the payment. So, whether it is material or plant everywhere it is taking 2 months time and credit from the higher company that means the company which is providing you this plant and equipment you can pay them 1 month after their payment is due.

So 2-1, so you need to keep stock of basically 1 month as for as plant is concern but when it came to material it was 4 months requirement.

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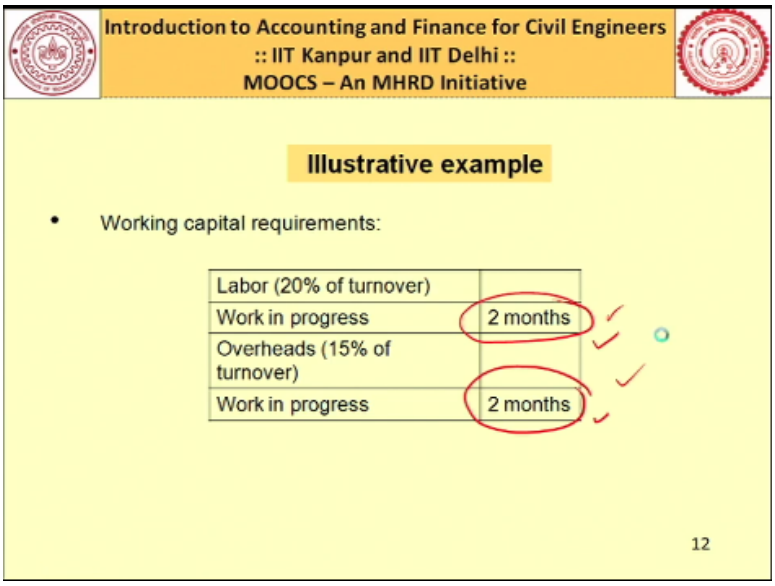

Now we will see for labor as well as for overheads, for labor you can see it is 2 months and there is no credit. So, whatever wages are due you have to pay them immediately, likewise there is no credit for overheads also. So, whatever overhead expenses you are incurring you will have to pay them in the same month, so 2 months here, 2 months here.

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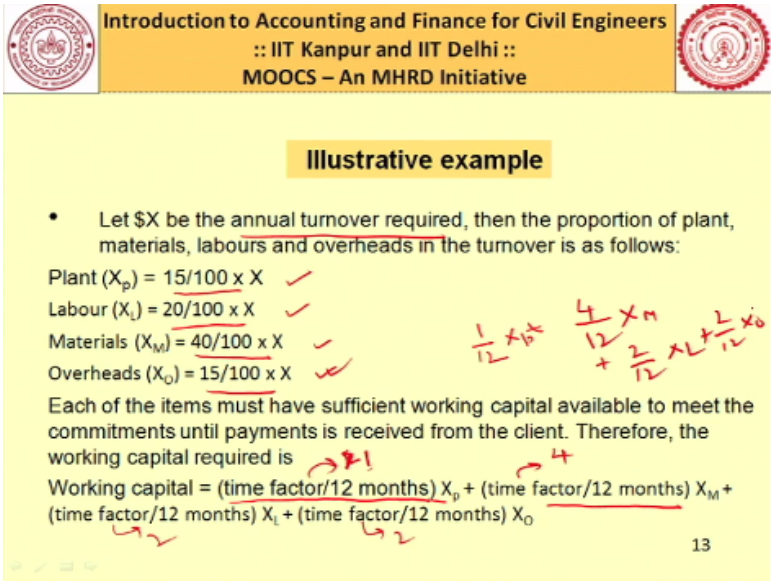

Now what we do is let us assume that x dollar be the annual turnover required which can justify an expense of 180,000 dollar of working capital and 45,000 dollar of establishment charges, now it is given that plant constitutes 15%. So 15/100 of X, labor 20%, so 20/100 of X, material 40%, so 40/100 of X and overheads 15/100 of X. Now we have also calculated the breakup of these plant, labor, materials in the previous slide.

So, from there the working capital you can write it as time factor/12 months, now if you remember for plant it was 2 months, for material it was 4 months. So time factor it we for plant, for material it is 4 months, for labor it is 2 months and for overheads it is 2 months. If you go back previous slide, labor 2 months, overheads 2 months and plant it is 1 month. So, I have make correction for this plant it would be instead of 2 month it is 1 month. So, what this becomes this become 1/12 of Xp +4/12 of Xm+2/12 of Xl+2/12 of X0 overhead.

