Introduction to Accounting and Finance for Civil Engineers

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Lecture-23
Bidding (Part-2)

Good morning, namaskar and welcome to the course once again. In the last lecture if you remember we gave you an overview of the entire bidding process especially from the point of view of a contractor. We learnt the pre-qualification process, we learnt how to carry out the site investigation, we also learnt how to prepare tender summary which is also known as tender at a glance.

In this class we will continue our discussion and we will understand how a contractor formulates his bid price. We will see what are the different components of a bid price and we will go into the details of each of those components and finally we will see how the bid price is evaluated or rather computed by a contractor.

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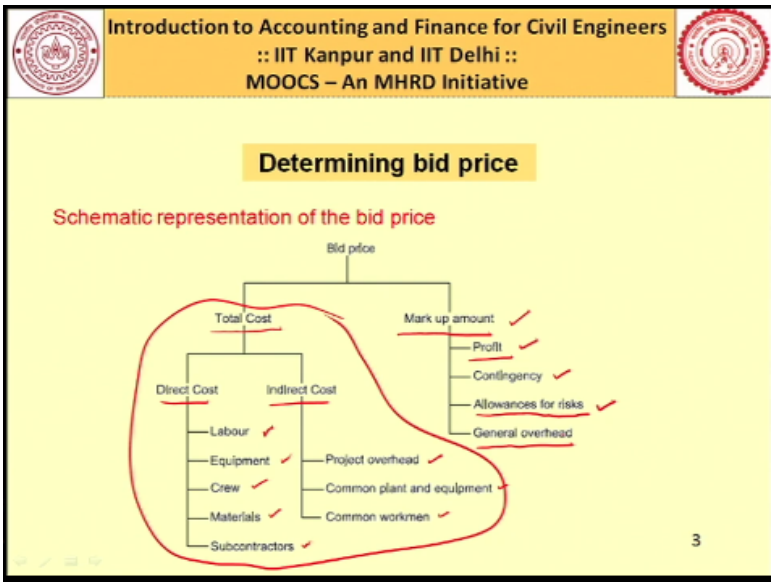

Now if you see the bid price is essentially consisting of your total cost and the markup amount. So if you look at the bid price closely this is what it consist of total cost and markup amount. The total cost consist of your direct cost and your indirect cost, in the direct cost you have cost of labor, you have cost of equipment, you have cost of crew members, you have cost of materials and you have cost of subcontractors.

On the other hand if you look at the indirect cost it consists of project overheads, common plant and equipment, common workmen. So these are as for as total cost is concern, now on top of it a contractor also adds his markup amount in one of the previous lectures I told you that markup amount is mostly equated with the term profit. But now in this lecture you will come to know that markup amount is more than profit, it consists of contingencies also.

It consist of allowances for risk as well and it consist of general overheads also, now we will go into the details of each of these cost component as well as the markup amount and we will see how finally the bid price is computed.

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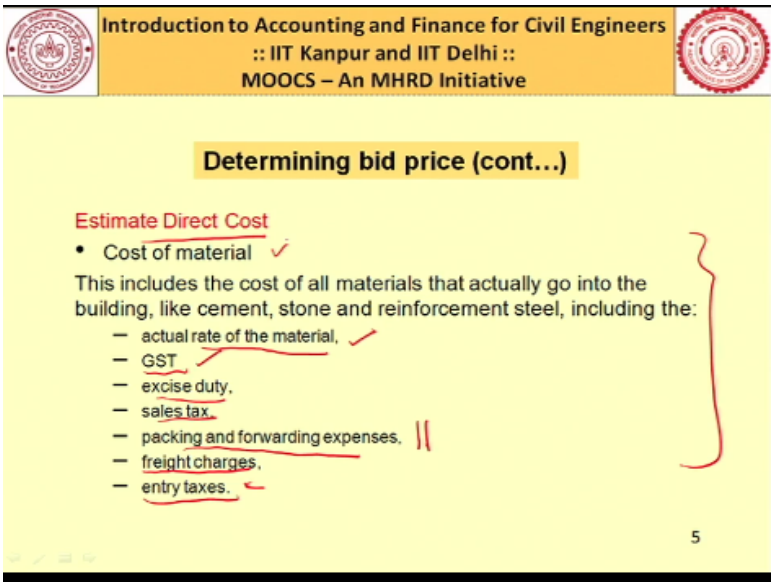

Let us go back straight to the direct cost computation, now as I told you direct cost consist of the cost of material, cost of labor, cost of plant and equipment, it could consist of cost of subcontractors also. Now when we determine the cost of material it has to actually consider the

rate of the material, the rate at which you are able to buy that material. Then you also have to add various taxes recent tax is GST which is goods and service tax.

We also had excise duty, sales tax, then you also have to add the cost of packing and forwarding because your materials have to be packed and then it has to be transported. So all those costs are to be included in your material cost , the freight charges that is transportation cost from freighting the material from one place to the other place and you also have the provision of entry taxes, sometimes this also known as (()) (03:33).

Some states (()) (03:36) or entry tax if the material passes through that particular state. So, these are the things you have to consider when you are evaluating the cost of a particular material.

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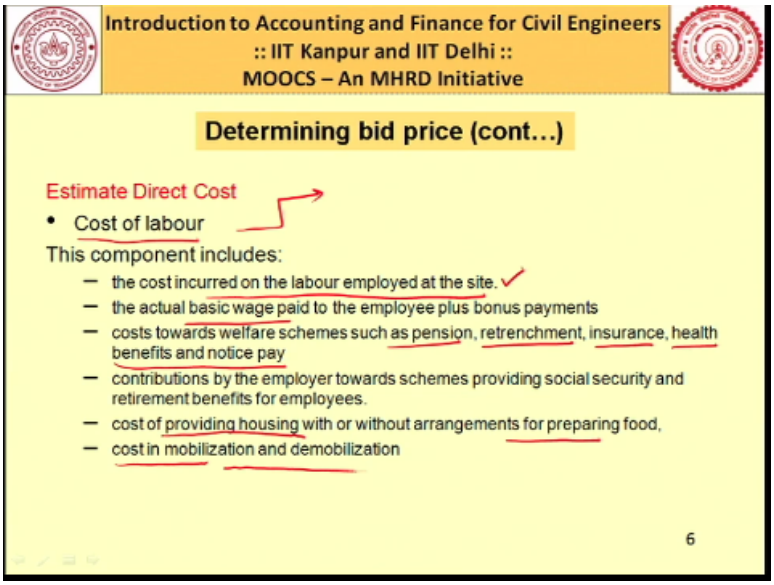

Now we will see the cost of labor, now if you see labor you can classify them as departmental labor and subcontractor labor. Departmental labor are in the role of the contractor whereas subcontractor labors are hired by the contractor to different subcontracting agencies. So, when you calculate the cost you have to pay those things into consideration. Now when you actually try to find out the cost of labor you have to find out the cost incurred on the labor employed at the site.

