Introduction to Accounting and Finance for Civil Engineers

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Lecture-24
Bidding (Part-3)

Good morning, namaskar and welcome to the course once again. In the last lecture we discuss how to determine a bid price from the viewpoint of a contractor, in earlier lecture we also the overview of a bidding process. We said that bidding process starts as far as the contractor is concern at the time of pre-qualification, after the pre-qualification process has been through the contractor collects the tender document from the office of the client.

And there after he does all different claims of works, one major step in preparing the bid is to prepare a tender summary. In the last lecture I told you briefly about how to prepare tender summary, in this class we are going to take up one real life case in which I will tell you how did we prepare the tender summary or the tender at a glance. This was a project which came up longtime back about 15 to 20 years back, but you will see the process remains more or less same.

This was a government project and I as a contractor took part in bidding for this particular project and I prepare the tender summary. So I am just going to tell you how exactly tender summary is prepared, what are the key points that we have to gather from a tender document. Now the project which we are going to discuss right now is basically an item rate contract, now in item rate contract you know that the tender document consist of a number of documents.

For example the client is going to give you the general contract conditions, the special contract conditions, they are giving you the bill of quantities. They are giving you the set of drawings and they are also giving a set of specifications. Now these documents are quite bulky, if you look at even a small project the bill of quantity would run in 200, 250 pages. The specifications should run anywhere in 500 to 600 pages, the general contract conditions again 300 to 400 pages.

In fact for big projects you will find that these tender document would come in large trunks, I know a project which was the construction of daily metro rail line for few kilometers. And the tender document came in a whole trunk, first consisting of large set of specifications, large set of drawings and quite a big document as for bill of quantity was concern. So, you will find it is quite a bulky document, now you also know that a typical time that is given to you for preparing a tender is quite less.

It would be hardly 2 to 3 weeks, in big projects maybe 4 weeks not more than that, so in such a short period going through all such documents is not a easy task. So you need an expert's eye to look for those important points from these set of documents. So to start with our lecture we are going to proceed with where to find those key points and how to write it up, so that it gives me a set of important information, so straight away let us move to the case project.

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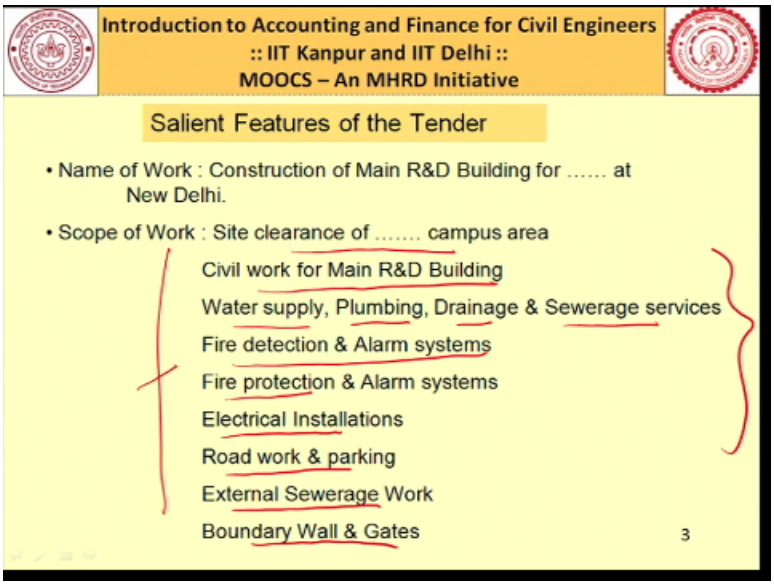

So, let us say this particular case project was basically the construction of main R and D building for a government organization, I am not going to give you the name of that government organization. But for your understanding assume that this was for a government organization, from the document you also have to look for the scope of work, this is very important. It will help you to identify many aspects of your contract.

For example whether you would like to go for bidding on your own, whether you would like to go in for joined venture, whether you would like to go in for subcontracting all these things would be clear to you if you are very much clear about the scope of work that has to be performed in this particular project. So as far as this particular project was concern site clearance of the whole campus area was in the scope.

The entire civil work for main R and D building, research and development building was to be done by the contractor. We have to carryout the water supply work, the plumbing, the drainage and all the sewerage services. We have to make sure that fire detection and alarm system, alarm systems work properly, you have a fire protection system, the electrical installations, road work and parking, external sewerage work, boundary wall and gates. So, these were the scope of work mentioned for this particular project.

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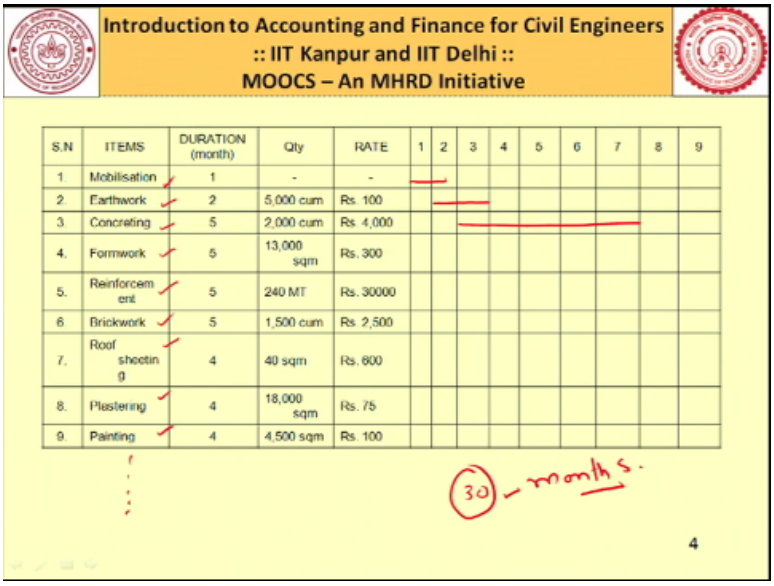

Now the first thing that you have to look for when you go through this particular scope of work is to prepare a construction schedule. A typical construction schedule will list out all the items, for example including mobilization, earthwork, concreting, formwork, reinforcement, brick work, roof seating, plastering, painting, so you go on adding all the important items that are part of your scope.