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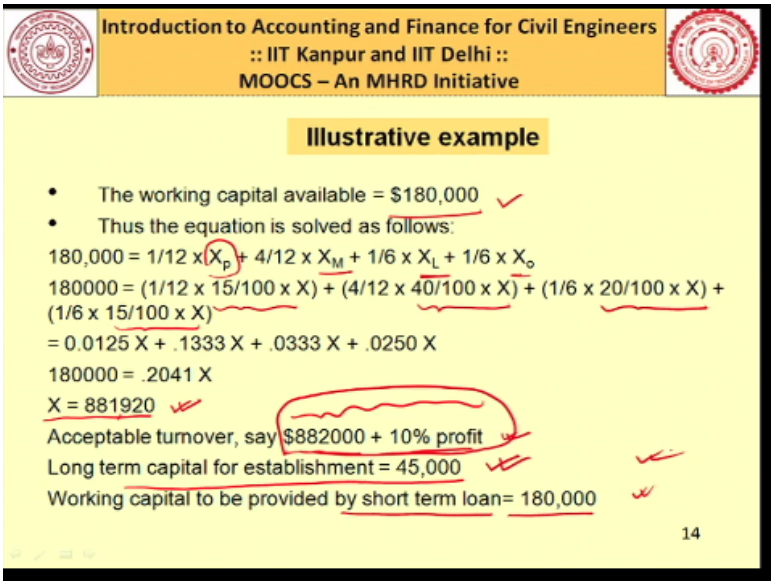

Now when you solve this and equate this to 180,000 you can calculate the value of X because Xp is already known 15/100 of X, Xm is already known it 40/100 of X, Xl is already known it is 20/100 of X and X0 is already known to be 15/100 of X. So, you have only one unknown in terms of X, so if you solve this you will get X=881920 or you can round it of to 882000 and you can add 10% profit on that right.

So, as long as you are able to achieve a turnover of this much your working capital of 180,000+45,000 of long-term capital it justified. Now you can see the company has also established how much it will mobilize from which sources. So 45,000 is needed for long-term, so this is the long-term capital for establishment and 180,000 they are trying to get it through short-term loans, so this also is quite important.

In fact you will find that the composition of working capital in terms of how much keep as current asset, how much you keep it as fixed asset also is very very important. In fact this decision how much should be the composition of current asset verses fixed asset is one very important criteria and it depends on the psyche of the project manager. So if the project manager is risk ours, he will have some composition, if the project manager is risk seeker he will have one set of composition.

So we will see how this composition of current asset verses fixed asset in total assets affects the incomes, affects your earnings we will see with the help of 1 small example.

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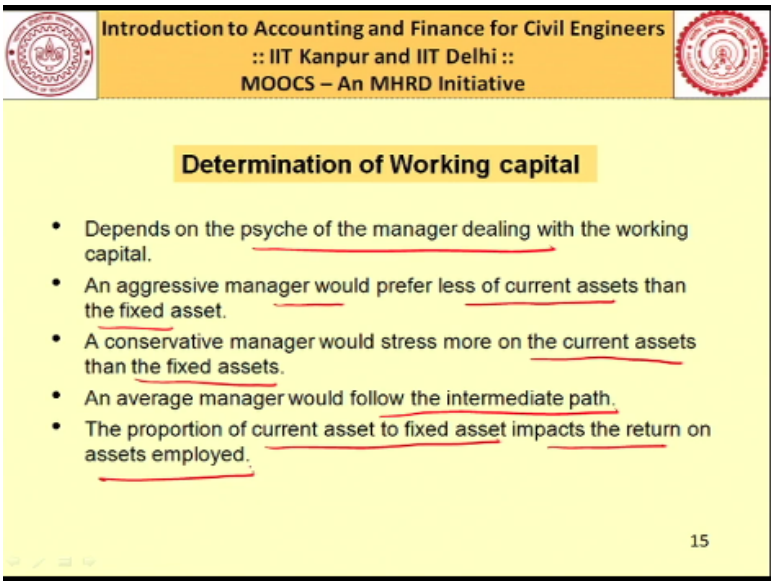

And as I told you this determination of working capital depends on the psyche of the manager dealing with the working capital and aggressive manager would prefer less of current assets and more of fixed asset. Conservative manager would stress more on the current assets than the fixed assets while an average manager would follow an intermediate path. Now this proportion of current asset to fixed asset this impacts the return on asset employed, how it affects, I will show with the help of 1 small example.

