Principles in Construction Management
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Lecture – 37
Recent developments in contracting

[FL] and welcome back to the series of lectures on principles of construction management. And today we will concentrate a little bit on some of the recent developments and contracting. And what we will talk about is the FIDIC model or conditions of contracting, and the PPP and related definitions.

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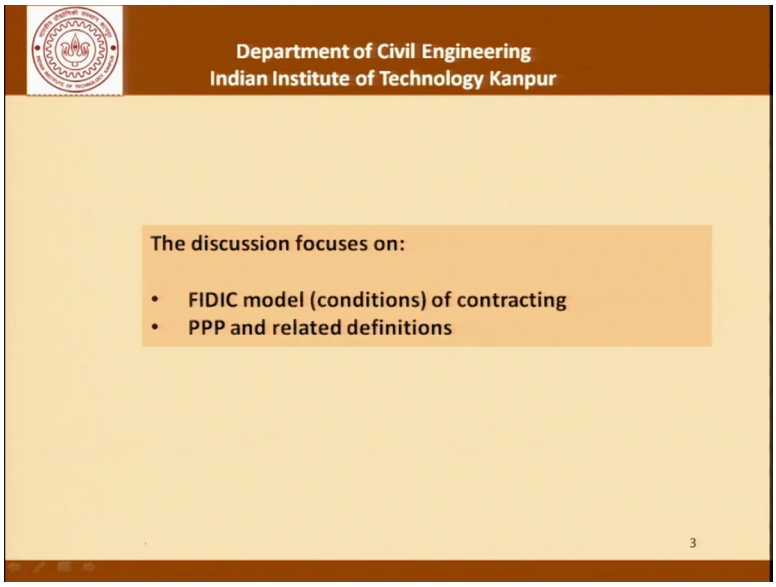

Both these issues are important from the point of view of modern construction. And as for as the FIDIC model is concerned, we will try to contrast it to the MES for the military engineering service which is one of the very commonly used central government general conditions of contract as for as India's concerned. And of course, you can take a look at CPWD another a specifications or contract conditions and you will realize that this is a more rational form of contracting, and why it is rational is something which will come to at that point in time.

Similarly PPP that is the private public partnership. And it is introduction in the infrastructure sector particularly has changed. The whole concept of contracting to the extent that the rules of the regulatory authorities the government contractors the

financing institutions have undergone substantial changes. And that has obviously, been reflected in the contracting conditions and that something which we will again look at very briefly and of course, possibly at some point in time later on we will talk about it in a greater detail in a separate module.

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So now coming to our discussion on FIDIC contracts. FIDIC is the international federation of consulting engineers this is the English translation of the professional body, which was founded in 1913 in Europe with a secretariat in Switzerland. The contract conditions is defined in FIDIC are equally suitable for use in domestic contracts it is not necessarily focused on international contracts or whatever.

Before 1999 FIDIC had 3 forms of building and engineering contracts. The red book for civil engineering construction the yellow book for electrical mechanical works the orange book for design and build contracts and in 1999 for new additional for published which are in use today. So, you can look at the FIDIC website and try to understand from the internet what those conditions are how the different books are written.

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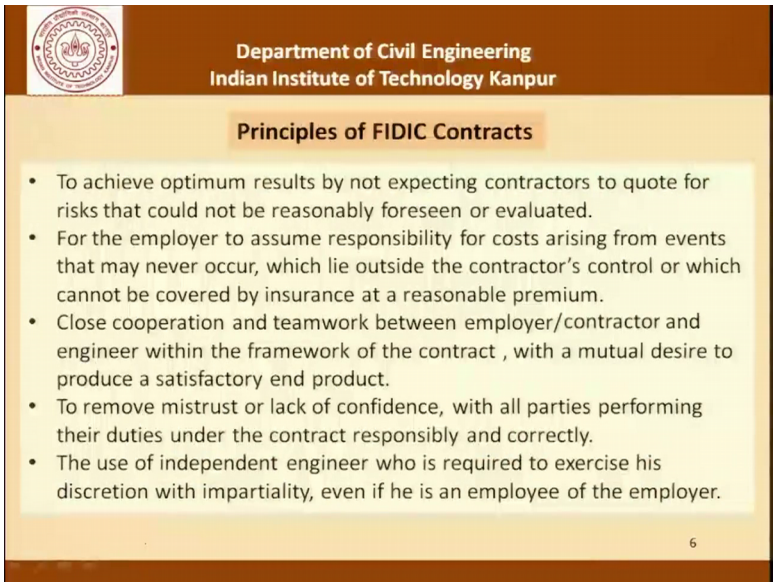

We will probably go through a little bit of the principles of FIDIC contracts in this slide to achieve optimum results by not expecting contractors to quote for risks that could not be reasonably foreseen or evaluated. See the basic thing is for us contacting is concerned is that So long as the task to be done is well defined. It is much easier to define it is much easier to carry out it is much easier to estimate the cost involved and so on.