Now you are given the total project duration say in this particular example the project duration was 30. So, you will prepare the schedule in such a manner that your entire scope of work gets completed in 30 months time or whatever is the schedule given you have to make sure that you complete this in that many months. Now for each of these activity you have to assume certain timeframe.

For example mobilization you might take maybe 1.5 month, earthwork you will start from the beginning of second month maybe it will continue up to monthly. Concreting you may start at the beginning of monthly 3 and it may continue up to maybe these minimum. So, you have to prepare a bar chart to start with maybe you can generate a pert chart or a CPM chart as the case maybe as the complications involved maybe in your particular project.

So the idea is you prepare a construction schedule, now once you have prepared this construction schedule you will find that from this construction schedule we can derive a large number of schedules. For example one very important schedule that the client would ask from a contractor is to give them the cash flow schedule. So at what point of time how much billing you are going to give or how much billing you are going to make.

So that the client is ready with that much fund, so this construction schedule is helping you to derive this cash flow schedule. You can also derive material schedule that means what material is needed at what point of time, all these things we can generate from this material schedule. We can also calculate the labor schedule out of this particular schedule which type of labor, how many numbers, which month everything can be generated.

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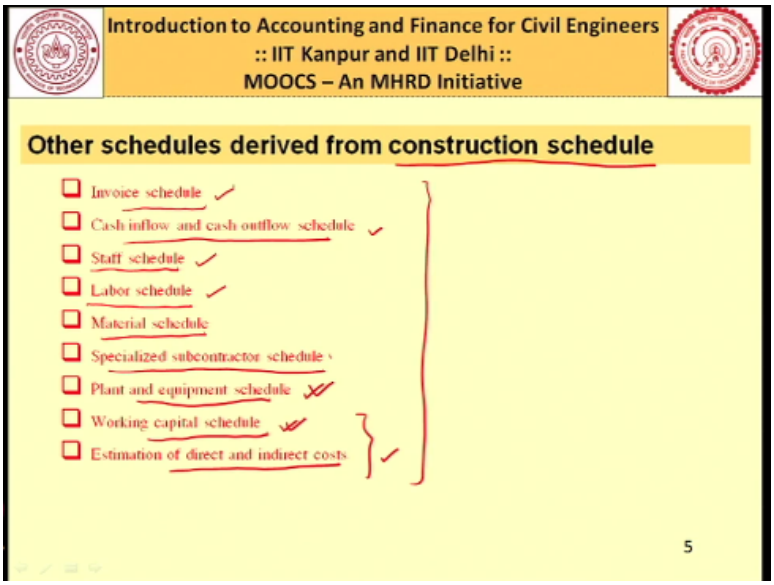

In fact you can generate a whole lot of schedule as mentioned in this particular slide from the construction schedule. So, that is the reason construction schedule is very very important, so no matter even if you have very less detail available at the time of preparing the tender, it is always advisable to go for preparing a detailed construction schedule. Because you know construction schedule is the mother of invoice schedule.

That means if you are prepare construction schedule in a nice manner you can generate how much billing you are going to do every month, that is what we are calling it as invoice schedule. So, month 1 how much bill you are going to raise, month 2 how much bill you are going to raise, so all these things client would be interested in knowing, so that they are ready with the fund that is needed by the contractor on a monthly basis.

You can generate cash inflow and outflow schedule, this you are familiar from one of the lectures conducted in the past, you can find out how many staff could be needed on a monthly basis. So, depending on what type of work you are carrying out on a monthly basis you can derive the number of staff that would be needed, you can also find the labor schedule what type of labor, how many numbers, which month, when they are going to be mobilize, when they are going to be demobilized, all these things are possible using this construction schedule.

You can derive the material schedule out of this, you can derive this specialized contractor schedule also. For example if your schedule says that aluminum work you are going to take from month 11 to month 15. So you know your requirement for this particular subcontractor is from month 11 to month 15. Now suppose you take 2 months to finalize the agency your work should start in month 9 itself, you have to carryout the lead time also.

So that from month 11 the contractor is in place to carryout the aluminum work. So you can derive the subcontractor schedule also, for example you would like to involve stonework contractor. Now stonework is starts from let us say our stonework starts from let us say month 17 onwards and your internal process takes 2 months time to finalize the contractor or a subcontractor.

So your process will start in month 15 itself, so basically this construction schedule is helping you to know what type of subcontractor are needed at what point of time. You can also generate plant and equipment schedule, what type of plant and equipment are needed at what point of time what is their mobilization period and when exactly they are likely to be demobilize. You can derive working capital schedule we will see in one of the lectures.

Subsequently how to calculate the working capital and we will also see how to estimate direct and indirect cost little later in the next lecture. So the idea is construction schedule is to be prepared even though you may complain that you do not have enough detail. So whatever details are available with you, you should try to develop a construction schedule because from this schedule only we are able to derive a large number of other associated schedules.

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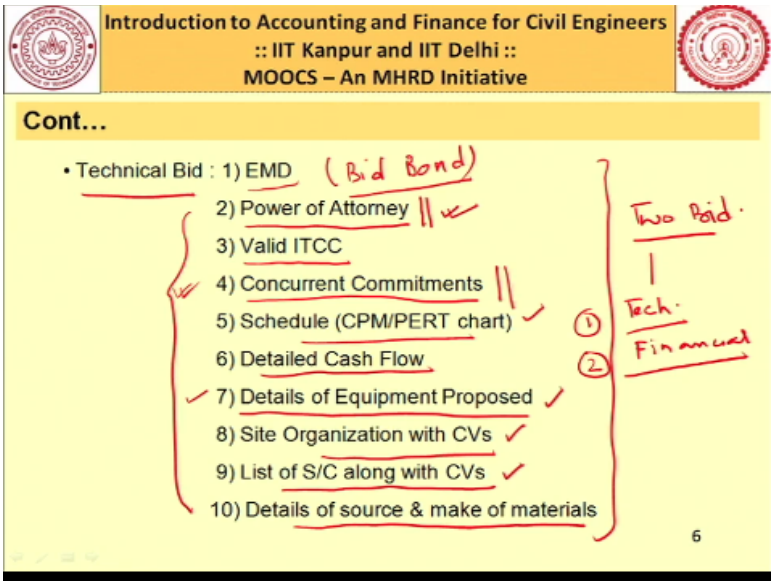

Now we go into the other details, now when I go into the tender document I find that it has to be prepared in 2 bid system. So, there is a term called 2 bid system when you say 2 bid basically 1 bid consist of technical bid as you can see here and the other one we call it as financial bid. So, basically the client is asking us to submit them 2 bids, 1 technical and other 1 financial, now in technical bid which is a separate envelope you would need to put these many documents or information.