It is the wages that you have to pay, the basic wage in a reason to the basic wages you also have to add cost which you incur towards their welfare such as the pension, the retrenchment benefit, the insurance, health benefits and notice pay. See when you hire a worker it is not the cost of paying wage to them alone, you also have to consider various other costs. There are many benefits that you have to pay to your workers.

For example if they are working for more than a particular number of days normally maybe 6 months you have to also pay them the bonus. Then when you are retrenching a worker that means you are selling them out of the project site you also have to pay them it is not that today you decided that you are no longer require and you just throw them out, no it is not like that you have to get them the notice pay, you also have to give them the retrenchment benefits.

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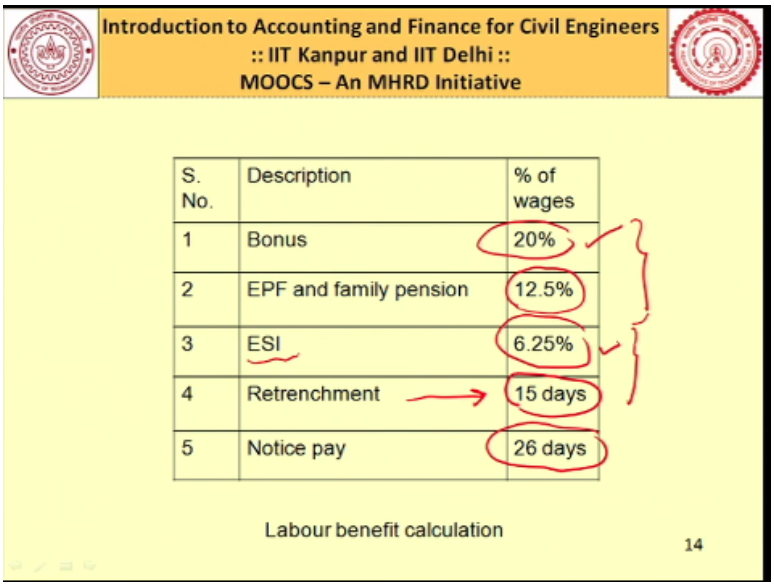

I will tell you how much that it cost, there is 1 slide which I have prepare which gives you. So, normally the bonus is about 20% of the wages if you have work for a particular contractor for more than a particular number of days. Then you have to have these provident fund and family pension that is about 12.5% of your wages. Then employee's state insurance the implication is about 6.25%.

If you are retrenching a worker, you have to pay them wage of 15 days extra, then the notice pay is for about 26 days pay. So you find in a reason to the minimum wages that you are paying you

have also considering all these cost. So whenever you calculate the cost of labor you have to consider all those cost also. Then you also have to consider the cost of providing housing it could be with or without arrangement for preparing food.

Then you also have to take into consideration the cost in mobilization and demobilization. Suppose some workers is coming from far off places you have to pay the petty contractors who is bringing those labors you have to pay them the rail fare and other expenses which the petty contractor is likely to interest, so all these are cost towards mobilization and demobilization.

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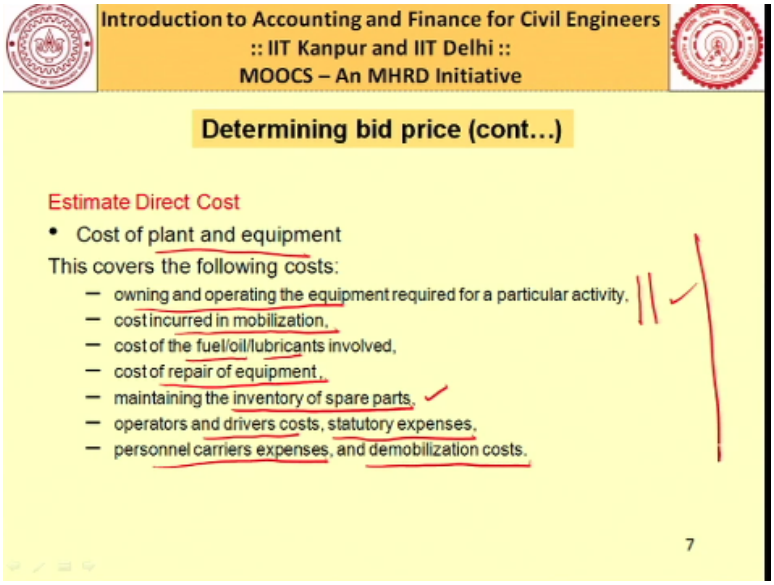

Then we go into the plant and equipment cost this is again part of your direct cost, so here you have to consider the cost of owning and operating the equipment it could be for different activity, it could be for comprehending, it could be for formwork and it could be for any other purpose. So whatever is the cost of owning and operating that equipment for that particular activity that cost has to be considered.

Then you also have to incur the cost time and you will have to take the cost of mobilization also, for example let us say you are transporting tower crane for a particular project site. Now this tower crane may come into maybe 20, 25 tillers, so the cost of transportation could be huge, then you also have to incur the cost of providing the foundation for that particular tower crane. So all these are part of your cost of plant and equipment.

Then you also have to consider the cost of the fuel, oil, lubricants which are needed by the particular equipment or you also have to consider the cost of minor repair that maybe required for making that equipment workable at your site you also have to keep some inventory of spare parts, so whatever cost you are incurring to maintain this inventory that has to be accounted for then the cost of operators and drivers some other statutory expenses.

That maybe required that also has to be consider, then personal carriers, expenses and demobilization costs. All these are part of your direct cost for plant and equipment.

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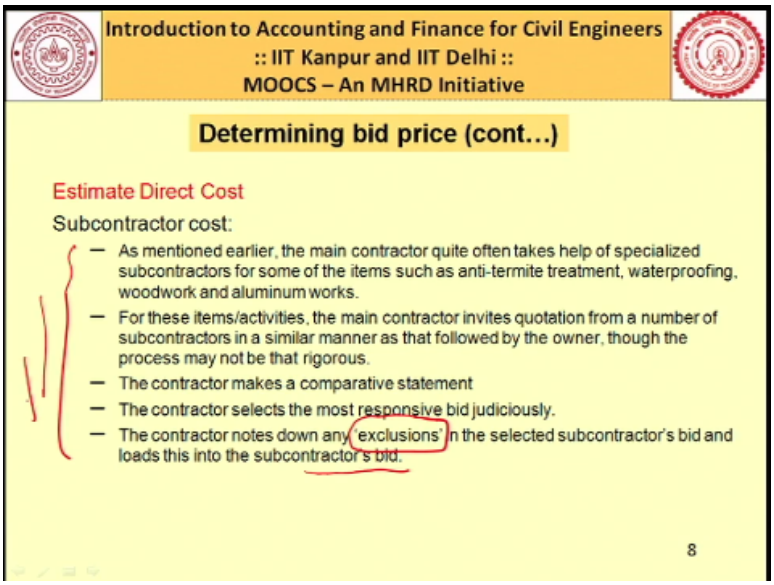

Then we move onto the subcontractor cost, you know that not all the activities are performed by the general contractor. They had the services of subcontractors, the subcontractors maybe there for anti-termite treatment or they could be there for water proofing or for aluminum works or for wood work. Now in a similar manner a contractor also invites quotation just the way a client invites the quotation from these contractors.