The issue gets complicated when there is a risk. And if there is a fair allocation of risk between the contractor and the client the cost remains lower. So, long as the allocation of risk is fair, the cost can be looked upon also fairly. We must not expect that the contractor is doing the work for charity and therefore, if we try to pass on the risk to the contractor in an unfair manner what to an unfair extent unreasonable extent, then the quoted cost is likely to be higher or there is likely to be more litigation and so on. So, from that point of view if you examine the Indian contrast that we have been taking about the conditions of CPWD and so on, you will realize that they are quite one sided that is what is done away with when we look at FIDIC kind of contract. For the employer to assume responsibility for costs arising from events that may never occur which lie outside the control if the contractor or for which insurance cannot be taken at a reasonable premium.

It calls for close cooperation and teamwork between the employer and contractor, and the engineer within the frame work of the contract with the mutual desire to produce a satisfactory and product. It seeks to remove miss trust or lack of confidence with all the

parties performing the duties under the contract responsibly and correctly the use of our independent engineer whose required to exercise is discretion with impartiality even if he is an employee of the employer. So, basically the principles involved as far as FIDIC contracts are concerned is that there is a job to be done and all stakeholders come together and try to do the job professionally without being unfairly or unduly biased in one direction or the other. Now that is the relationship between the engineer the client and the contractor or the consultant which has been redefined as for as the FIDIC contract system is concerned.

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This slide highlight some of the features of the FIDIC contracts which have been identified by academicians and researches to be balanced, that is a fair apportionment of risks rights and obligations between the parties that is the stakeholders.

Its well tried that is it has a long case history from earlier contracts, accepted that it is known and recognized in wide use in international contracts supported that is recommended or required by development banks, effective in terms of clear and complete conditions time limits provisions for attribution and so on.

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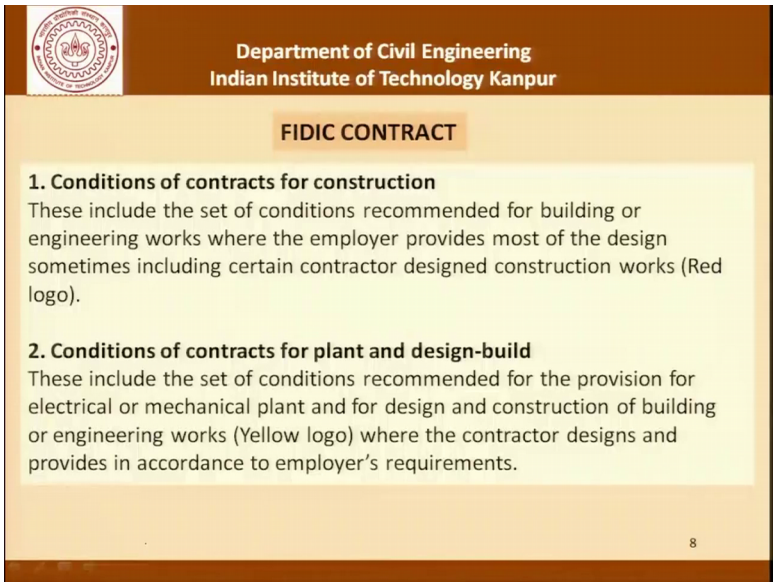

So, as far as the FIDIC contracts are concerned we talked about 4 documents which are presently available, conditions of contract for construction. These includes a set of conditions recommended for building and engineering works where the employer provides most of the design sometimes including certain contractor designed construction works. So, this is the first document the second document deals with conditions of contracts or plant and design build. These include sets of conditions recommended for provision for electrical or mechanical plant and for design and construction of building or engineering works which carries a yellow logo, where the contractor designs and provides in accordance for the employers requirement.

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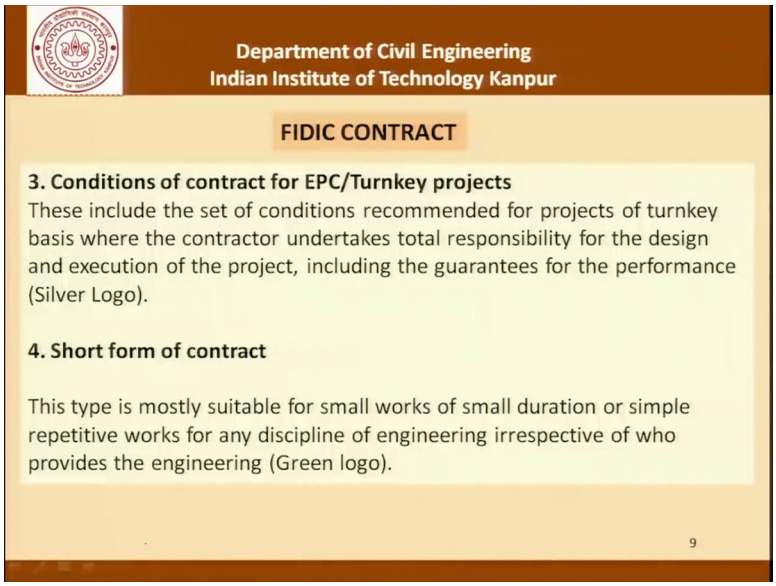

As for as the third division is concerned it deals with conditions of contracts or EPC or turnkey projects and these include the set of conditions recommended for projects of turnkey basis whether contractor undertakes total responsibility for the design and execution of the project including the guarantees for performance.