For example in technical bid envelope you will have to provide the earnest money deposit, in one of the lectures I told you that earnest money deposit is also sometimes known as bid bond right. Now this earnest money deposit is essentially ask from a contractor that in case they become successful in winning the bid they cannot back out at that particular time. In case they fail to take up the job the earnest money deposit will be forfeited by the client.

In case they have become successful then the earnest money deposit will get adjusted in some other means right. Then the client would also ask for power of attorney basically the client would like to know whether the person who is signing the agreement or the person who is signing the contract is the appropriate person is the right signatory or not. So this will be identified by the power attorney document, the client would ask you to submit the valid ITCC, ITCC is basically income tax clearance certificate.

So, normally the client would ask you to submit last 3 years income tax clearance certificate, so if you have been filing your income tax return on time, the income tax authorities give you a certificate that is what you have to submit it to the client. Then they also sometime ask you to submit concurrent commitments, concurrent commitments are essentially all those work which currently you are involved in.

So, at the time of submitting the bid you might be doing job X, job Y, job Z, so the client is interested in knowing what kind of work you are doing at present. Sometimes this details of concurrent commitment is found useful in deciding the bid capacity of a contractor. Say for example if your bid capacity is 500 crores and you already have about 450 or 460 crore worth of job in hand.

The client will not be confident in avoiding you let us say 200 crore project, because they know that you have got limited capacity. So, for that reason to assess the bid capacity of the contractor they would like to know the commitment that you have at present and the value that you are working for different other clients at that point of time. Now as I told you they would also require the schedule construction schedule either in the form of a bar chart or a CPM chart or a PERT chart.

Now basically this is going to give you the detailed cash flow I have already told you how construction schedule can be useful in generating many other associated schedules. The contractor would also be supposed to be providing the details of equipment that he or she is likely to be using on that particular project. They will require the site organization with their CVs who is going to be the project manager what are his qualifications, what kind of experience he or she has.

They would also like you to tell them about the list of subcontractor along with the CVs what kind of subcontractor are they, how many years they are been in that particular business and so on. Likewise they would also ask you to give them the details of source and make of materials, so these are the parts of technical bid which will be submitted in one separate envelope.

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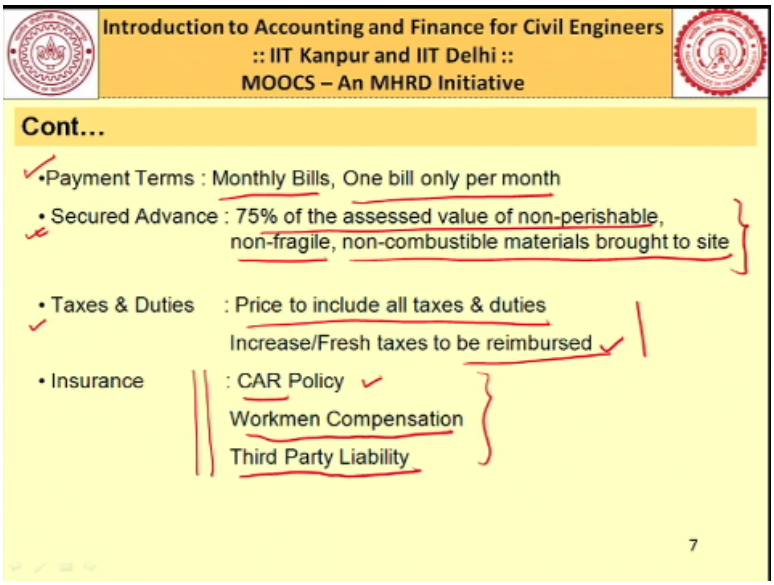

Now we will see further what other details are available in the tender document, for example now I study the payment terms, how the payments will be made. So, if I have studied from the document that the client will pay monthly bills, 1 bill only per month, then I went through the close on secured advance I find that the client is going to pay me 75% of the assessed value of non-perishable, non-fragile, non-combustible materials brought to site.

Normally these are to help the contractor improve his or her cash flow, so what the client is saying me is if you bring materials which are non-perishable in nature, non-fragile in nature, I will pay you 75% of it is cost. The moment the material lands up at site, then I see the close on taxes and duties and I find that my prices are to include all taxes and duties which are at presently implementable.

Any fresh implementation of tax the client is going to reimbursement, so this is very important, so that means as of day whatever taxes and duties are prevalent I have to include that in my price anything new that is coming during the course of the project will be reimbursed to be by my client. I go to the insurance clause and find that as a contractor I have to purchase this CAR policy which is contractors all rest policy, I have to purchase workmen compensation policy.

And I have to purchase this third party liability policy, these 3 policies I have to buy for particular project .

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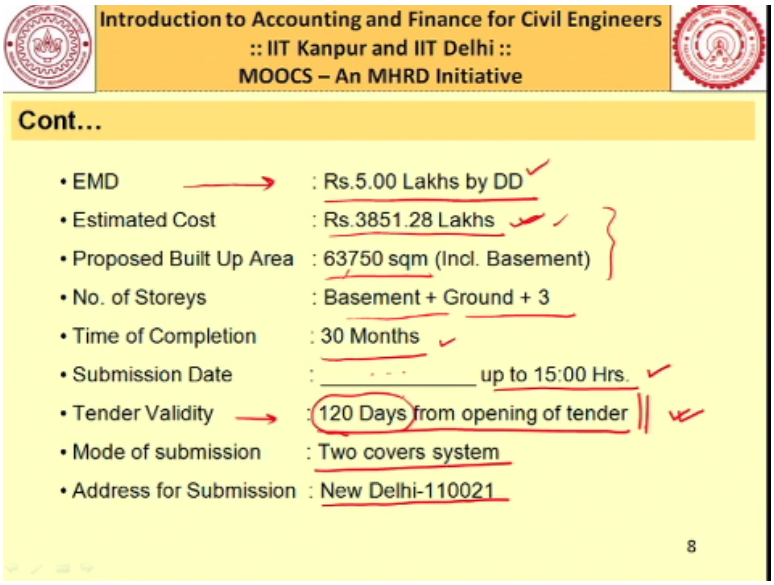

I am also told that the earnest money deposit that I have to deposit is rupees 5 lakhs in the form of a demand draft. The client has estimated the cost of this particular project as rupees 3851.28 lakhs, so this is given in the tender document that the estimated cost for this particular project is this much. The proposed built-up area also I calculated from the drawing it is coming to be 63,750 square meter.