So let us say for example the contractor is looking for a subcontractor for carrying out anti-termite treatment work. So he will contact number of subcontractors who are involved in this anti-termite treatment work and they will collect the quotation, they will study the quotation and they will see whether all the items which are needed to perform anti-termite treatment has been

considered by the subcontractors, if something is not considered those are part of your exclusions.

Suppose the subcontractor says that I have not considered the expense towards water and power. So the main contractor would add the cost of water and power in the cost given by the subcontractor and then only he will provide that into his bids. So these are the things he has to consider when subcontractor cost is accounted for.

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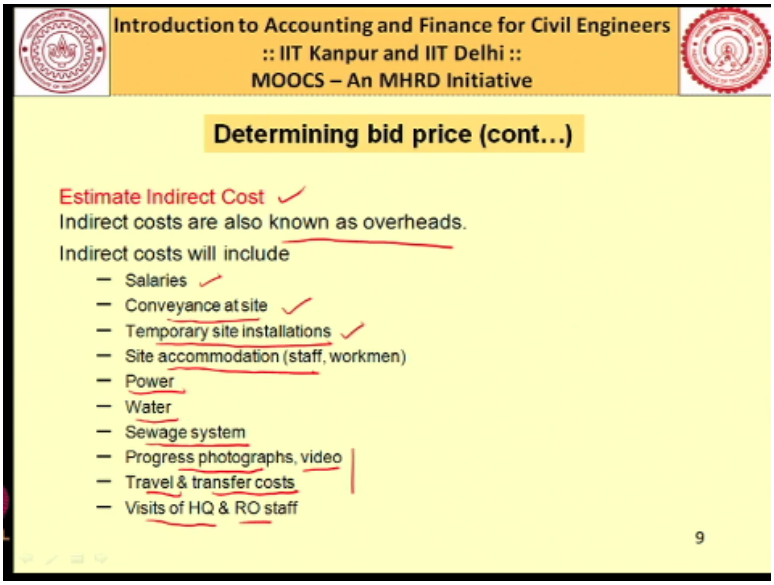

Now we will see what constitutes indirect cost, we have already seen the direct cost part, now we will see indirect cost. They are also loosely known as overheads, now they will include a large number of expenses, for example expenses towards salaries of your staff, you will require conveyance at site. So it could be jeep, it could be cars, it could be buses, trucks and so on, so that is part of your conveyance expenses.

Then you also incur cost towards temporary site installations, for example you will have workshop, you will have officers for your client, you will have officers for your own staff and you can have officers have your architects. So they are all part of your temporary site installations, so whatever cost you are incurring here that has to be accounted for under this indirect cost, then comes your cost towards site accommodation of staff, workmen and so on.

You require cost towards power, cost towards water, cost towards providing sewage system, then you also incur cost towards making progress photographs, taking videos, you incur cost towards travel and transfer cost of your staff. Then sometimes personnel from your headquarter and regional officers visit your site. So that cost also has to be incurred into and taken into account in the indirect cost.

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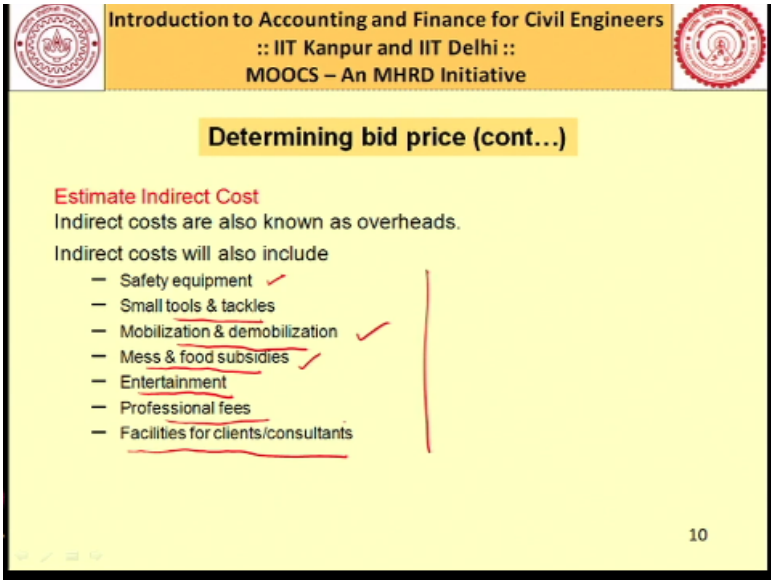

There are some more items which are to be covered under indirect cost, there could be safety equipment, small tools and tackles, the cost towards mobilization and demobilization, the cost that you incur in mess and providing food subsidies to your workers. The cost towards providing entertainment to your staff and to your workers, the cost incurred in providing professional fees and the cost that you incur sometimes in providing facilities for clients and consultants. So all these are part of your indirect cost.

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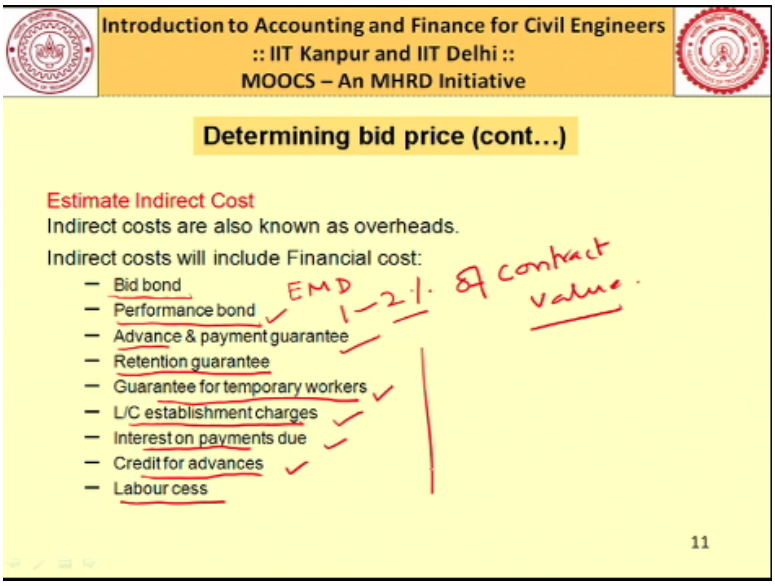

Then there are certain other financial cost also that is to be part of indirect cost . For example the bid bond. As I told you in the previous lecture bid bond is nothing but your earnest money deposit, so normally it is about 2% of the contract value, 1 to 2% roughly of contract value. So this also has to be accounted for right, then sometimes a client ask you the performance bond, so the cost towards providing performance bond also is to be incurred here .