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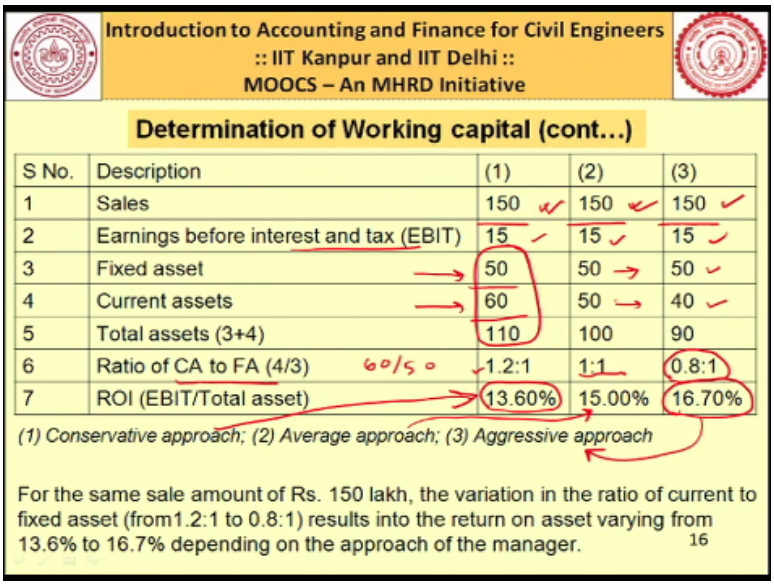

Now let us the sales from a particular company is 150 in all the 3 cases whether the project manager is risk seeker or risk ours or an average I am considering the same sales value for all the 3 cases and I am assuming that the earnings before interest and taxes let us say 15 rupees, 10% of my sales. Now let us see how this first manager has proposed the composition of fixed asset and current asset, fixed asset they are keeping 50 unit, current asset worth 60, so total is 110.

But what is the composition you can see fixed asset is 50 and current asset is 60, so that total is 110. So, if you take the ratio of current asset to fixed asset, how much it would become current asset is 60, fixed asset is 50. So you will find 1.2:1, now for the second case he is taking 50:50 current I mean fixed asset is 50 and current asset again 50. So the ratio here is 1:1 and in the third case is fixed asset is 50 and current asset is 40.

So here the ratio is 0.8:1 for current asset is fixed asset, now if you calculate for these data the return on investment or the earnings before interest and tax to total asset you will find this is coming to be 13.6%, this we call it as conservative approach. So you can see the return here is less in average approach we are getting 15%, what we have done here the fixed asset and current asset both are same.

And in the 3rd case which we call it as aggressive approach, here we have more fixed assets and less current asset. So, in that case you can see your return is very very high right, so depending on the psyche of the project manager you will find your return also gets affected.

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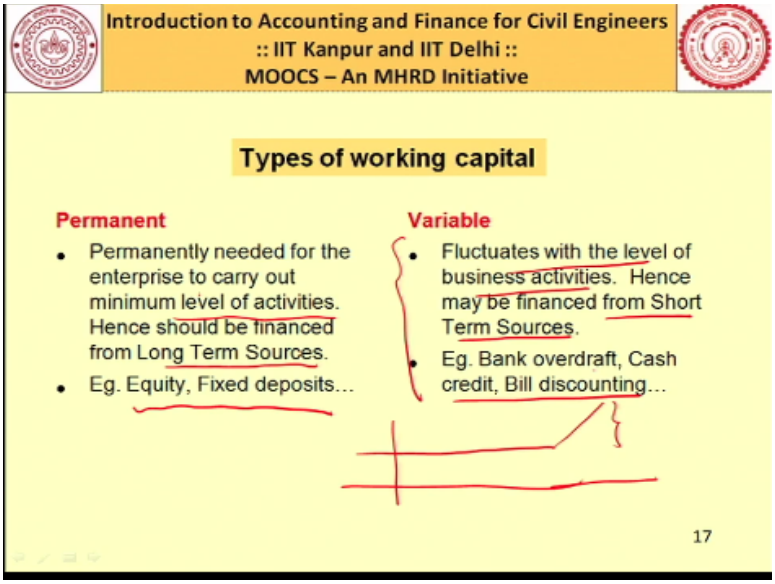

Now it is a normal practice to distinguish between permanent portion of working capital and variable portion of working capital, permanent portion of working capital is needed for the enterprise to carry out the minimum level of activities. Hence they are financed from long-term sources such as equity and fixed deposits. On the other hand the variable working capital this fluctuates with the level of business activities, in some season you may require very high working capital.