Now these 2 data would be important for me to crosscheck my rates on sum thumb rule. We will see how it is to be check, from the drawings I find that the structures are typically basement+ground+3 storey, time of completion as I already told you it is given to be 30 months, submission date. Some value is given here up to 15 hours, the validity of the tender is 120 days that means my price is must be firm that means they should not undergo any changes up to 120 days from the opening of tender.

Suppose the client does not take any decision between 120 from the start, from the opening of tender and up to 120 days . In that case they will have to ask me whether my prices are still valid. If I am ok I will send them or later saying that ok my prices are valid. Otherwise I will say no my prices are not valid, I would like to revive, so this is what tender validity means. So in this particular project the tender validity period was 120 days, mode of submission it is 2 cover system.

As I told you 2 cover system basically means you have to have a technical bid package separate and financial bid envelope separate. Then you also have to note it down address for submission.

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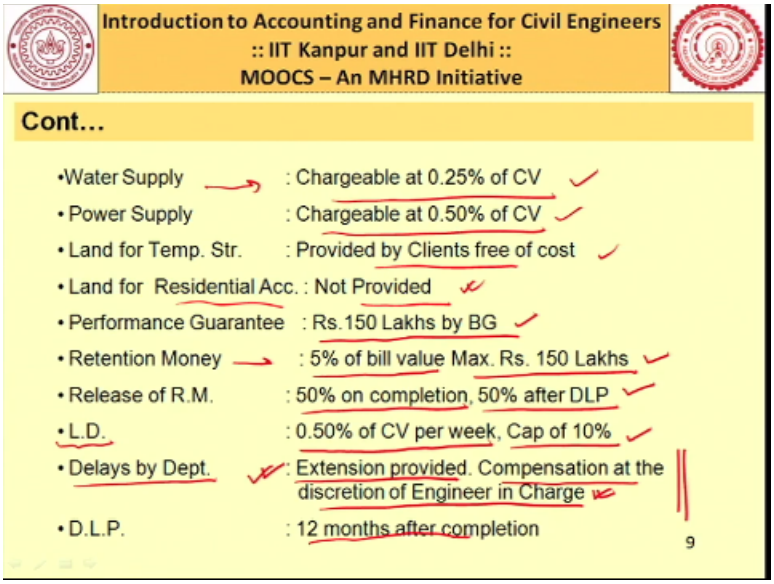

Then I see the clause on water supply who is going to supply me water, so I find that client is supplying me water at one point. But they are charging me 0.25% of contract value, power also is being provided by my client but it is chargeable and they are going to charge me 0.5% of contract value. Land for temporary structure it is being provided by clients free of cost, land for residential accommodation it is not being provided.

So I will have to look for some leasing of this kind of land, so that I can put accommodation for my staff. Performance guarantee client is asking for and they are asking to deposit rupees 150 lakhs in the form of a bank guarantee. Then I see the clause on retention money, retention money already are familiar with from every bill the client is going to bit up 5% of bill value, maximum of rupees 150 lakhs.

This release of retention money is like this 50% they are returning me on completion of the project and 50% after defect liability period which is 12 months after the completion. So, defect liability period is up to 12 months after the completion there is a liquidated damages clause that

means if I am not completing this project in 30 months. The client is going to charge me a penalty of 0.5% of contract value/week and subject to a maximum of 10%.

If there is a delays by department the client will give me time extension, compensation at the discretion of engineer in-charge. So, they will give me the time extension beyond 30 months but whether it will get compensated or not will be depending on the judgment of engineer in-charge, this is what the contract document says.

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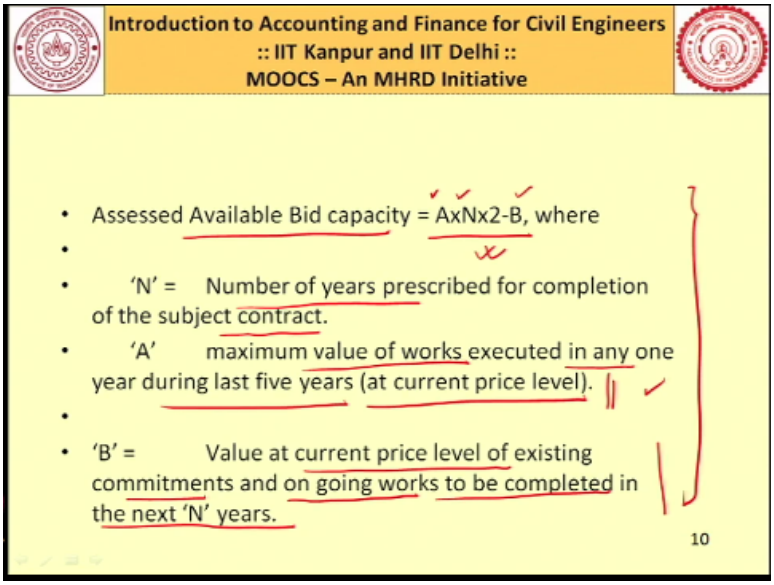

Now in one of the lectures I have told you about the concurrent commitments and today I also told you that this concurrent commitment is essentially use to find the bid capacity, available bid capacity. So, there is one formula which is quite widely used it says assessed available bid capacity=A*N*2-B. So, where N is the number of years prescribed for completion of the subject contract, say if it is 36 months then it is 3 years, 30 months it means 2 years 6 months.