Sometimes the client gives you mobilization advance but they ask you a guarantee from you, so the charges towards providing that guarantee is to be included here. Retention guarantee what happens from every bill the client bid up certain amount of retention money right. Now the current trend is retention money is released (()) (12:45) bank guarantee. So, whatever bank guarantee charges your incurring that has to be included in your indirect cost.

Then sometimes you provide guarantee for temporary workers, so cost incur towards this has to be included here. If you are into export business you will have to provide this charges for later of credit L/C establishment charges. Then you may incur cost towards interest on payments that is due, then credit for advances, labor cess, all these are part of your indirect cost.

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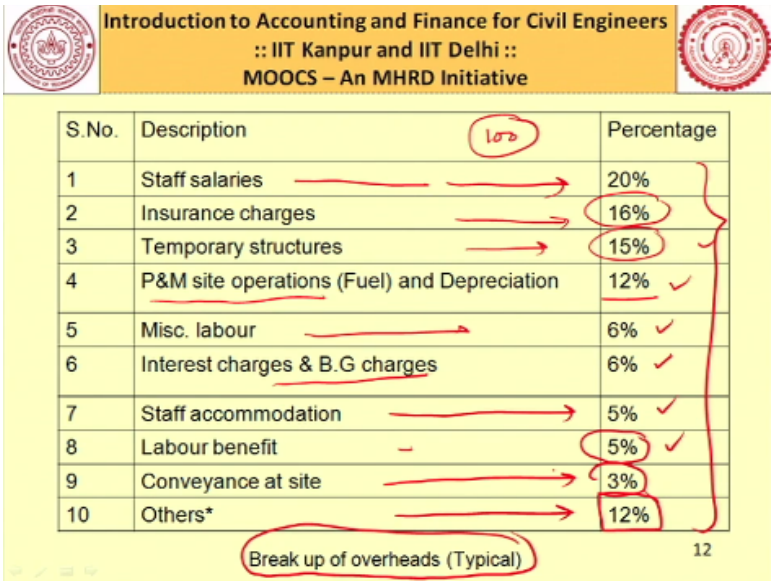

Now I will you a typical breakup of overheads, maybe for typical building projects, you will find that let us if your total overhead is let us say consisting of 100%, staff salary will be 20% out of that. So if let us say the total overhead is coming out to be 100, so 20% component of that would be coming from staff salaries. This is just giving you a typical idea, so that you can understand the magnitude of each of this cost heads.

Insurance charges would be roughly 16% of your total overhead, temporary structure cost would be roughly about 15%, plant and machineries site operations including fuel and depreciation the cost would be about 12%. You may spend about 6% on miscellaneous labor charges, interest charges and bank guarantee charges would be roughly about 6%, staff accommodation would be costing you roughly about 5%, labor benefit I told you what are the terms under labor benefits.

For example it would be the bonus, it would be the family pension, it would be the ESI, it would be retrenchment benefit, it could be notice pay, all put together it would be roughly about 5% of your overheads. Of course these values may change from company to company but this is a general guidelines you can get some idea out of different percentages. Then you have conveyance at site this is about 3% of the overheads. Then others we are saying it would be about 12%, I will give you what comes under others in different slide.

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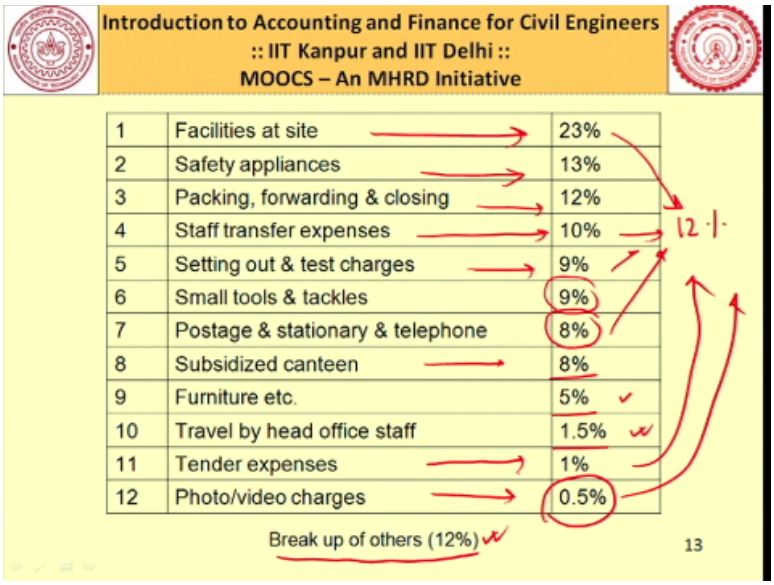

So, this is the breakup of that 12%, so 23% of 12% would be spent on providing facilities at site, 13% of this 12% would be safety appliances, you will buy helmet, you will buy safety belts, safety shoes and so on. Packing forwarding and closing it would cost you about 12% of this 12%, staff transfer expenses would be roughly about 10% of this 12%, setting out and test charges it would be about 9% of this.

Likewise small tools and tackles 9%, postage and stationary and telephone expense it would be 8% of this 12%, subsidized canteen expense would be about 8%, furniture etc., roughly about 5%, travel by head office staff it would cost you about roughly 1.5%, tendering expenses right from buying the tender document to preparing the tender roughly it would cost you about 1% of this 12%, photo/video charges very nominal about 0.5% of this 12%. So, this is how you split this 12% and this is how a typical overhead component could look like.

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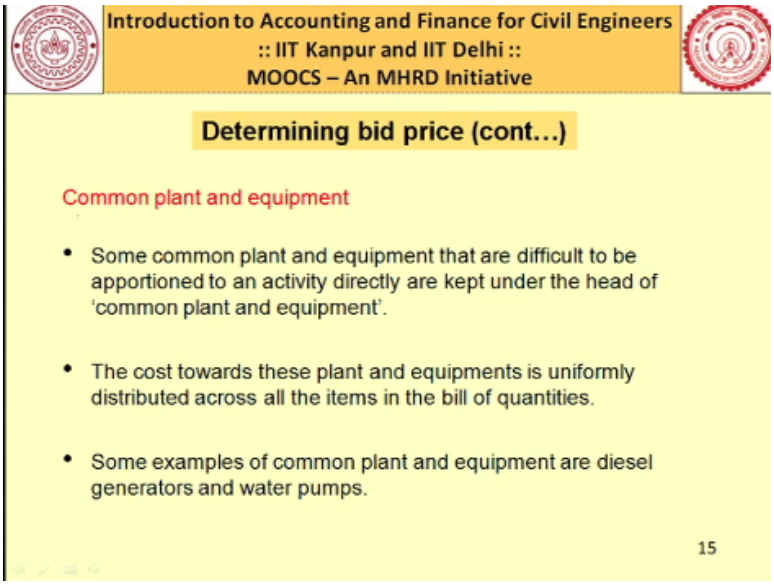

Now we will see the common plant and equipment, if you remember the indirect cost, indirect cost consist of your overheads, common plant and equipment and common workmen. Now what happens there are certain plant and equipment for which it is very difficult for you to decide the exact nature of cost. For example let us say you have a diesel generator set available at site.