For example let us say this is your fixed part, permanent part and then depending on our season you may like to increase the working capital. So, the variable portion you can keep on fluctuating depending on the demand. So normally the variable portion we finance it from short-term sources for example the bank overdraft or the cash credit or bill discounting. So this is how you have a strategy to finance your working capital.

We will have one separate lecture on financing of working capital there we will see what are the different sources of working capital, when it comes to a construction company you will see .

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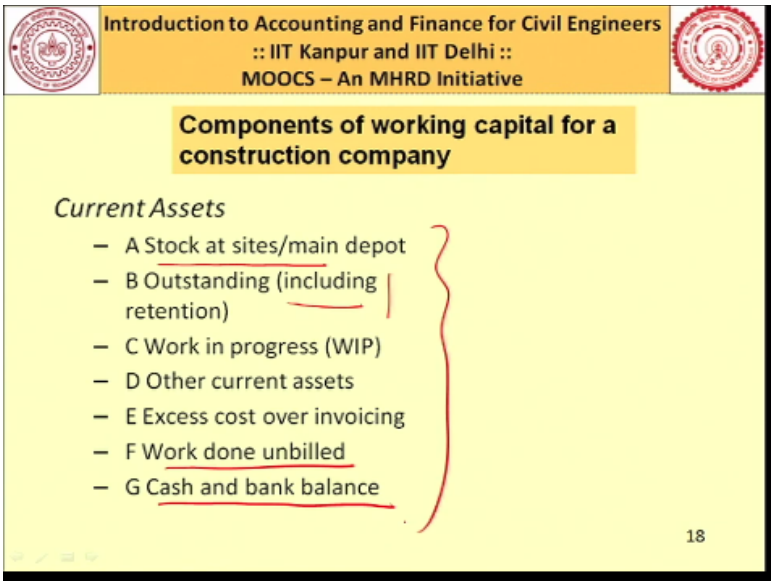

There are different types of current assets that the company employs, for example it has different types of stocks at sites as well as main depot. Then it is assets consists of outstanding including retention you know in construction what happens whenever the contractor submits the bill the client retains some percentage normally 5 to 10% out of the whole gross bill. And this is release to the contractor after the completion of the project and some portion of retention money is release to them after defects liability period is over.

So this outstanding with the client is also an asset as for as the contractor is concern. Then comes work in progress what are work in progress it might have so happen that you might be planning to do concreting on a particular date. In for that you might have procure the aggregates, you might have procure the cement, maybe some portion of concrete must have also been achieved or concreted.

So these you can classify them as work in progress, then there are certain other current assets, then you have what some times excess cost over invoicing. Then you have work done but unbilled and then in addition you have cash and bank balances. These are some of the examples of current assets in the context of a construction company.

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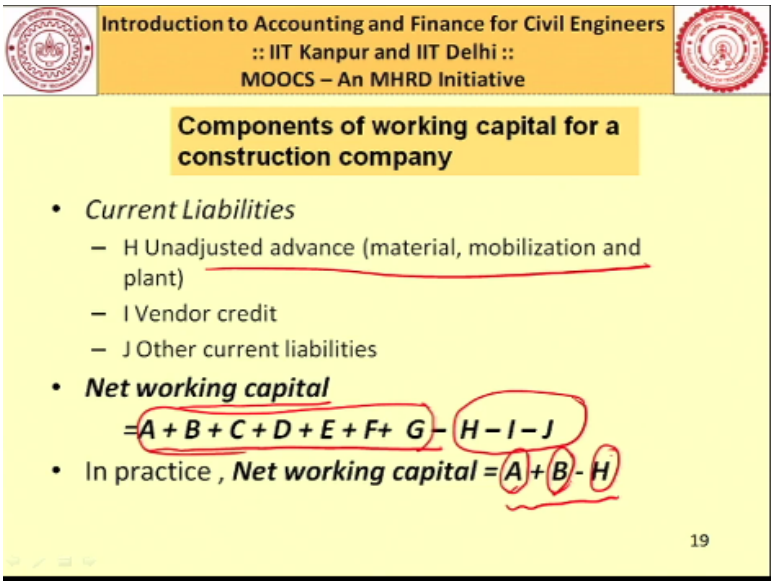

Likewise you have current liabilities also in the context of construction firm. For example unadjusted advance, you now know that during the start of the work sometimes the contractor is given the mobilization advance of the order of about 10%. So this advance is with the contractor and the contractor has not yet done the work up to this much value. So this money is again the liability because you have not done the work but the money is with you.