So 2.5 years, so N becomes 2.5, A is the maximum value of work executed in any 1 year during last 5 years at current price level. So, all the price level from previous years you have to adjust it to current price level and you take the maximum value of work that you executed in any 1 year during the last 5 years, so that is your A. Now B is what B is the value at current price level of existing commitments and ongoing works to be completed in the next N years.

N is what the number of years prescribed for completion of this subject contract. So knowing A, knowing N and knowing B we can very easily calculate the bid capacity. This will give some idea to the client regarding the capacity of this particular contractor.

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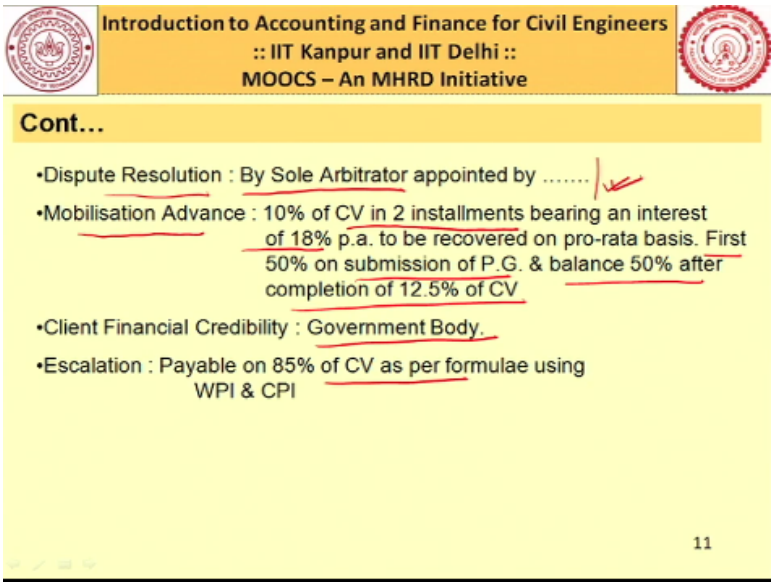

Now I further going to the details of some other clauses, I look at the dispute resolution clause, I find that it is quite a dangerous scenario. The client is saying they will appoint a sole arbitrator, now sometimes this could be very tricky situation. Because if the client is having the power of appointing the arbitrator it maybe that arbitrator may not be acting in an unbiased manner. So, sometimes some contractors may not like this particular clause and they will request the client to change this dispute resolution clause.

Then as for as mobilization advance is concern it is given as 10% of contract value in 2 installments and it is interest bearing. So, client will charge 18%/annum interest and they will give you the mobilization advance in 2 installments. First one would be release to you on submission of performance guarantee and balance 50% after completion of 12.5% of contract value, clients financial credibility no it is a government bodies.

So no problem, escalation I will tell you what it is, it is payable on 85% of contract value. So, what happens during the currency of the project you will find that the prices of material, prices of labor, prices of fuel they keep on increasing. So sometimes some clients especially if the duration

of the project is large they tell you that okay they will compensate you for this price increase, but normally they do not compensate you for the entire contract value.

So, they will compensate you for 85% of the contract value on it, why? because they assume that the 15% part is your overhead and profit. So, they are not going to compensate you for your increase in overridden other expenses that you are incurring at site. But they are going to compensate you for any increase in material prices, any increase in labor prices and any increase in PUL prices which is petrol, oil or lubricants. So, most of the clients they have some kind of a formula, now that formula I will show you it is very simple.

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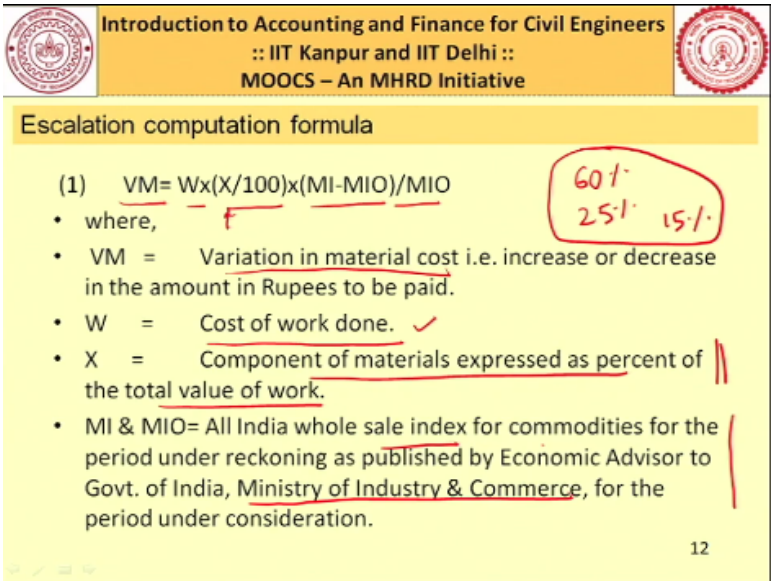

Say for example they want you compensate you for material price increase, so let us say material price increase we are saying VM which is variation in material cost. So, VM is calculated by W*X/100*(MI-MIO)/MIO, so W is basically whatever cost of work you have done for a particular period, X is the component of materials expressed as percent of the total value of work, so most of the time this will be predefined.

So, they will tell you that okay in this particular project material part consist of about 60%, labor part maybe about 25% and POL part they will tell you may be about 15%. So, this X is predefined in the very beginning, so let us say in this case X is 60% is given in the tender

document then what are MI and MIO. These are all India wholesale index for commodities for the period under reckoning.

That means the day on which you are calculating the escalation and the day at which the tender where received right. So, the difference between the 2 index values we are using it to calculate the variation in material cost. This index is published by government of India, ministry of industry and commerce, normally on a weekly basis they publish this. So, you know the period at which the tenders were received what was the index value there.

And what is the index value today when you are calculating the escalation. So knowing this you can calculate the variation in material cost.