Now this diesel generator set is available for all the activities, it is being used for pumping of concrete, it is being used for providing area lighting. So, it is very difficult for me to identify exactly what proportion of this cost is going in providing area lighting or in providing the pumping cost and so on. So if I am unable to distinguish very clearly where exactly the cost is being spent I put it under common plant and equipment.

Likewise if a worker is involved in many activities, it is always better to put the cost under common workmen. I will give you the example of some more common plant and equipment, let us say one example I give you for diesel generator set, another example could be water pump. Now this water pump is pumping water for curing purpose also, water is being used for providing for making concrete as well for making motor also.

So it I very difficult for me to really distinguish that out of X cost 0.5X is going here, 0.2X is going here, 0.3X is going here. So, what I am doing in order to avoid these calculations I am putting the entire cost of providing water pump or for that matter DC sets into a separate head

and I am putting it under indirect cost. Now again when it comes to common workmen I also do the same thing, for example let us say take the case of a storekeeper.

Now storekeeper is there for all the activities of my project, it is not that the storekeeper is there only for concreting activity, no, it is not like that. So, what I do whatever expense I incur towards storekeeper I put it under entire project under indirect cost, under common workmen. Likewise there could be safety steward in my project. So any injury happens to worker is there, likewise I will have some timekeeper, security persons, so all these expenses I am putting it under common workmen.

So what we have seen under indirect cost we have seen the overheads, we have seen the common workmen and we have also seen the common plant and equipment. Now as far as the total cost components are concern we have through. Now we will markup, now in one of the lectures I told you that markup is loosely defined as profit, but in this lecture now you know that it is more than profit, you also have to consider your general overheads, your contingencies and your allowances for risk right.

Now we will see each one of these, let us say first straight general overheads, so if you are working for a large company you will find that you have officers at different places, you have your headquarter, you have different regional offices. Now different types of professionals are engaged in these offices, so they are there to support site activity, someone would be there to provide helping design, someone would be there to provide help in procurement, someone would be there for tendering and so on.

So you find they are there to help you out and you also pay their salaries, you have to pay the expense towards maintaining that particular office, you have to spend money towards electricity charges and so on. So all these costs have to be met from somewhere, so all these costs are coming under your general overheads. Normally the general overhead for a particular company would be in the range of about 2 to 3%.

Now every year you calculate what is the total expense that you incur in these offices and you also see how much business you did that particular year. So you can get a percentage, suppose you spent 1 crore towards maintaining these offices and you did a business of 100 crores. So, 1% is your general overheads, so for the next year whenever any new bidding is taking place we will put this amount of 1% in our markup.

Now the second term under markup is your allowances for risk, so when we are doing a particular project we are bidding for a particular project we know what are the likely risk that you can encounter in that this particular project. This is coming from your past experience, so you can maybe either buy some kind of a premium or you can try to transfer these risks, so you have certain provision to overcome these risk situations.

So all these expenses that you are likely to be incurring to overcome these risk we are putting under our markup. Then those risk which we are unable to foresee at this moment we are covering it under contingencies. So contingencies are the amount that you keep aside to meet some kind of unforeseen situations, so something which you never forecasted let us say that occurs in your project.

So, if you have to overcome that you need to have some kind of money already to be built in your bid price. So these are all part of your markup and of course profit is 1 major term of markup. So, now you understand markup is essentially consisting of 4 terms your profit, your contingencies, your allowances for risk and finally your general overheads.

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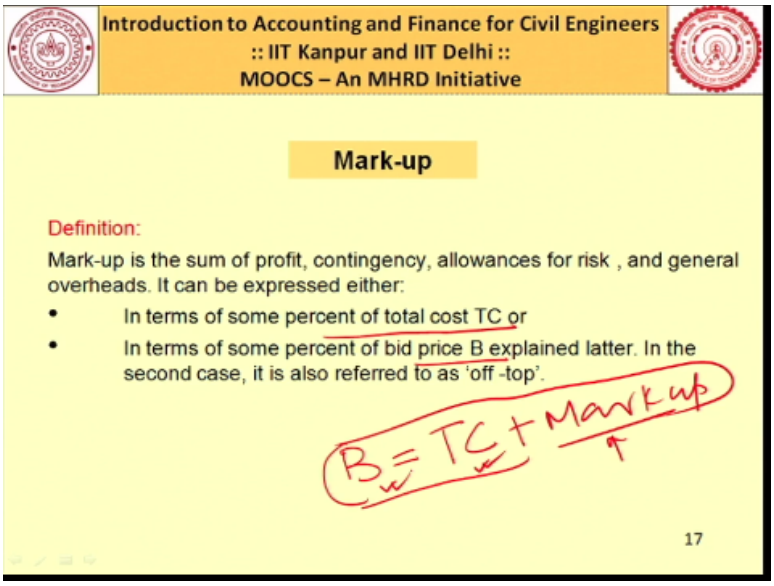

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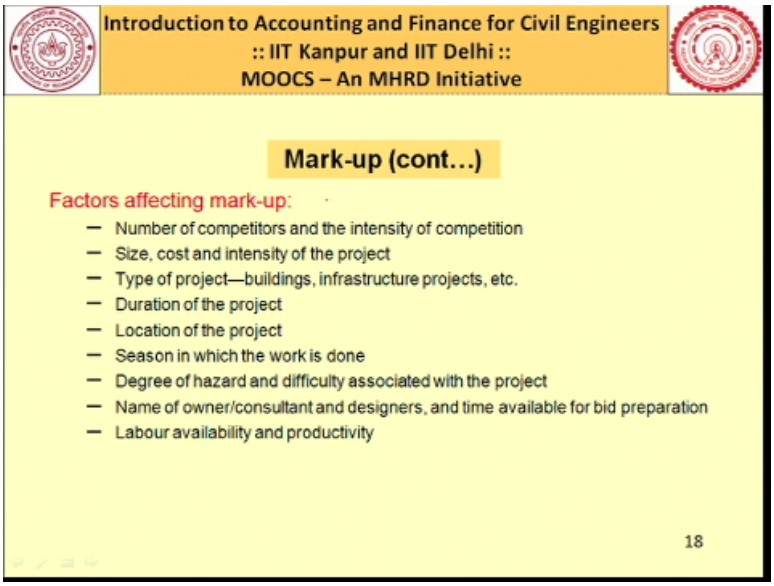

Now markup is normally expressed in 2 ways, either you can express it in sum percent of your total cost or you can express it in terms of your bid price. Now there are 2 terms which you have to understand let us say B is your bid price and this is consisting of your total cost+markup right. This is how we defined our model bid price is total cost+markup amount right. Now this markup I can express it in 2 ways either sum percentage of this total cost or sum percentage of B and this is how it will look like.