Then there are certain vendor credits you take material on credit, so you have already taken the material but you have not yet paid to the vendors to the suppliers. That again is the form of a current liability, so in the case of the construction firms the networking capital is defined as the difference of current asset and current liability. So A+B+C+D+E+F+G up to this is the current asset and then H, I and J you subtract it this is your current liability right.

So if you want to be accurate this is how you have to calculate the working capital but what happens in practice only the important parts are considered. For example A, B what is A, A is stock and B is outstanding, so if you can take care of your stock portion and if you take care of the outstanding and if you take care of the unadjusted advance you are better place to manage your working capital .

We will also see what factors the construction contractor should attend to make sure that they utilize their working capital in an effective manner, that is what we are going to learn now.

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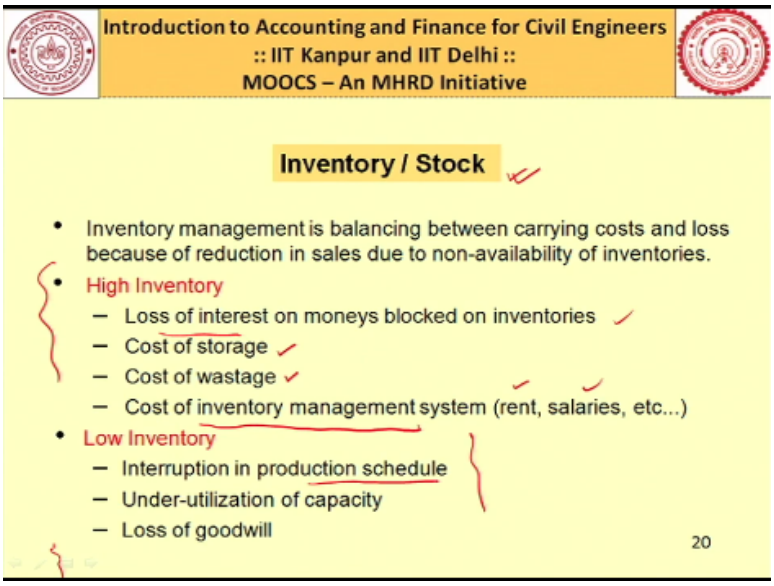

So, as I told you stock or the inventory is one such important item which needs to be monitored on the regular basis. Now you have to make a compromise between high value of inventory and low value of inventory. Now there are pros and cons of keeping high inventory and pros and cons of keeping low inventory, for example if you are keeping high inventory you have a cost of storage involved you have a cost of wastage involved.

Then you lose interest on the money that is blocked on keeping these inventories, then there are cost of maintaining these inventory, for example the rent, the salaries of the staff and so on. So, these are the pros and cons of keeping the high inventory. On the other hand what is the disadvantage of keeping the low inventory if you are keeping inventory or low stock there might be chance that your production schedule may get interrupted.

Sometimes you might be wanting to do the work, but since there is no material you will have to stop it. You might be underutilizing the capacity and sometimes it may so happen that it may result in loss of goodwill also. So, you have to keep a balance between whether to keep a high level of inventory and whether to keep a low level of inventory.

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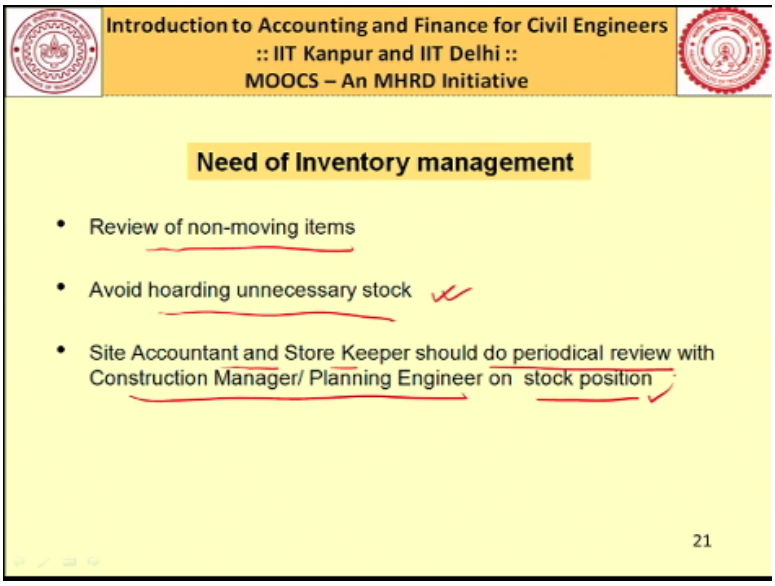

So, there are certain things that you need do in inventory management, for example you have to review non moving items. There are different types of item there are fast moving items, there are slow moving items and then there are non moving items. So when you go to your store you have to make sure which are non moving items, non moving items essentially mean that they have been there in the store for so long and nobody is asking for those materials.