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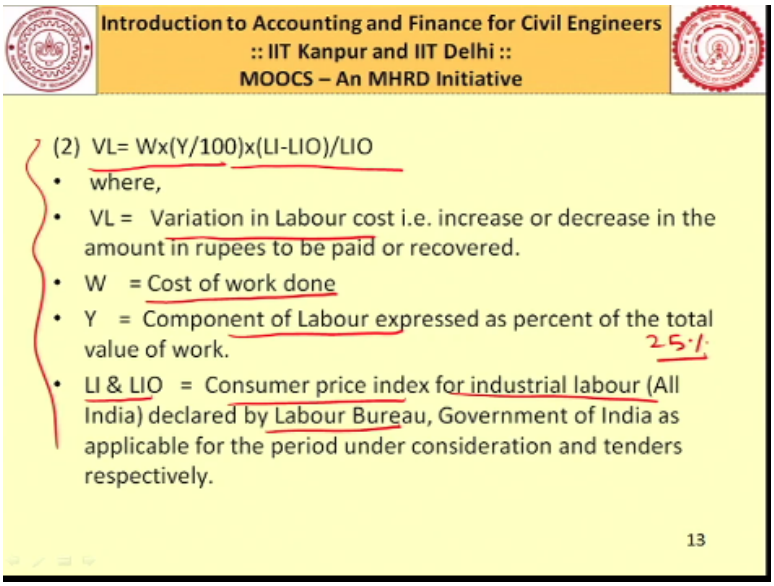

Likewise you can calculate the variation in labor cost, here also formula remains more or less similar W*Y/100*LI-LIO upon LIO, VL is variation in labor cost, W is cost of work done, Y is component of labor. So, let us say 25% of the whole cost is coming as labor cost, so Y becomes 25%, LI and LIO they are consumer price index for industrial labor. These are published by government of India labor bureau and that is what we have to use to calculate this labor cost variation.

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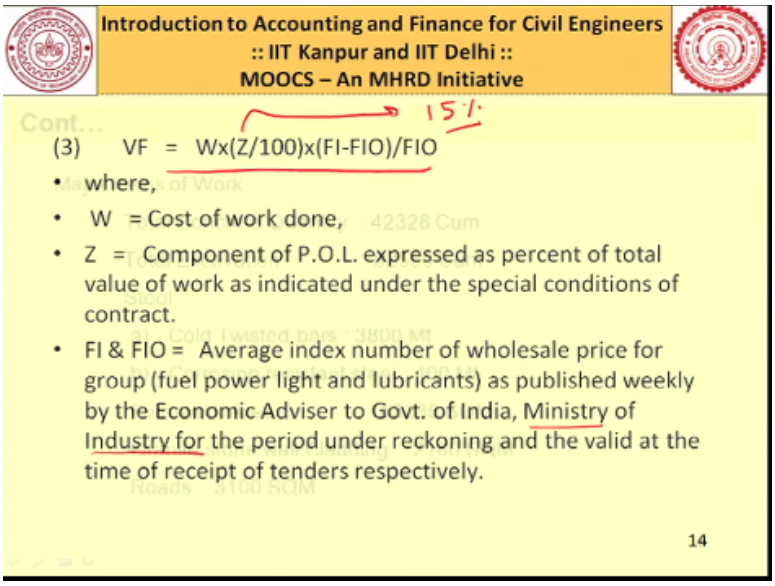

Likewise you have fuel cost variation, this is given by similar formula here Z could be let us 15%, the POL component petrol, oil and lubricant component this index is published by economic adviser to government of India, ministry of industry. So, you can see what was the index prevailing at the time of submission of tender and what is the index at this point of time when I am calculating the escalation.

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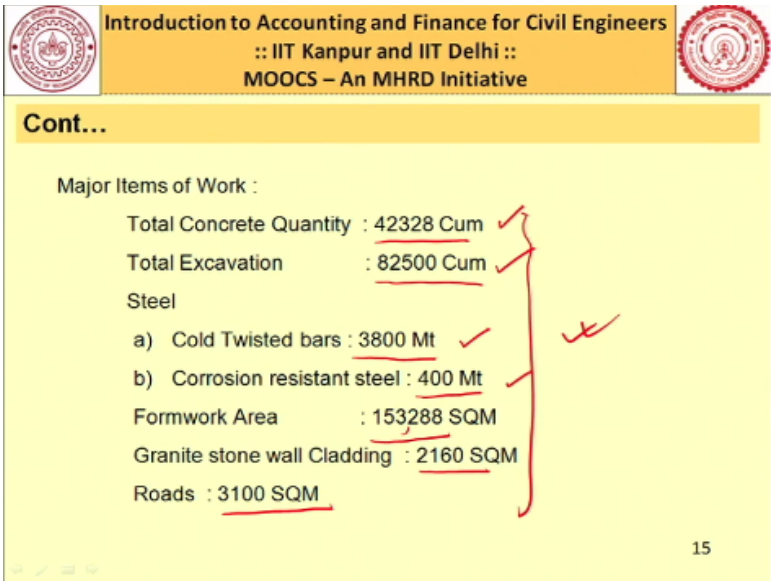

Now sometimes you also try to find out the major items of work, so I have calculated this, this is again to check my tender rates whether they are correct or not. Sometimes I will multiply these quantities with their approximate rate and I will get an idea of what should be my bid price. So,

that will basically crosscheck whether the bid price that I have calculated and I am likely to be submitting whether they are ok or not.

Normally these thumb rules are available with top bosses, so from their experience they have derived certain kind of thumb rules that ok, if this is the quantity of earthwork, if this is the quantity of concrete, the bid price must be somewhere at this level. So, that is the reason you try to calculate the major quantity and we will multiply it their rates, so that we get some idea about the bid price.

So you can see here in this particular project the total concrete quantity is about 42,000, total excavation is about 82,500, cold twisted bar 3800 metric ton, corrosion resistant steel 400 metric ton, formwork area is 153,000, granite stone wall cladding 2160 square meter, roads 3100 square meter. So, these are the major scope of work that I have identified from my bill of quantity.