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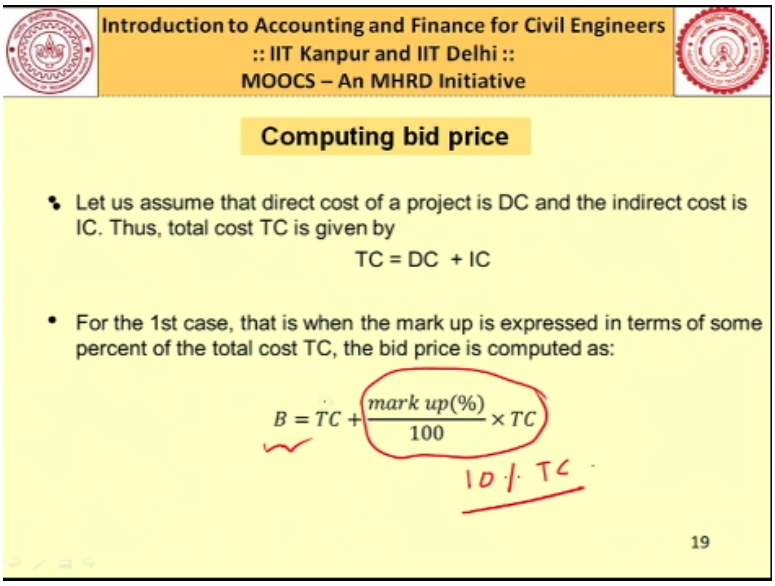

So, if you are expressing this markup in terms of certain percentage of TC total cost, so this is what it is. So, let us say I say 10% of TC, markup is let us say 10% of TC, so how much will be my bid price?.

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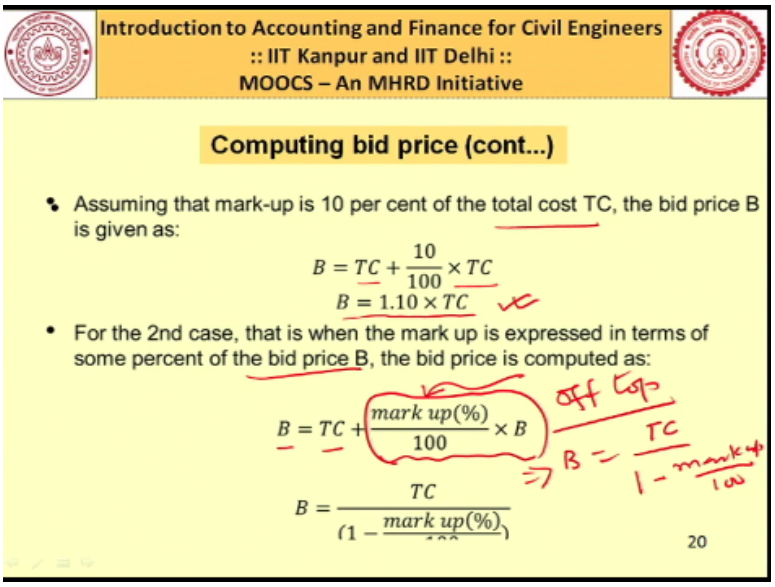

It would be B=TC+10/100 of TC, I am saying that let us assume markup to be 10% of total cost. So, my bid price is going to be 1.1 multiplied by TC, this is one way of representing my markup that is in terms of total cost. Now in the second case I am expressing my markup in terms of my bid price. And in that case this term we are also referring to it as off top right. So what I am doing it here B=TC+sum percentage of B, let us say I am saying markup is 10% of my bid price.

So, I will write it like this sum percentage let us say 10% of B, so if you calculate it, it would be B=TC upon 1-markup percentage upon 100. So, if this is 10% of B.

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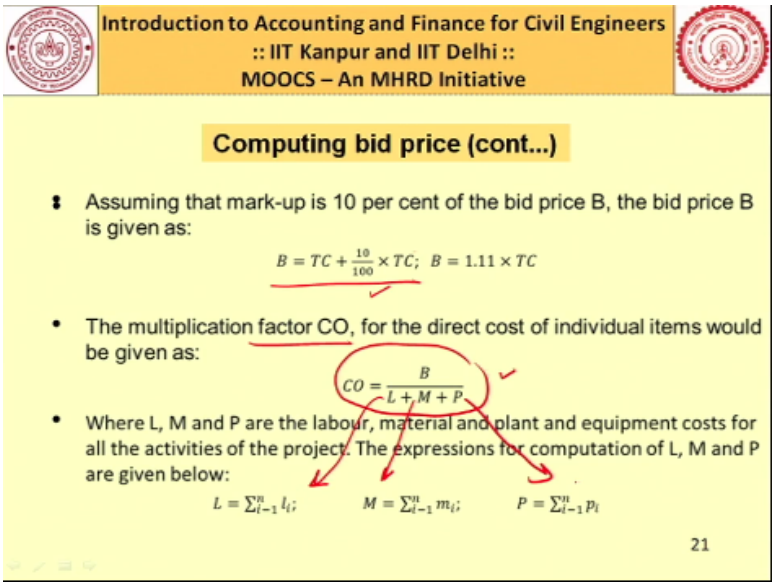

So, if you see here it would be something like this B=TC+10/100 of total cost let us this is in this case it is B here. So, I will just do it do the calculation for you, so that you do not get confused.

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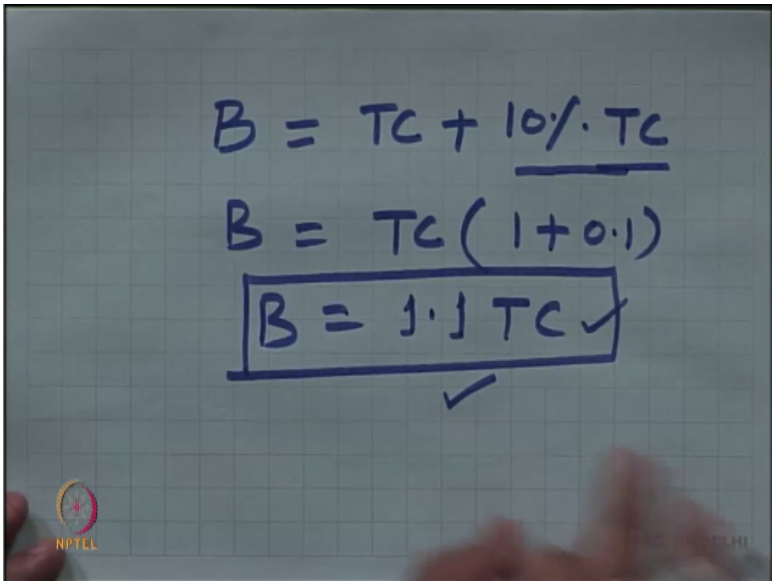

So, in the first case I am writing B=TC+let us say 10% of TC right, so in this case we are defining the markup as sum percentage of total cost. So, it would be B=TC(1+0.1), so it is 1.1 TC, so this is how we define your bid price, it is 10% of 1.1 multiplied by TC.