So unnecessarily space is occupied, unnecessarily money is blocked, then you also need to avoid hoarding of unnecessary stock, whatever is needed that only should be kept in your stock. So it is essential that your site accountant and a store keeper there should do periodical review with the manager and the planning engineer to keep better stock position at your site .

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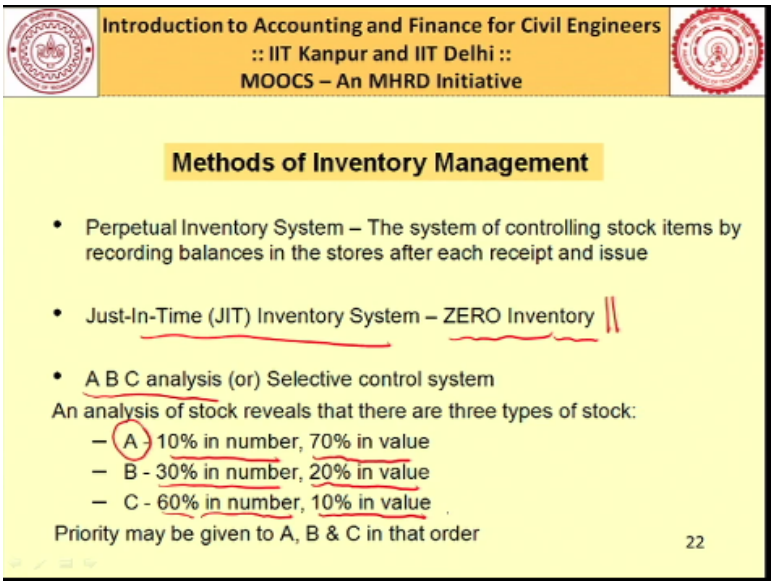

There are certain methods through which you try to maintain your inventory. For example there is just in time concept in which you aim to keep 0 inventory. In construction it may not be that feasible because your suppliers may not be that level but in manufacturing some of the manufacturers do tend to stick to this 0 inventory. So that they do not incur lot of cost in maintaining the inventory then you have a ABC analysis which is also quite useful.

If you classify different materials of construction in a construction company will find that the A type of item they will be very few hardly 10% in number. But they would take about 70% of your stock value. B they would be 30% in number and they would occupy about 20% of your stock value and there is C which will be about 60% in terms of volume or number but they will of very low value. So you have to make your priority in terms of A, B and C to make sure that your inventory is properly managed.

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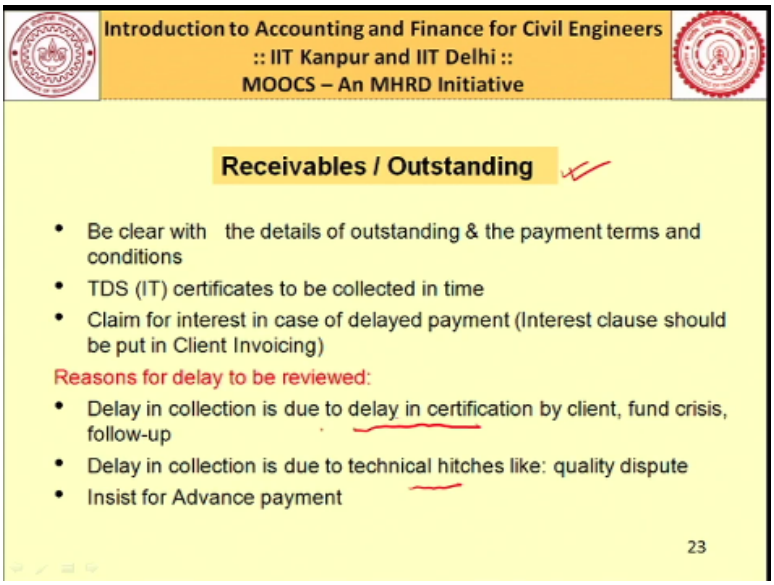

Then another important thing is you have to keep a cheque on your outstanding, how much money is with the client that you have to always keep in mind. And you have to make all out efforts to make sure that this money is release to you in time. Sometimes you may like to even put a interest clause, because it is not good to keep your money block with someone, you are after all done the work why your money should be block.