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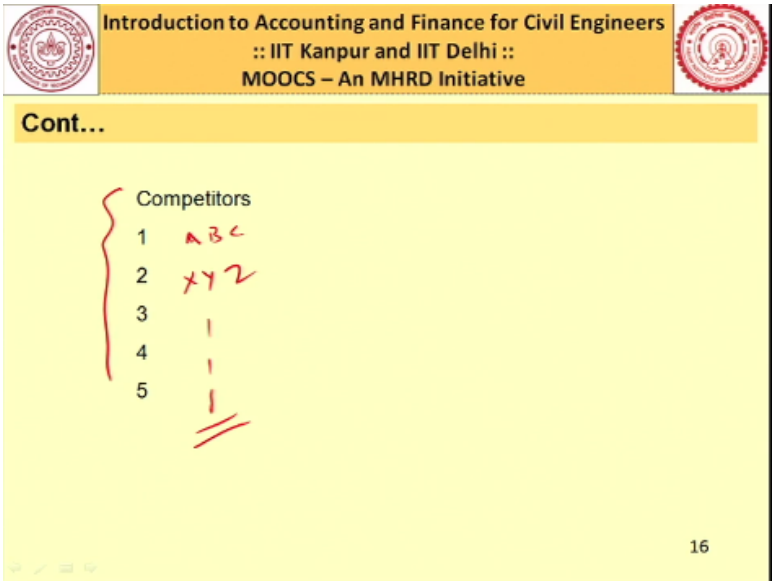

Then I also look at who are my competitors, so my competitors could be A, B, C or they could be X, Y, Z and so on. Now what to do with these competitors, what impact these competitors have on my bid price determination, we will discuss in subsequent lectures. But I will just tell you basically knowing the competitors is always a good thing. Since most of the time you keep on meeting these competitors every now and then you have fair enough idea what is their strategy of deciding on the markup.

So, based on these information we will be in a position to fix our markup, now my markup will also depend on many other factors. But number of competitors is also going to be a influencing factor, so that we will take into consideration, we will discuss this more in detail in some other lectures.

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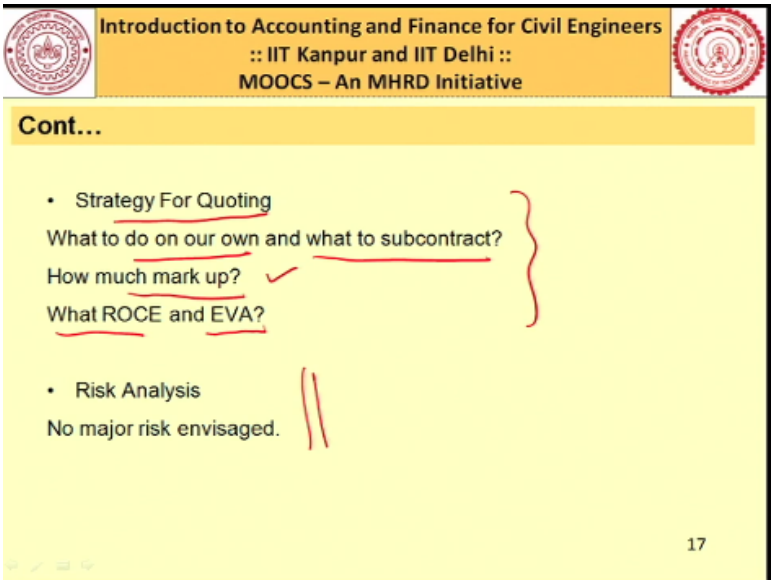

Then I will also have to think of strategy for quoting what to do on our own that means out of all the scope which items I should be doing on our own, how much to subcontract, how much markup to provide. So, that it gives me enough return on my capital employed, enough value edition, all these things are to be decided at this point of time. Then I also need to carryout risk analysis, whether any risk is involved in this particular bidding, what kind of risk is my money safe?

I know it is going to be safe because I am involved with the government's client. So, you can see I have identified almost all those key points where my money is getting influenced, my bid price is getting influenced. So I have to be very very careful about these particular points, so anything that you think that is going to slightly or maybe in a large term going to affect your bid price, you should be very much careful about that.

And all those points are to be written in a very nice manner in detail, so that when this is presented to your bosses or to the top management. They have fair enough idea and they can be appropriate and in form decision.

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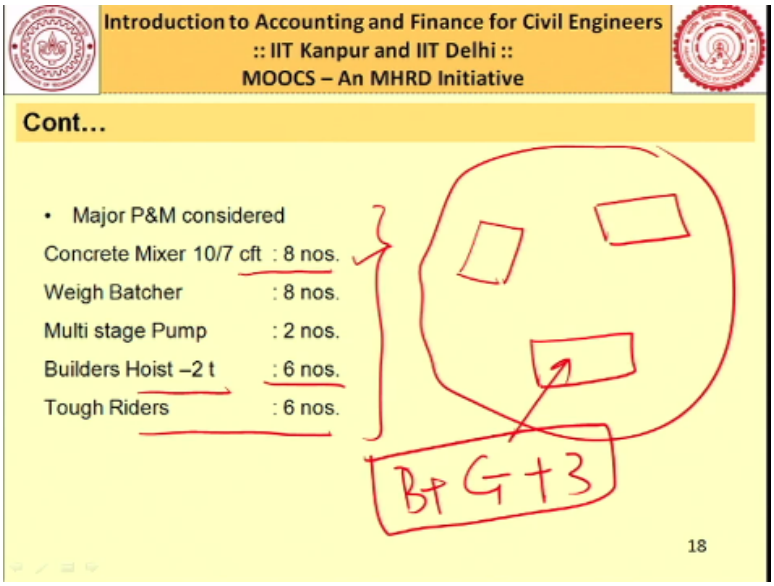

If you just have a look I have also classified what are the major equipment that you will require for this particular project. This has come from my plant and equipment schedule, I am thinking of mobilizing 8 mixers because my concrete quantity is not much and that to they are all segregated. So 1 building is here another building is here, third building is here, so my buildings are scattered and they are all ground+3 and 1 basement.

So, they are not even high rise, so I am not going in for even cranes, I am just using a builder hoist of 2 ton capacity 6 numbers and using tough riders. So, depending on the layout of your buildings, depending on the height of your buildings you can even think of what kind of equipment to be mobilized for a given kind of a setup.