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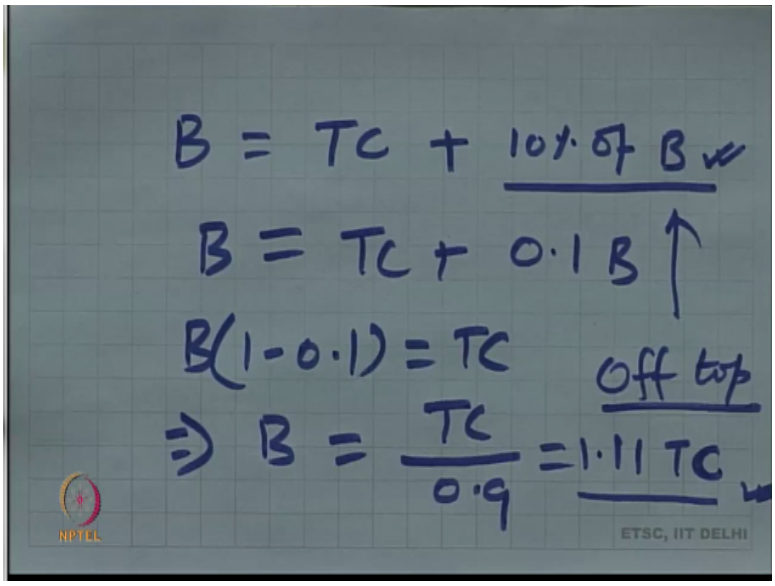

Now in the second case what we are saying is we are saying B=let us say TC+sum percentage of let us say 10% of B. We are saying I am defining markup in terms of sum percentage of bid price itself. So this is going to be TC+0.1 times B and this case we are defining this markup as off top, we are calling this term as off top right. So this is B=TC+0.1B, so B(1-0.1)=TC, so if you see here we are getting B as TC upon 0.9 and which would be about 1.11TC.

So, now you understand the difference in the first case my bid price was 1.1TC. In this case I assume 10% of total cost as my markup, in the second case what I did I assumed 10% of B as my markup percent and that is how I get B=1.1TC. So, for a large project this would make a very big difference, so you have to be very very clear about this. Now when it comes to markup it depends on a number of factors.

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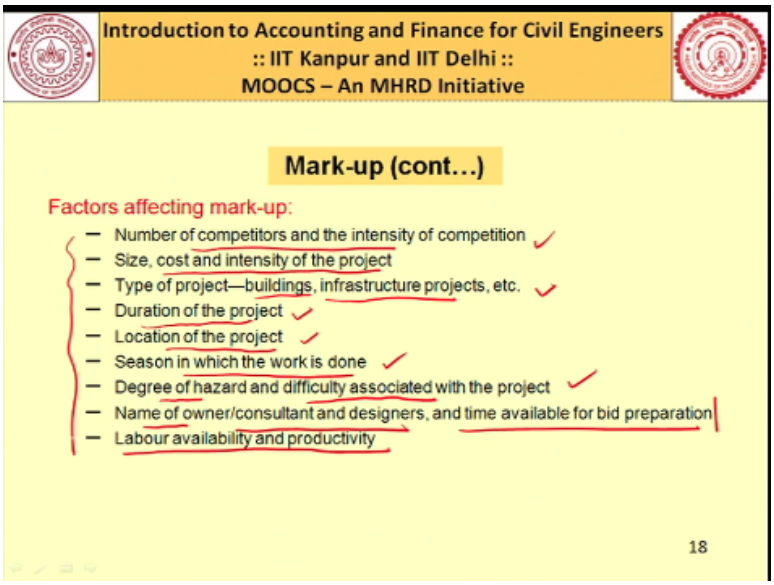

So, let us see quickly what are factors which affect this fixing up of markup, see what happens if you see the bid price of different contractors you will notice that the difference in bid price especially if the contractors are at par, that means they are getting the same material from the market at very nearly the same price, they are getting the same labor, they are getting the same engineers, same plant and equipment almost at the same price.

So still the difference in bid price exist, so why it is so, this maybe purely on account of difference in markup. So some company might have applied 10%, some company might have applied 12%, some company might have applied 15%. So, the difference in bid price is essentially on account of difference in markup especially when all your contractors are at par**.** So, we would like to know what are the factors on which a contractor decides it is markup for a particular project.

So, that depends on a large number of factors in fact number of research is have also been carried out regarding how a particular contractor fixes a given markup. And people have found that these are the factors which affect the markup, for example the number of competitors that you are likely to face and the intensity of competition. So the more the competitors you are having you will find that it will affect your markup application for that particular project.

It is also decided based on the size, cost and intensity of the project, of course it will also be based on the type of project. For example if the building project you are competing for or if it is infrastructure projects markups are going to be different. Duration of the project is also one very important factor, location of the project also decides your markup, suppose you are trying to go for a new location you would like go in for a higher markup.

Because you do not want to take risk, because everything is unfamiliar to you, so until unless you are assured of high return you would not like to go there. Then sometimes it is affected by the season in which the work is done, the degree of hazard and the difficult you were likely to encounter in the project that also governs the markup. Sometimes who is the owner, who is the consultant and who is the designer that also affects the markup.

Suppose you are trying to work for a known client, you have a very good relation, you would like to work for them even at a lower markup. But if the client is fussy they are delaying payments, you would do not like to work with them for low markup until unless you are assured of very high return you would not be willing to work with them. Then the time available for bid preparation also is one of the factors, if you have very less time normally you try to go for higher markup.

Then the labor availability and the productivity likely to be achieved at site also affect your markup. So, that was our discussion on markup was concern, now we are very close to computing the bid price because now we have completed our discussion on direct cost, indirect cost and even the markup. So in order to find the bid price I just find another term which is known as cover or multiplication factor.

So, multiplication factor CO sometimes also known as cover is a ratio of bid price to labor cost L+material cost M+Plant and machinery cost P. Now capital L is the sum of all labor components for different items, this capital M is sum of material component of all material items, all items of my project, P is the sum of all plant and machinery component of all items in my project.

So, what I do is I have calculated the labor cost for all items, I have calculated the material cost for all items, I have also calculated the plant and machinery cost for all the items. So I add all of them and these are part of my direct cost. So I know the direct cost but my client is interested in knowing the final rate. So, how do I derive the rate, now I have got the labor component, material component, plant component and sometimes your subcontractors are employed that cost component is also there with you.

But the client is looking for overall rate for every item, so what I do, I divide this sum of labor cost+material cost+plant cost from my bid price, bid price has already been computed overall bid price how? I assume the markup either as 10% of cost or 10% of bid price and that way I could get the bid price from my total cost. Now I have to give the individual rates for different items see if you look at the configuration of a bill of quantity it will be something like this.