So, you should be constantly after the client, so that they release your payment, so you have to do the follow-up and you have to make sure that the client does not delay the certification process right. And you have one person exclusively for follow-up and make sure there are very low level of outstanding.

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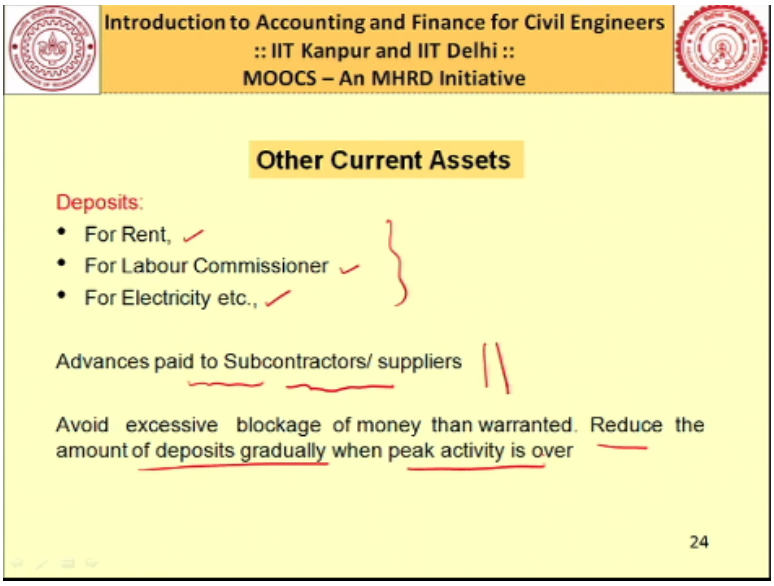

Then you also have to make sure that the deposits that you keep for rent or with labor commissioner or for getting the electricity. These deposits are recovered as soon as possible, then you also have to make sure that the advances that you paid to your subcontractors and suppliers did have recovered in time, you have to avoid excessive blockage of money then which is warranted you have to reduce the amount of deposits gradually when peak activity is over.

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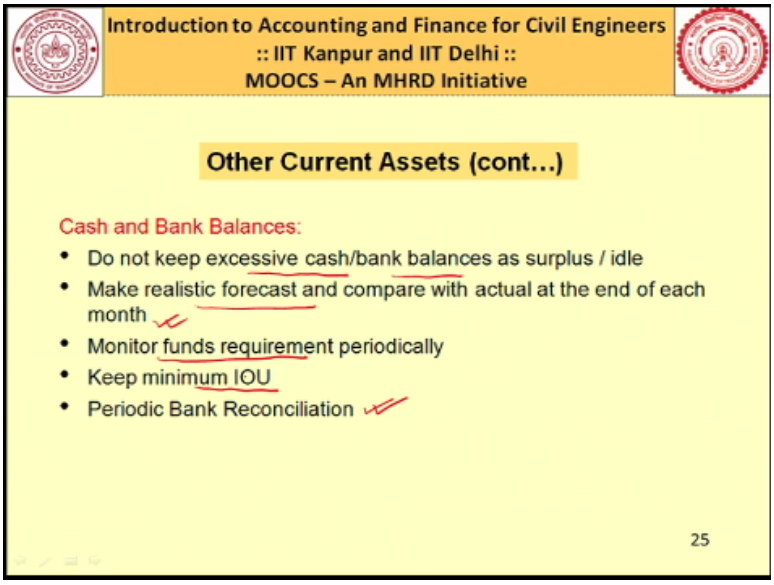

So, all these are basically aim to help you in reducing your inventory level. Then you also have to keep a watch on the cash and bank balances, it is said that you need not keep excessive cash or bank balances are surplus. You have to make realistic forecast and compare with actual and the

end of each month, so that money is not blocked unnecessarily, you have to also monitor funds requirement on a periodic basis and you also have to carry out the bank reconciliation.

Then you also have to keep IOU to a minimum level, what happens in companies whenever you go for a tour you collect some advance that is what is known as IOU. So you have to make sure that not many staff has this IOU for long period. So the moment they come back from their trips they should be advise to clear this IOU because all these are contributing in your working capital right. So you have to make all out effort to make sure that the requirement of working capital is kept to the minimum.