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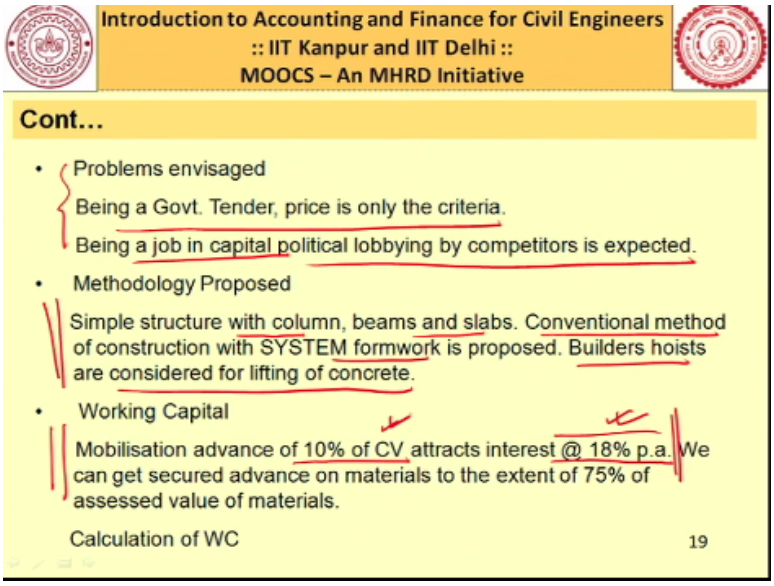

Some of the problems that we are envisaging for this particular project is like this being of government tenders, so price is the only criteria for selecting a bid, being a job in capital. So, this job was suppose to be carried out in New Delhi itself, so being a job in capital political lobbying by competitors is expected. So this I have to be very careful about this. The methodology that I have thought of doing or involving in this particular project is like this.

It is a simple structure with column, beams and slabs, so I am going in with conventional method of construction with system formwork. Builders hoist are consider for lifting of concrete, working capital I will tell you in detail how this is to be calculated for a time being you just see that mobilization advance of 10% of contract value is given by the client but it is interest bearing.

Now we will have to decide whether we are able to realize money from the market at a lesser value than this or at a higher value than this. So, suppose we are able to get money at a lower interest rate and this then I may not take this mobilization advance if my interest rate is more than 18% then I am going to take this advance and so on.

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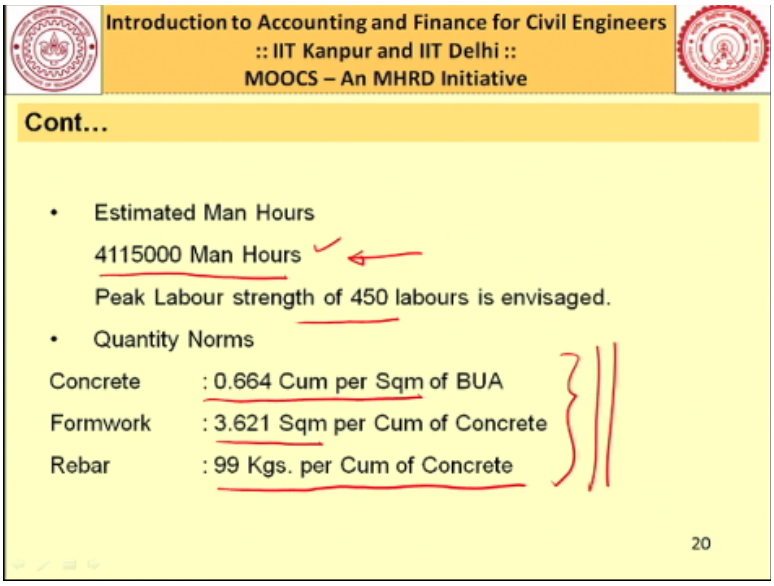

So, this is how you carryout things then one more thing that we need to do is calculate the man-hours. So, depending on the quantity of work involved and the productivity of different workers, I have calculated the estimated man-hours for this particular project. So, I have calculated what is going to be the peak labor strength. Now these are again thumb rules for example I have found that concrete quantity is coming to be 0.664 cubic meter/square of meter of built-up area.

Formwork 3.621 square/cubic meter of concrete, likewise I am finding reinforcement as 99 kg/cubic meter of concrete. These things are again to crosscheck, so if you are a experienced person you will find whether the quantity that you have been able to calculate for this particular project whether they are reasonable or not. So, fine we will stop at this point quickly summarize what we learned in this class.

We started our discussion by presenting you a case study, I told you how to find out those important points which are going to impact you financially, which are going to affect your bid price. So, we discuss all those key points in some other lecture we will discuss how to take care these points when we analyze our rates.

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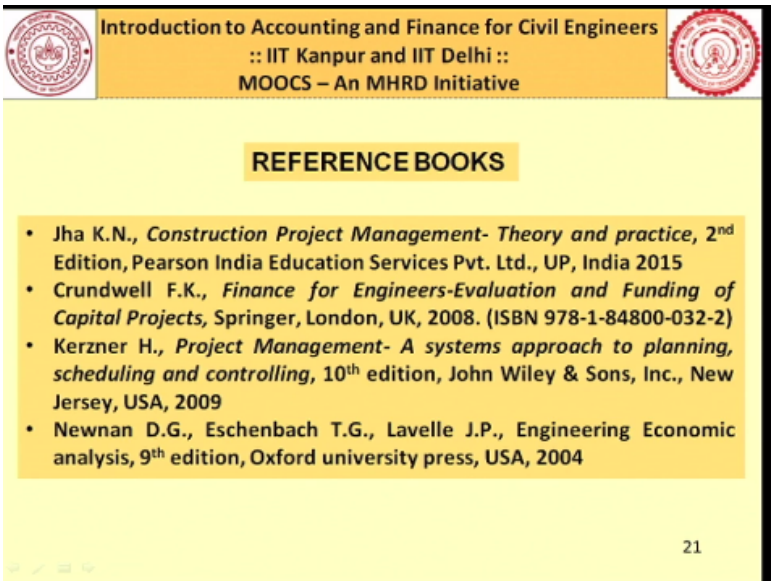

So, more on this we will discuss later in some other lectures, so we stop at this point, thank you very much and see you some other time.