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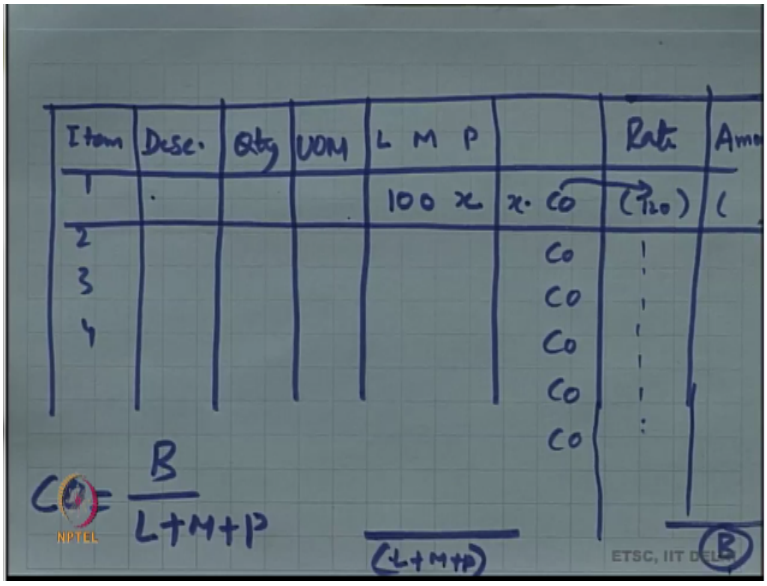

So, you have let us say this is my item number it could be 1, 2, 3, 4 here you describe the items description. Then here it would be quantity, here it would be unit of measurement right ok, now the client is looking for the rate part and finally it will ask you the amount right. So for each of the client, each of item client is requiring you to fill these values. Now what you have done, you have calculated the labor cost for this item, material cost for this item, plant cost for this item.

So, this value you already have, now you have added it up right and you have got total amount as B here this is already found out. So, what I do is this sum of L+M+P I divide it from B, so I find the term B/L+M+P which is I am calling it as cover or multiplication factor. Once you have got this cover I can multiply each of the say I am getting X here, so I will multiply this with X*CO, so X*cover is my this value.

Suppose the sum of labor+material+plant for item number is 100 and you have got the cover as 20. So, this cost is going to be 120, now this is one way in which you distribute the cover, so CO is same for all the items, we call this as uniform loading. But contractors do not load this cover uniformly for all the items, here is also a catch not all contractors would be loading the cover uniformly in all the items, sometimes they do front loading, sometimes they do back loading.

So, what happens in front loading instead of multiplying this cover in all the items uniformly what they do they take higher cover and multiply it in those items which are likely to be occurring at the beginning of the project. So what I will do is I will see which items I will take it up at the beginning of the project. So let us say my total cover is coming to be 10%, so those items which are likely to do it in the beginning. I will multiply it with let say 15% or 20%.

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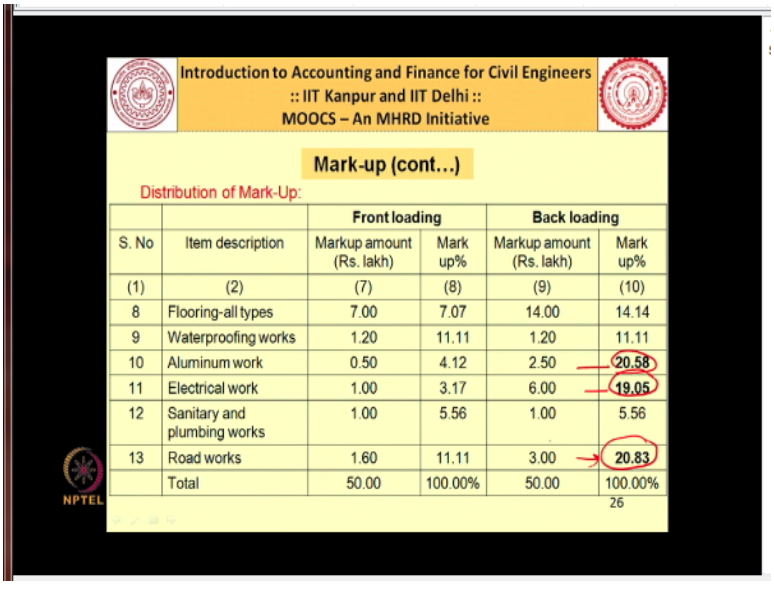

So, this is what you can see here let say in this particular example if you see by uniform cover is 11.11%. So, I have multiplied all these items with this same cover 11.1, you can see I have 13

items in my project. Now all of them I have use this cover of a 11.11%, this we are calling it as uniform loading what happens in front loading. If you see all those items for example earth work, concrete work, formwork.

I have multiplied with the higher cover, so average was a 11.11 but you can see earthwork itself I have loaded 22.22% concrete work I have loaded 13.89%. Formwork I have loaded 18.52%, brick work I have loaded 15.36% and reinforcement I have loaded 12.84%. So this is what is known as front loading what happens in back loading all those items which are to be taken up towards the end of the project.

I am loading it with the higher value, you can see 22.59 for plastering, 22.22 for painting and likewise aluminum work which is to be taken up towards the end. I have put 20.58. Electrical work I am putting 19.05 and likewise road works which is supposed to be taken at the end I am putting 20.83. So this is known as back loading, so depending on the strategy adopted by the contractor they can either go in for uniform loading, front loading or back loading.

In India most of the time people going for front loading because that way it helps in their positive cash flow, so what happens is if you apply more cover in the initial items you may have more money for less work that you have done, so for example if you have spent 80 rupees you might get 105 rupees from the client if you have front loaded. In some cases especially in countries where rate of inflation is very high they prefer back loading.

But not in case of our country, but you have to be where very very careful if you are contractor in applying this front loading. Because sometimes client make achieve specially for items which are very obvious. For example if you try to front load on a items such as reinforcement people will catch you. Because it is not very difficult to find the rate of reinforcement, so if let say the item is cutting, bending and time of reinforcement.

Anyone can call up let say sale or TATA to find what is the rate at which they can deliver at your site or you can talk to any sub-contractor who is into cutting and bending and time of this. They will easily tell you what is the rate for pattern, then you can add the cost of cover blocks and

binding wares**.** So, you know what is the likely reasonable cost of a reinforcement item. Now if you have front loaded it that too with the very high margin client will catch you.

And then they will precise you to lower your prices. So you have to be very very careful when you are going for front loading. So, in this particular lecture I have essentially told you about how to determine the bid price. Bid price is essentially consisting of your total cost and mark up, total cost is consisting of your direct cost+indirect cost or direct cost is again consisting of cost of your labor, material, plant, crew and sub-contractor likewise indirect cost consist of your overheads.

Common plant and equipment and common work man, when it comes to mark up it essentially consist of your profit overheads that is general overheads allowances for risk and contingencies. Ahh There are many factors on which this mark up depends we have seen all those factors. In the subsequent lectures we will discuss more in detail regarding how to go about all these things.

Once again I will try to take up some kind of a cases study, in that case it would be more clear to you. So we stop at this particular point, thank you very much for reference you may like to refer to these books, if you have any doubt regarding the availability of these books or if you want some more text books you can always write us, so thank you very much and see you some other time.