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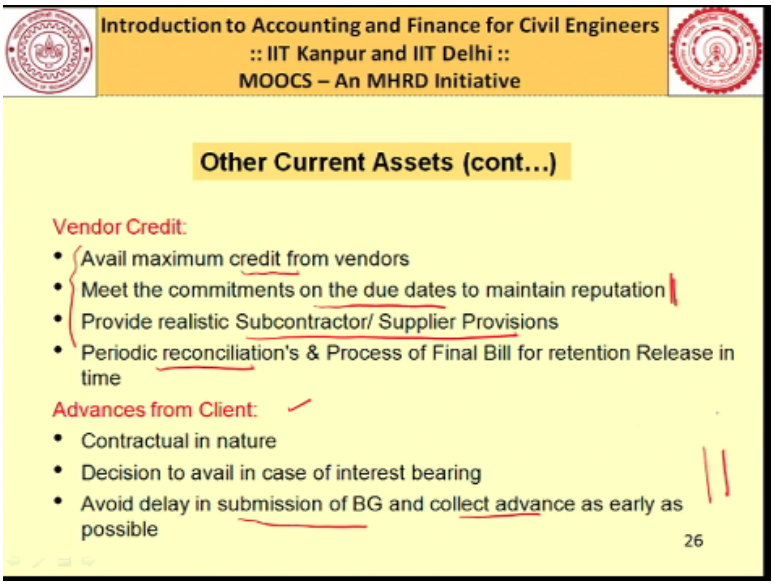

Then you also try to avail maximum credit from vendors, say you all getting some materials from some materials from vendors. So, you tell them okay you give me 4 weeks of credit that means you give me the material today and I will pay you after 4 weeks or after 6 weeks right. Then meet the commitments on the due dates, otherwise from next time those vendors will not be extending you the credits.

Then provide realistic subcontractor and supplier provisions, you have to periodically reconcile and you have to make sure your final bill and retention released in time. Then make sure that the advances from clients are interest free. So, that it does not add to your working capital, you can

avoid delaying submission of bank guarantee and you can collect the advance as early as possible.

So, these are certain ways through which you can manage your working capital in an effective manner. So just to summarize in this lecture we discuss what working capital means we understood what is gross working capital, what is net working capital. We recollected what constitutes current assets, what constitutes current liabilities, we did 1 small example through which we try to find out the way in which working capital requirement is calculated.

We understood the working capital cycle in the context of a construction firm, subsequently we also said what are the key factors on which the working capital of construction firm depends, you understood that keeping stock of a stock is very important, you have to have a cheque on your outstanding the money with the client must be paid to you as soon as possible and there are certain other things like vendor advance.

And some more things which if you take here you will be in a position to manage your working capital in an effective manner. In the next class when we meet we will see what are the various sources through which these working capitals are financed, they are categorize normally in short term sources, long term sources and so on.

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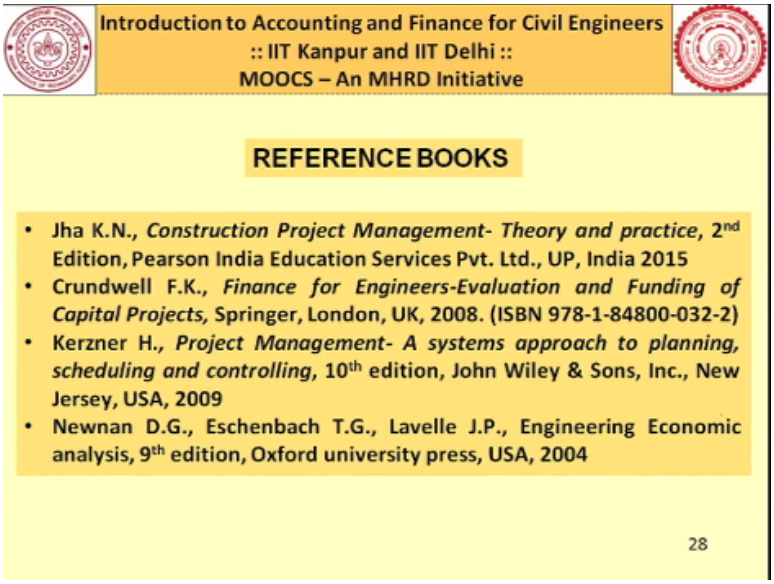

If you want to go into the details of this you can go through these reference books which are already provided to you from time to time, you can have a check in this books and go to the details of the topics that we have covered in this lecture and in other lectures, so we stop at this point thank you very much and see you some other time, thank you.