And the last one that is the short form of contract this type is mostly useful for small works of small duration, or simple repetitive works for any discipline of engineering irrespective of who provides the engineering and design having gone through these slides. Now let us try to go through a few examples of how the FIDIC contracts or the FIDIC contracting conditions compare with the MES contract or a general contract which is practiced in india most of the time.

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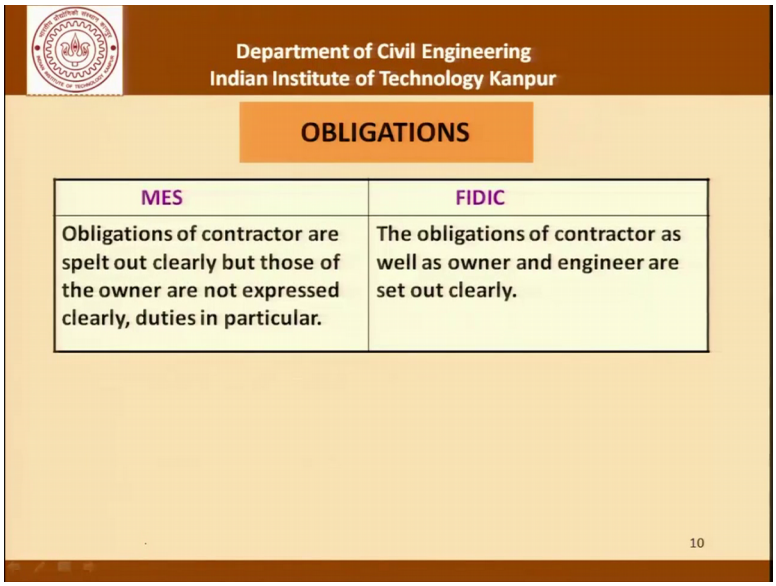

One of them; let us says the condition of obligations for the different stakeholders let us talk of 2 stakeholders the engineer and the contractor. So, as for as the mes contracts are concerned the obligations of the contactor are clearly spelt out, but those are the owner or not expressed clearly particularly the duties. It is not very clear as to what kind of duties must be owner perform to facilitate the progress of the work to facilitate that the contractor is able to continue the work in an uninterrupted manner.

Whereas in FIDIC contract the obligation of contractors as well as the owner and engineer are set out clearly.

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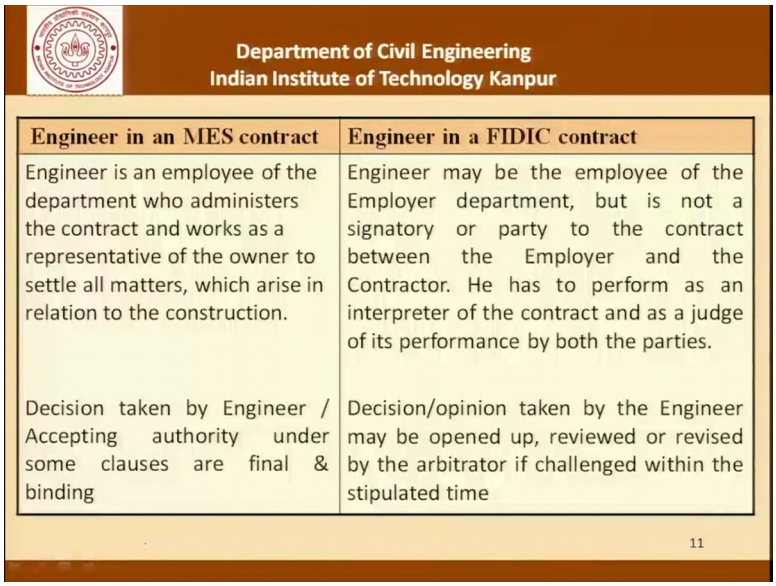

Now, let us try to look at the role of an engineer in an mes contract was at the role of an engineer in a FIDIC contract. Now an engineer is an employee veryt often of the department who administers the contract and works as a representative of the owner to settle all matters which arise in relation to the construction. And the decision taken by an engineer or the accepting authority under some clauses are final and binding as far as the contractor is concerned. This kind of condition is replaced by a text which is something like this which says that the engineer may be the employee of the employer department, but is not a signatory or party to the contract between the employer and the contractor. Thus he is expected to perform as an interpreter of the contract and has a judge of it is performance by both parties.

So, this is a very important deviation from the MES contracts. In the MES contract the engineer whose an employee of the client organization, and does not have the freedom to interpret the contract. Whereas, in a FIDIC contract the engineer has been recognized as an independent professional who has the right to interpret the contract in a fair manner. And the interpretation of contracts we have already talked about it how it is to be done. So, the engineer more or less exercises those kind of powers as for as interpretation of the contract is concerned. And as far as decision making is concerned the decision and opinion taken by an engineer may be opened up reviewed or revised by the arbitrator if challenged within the stimulated time. So, this final and binding clause which makes it

difficult for the contractor sometimes to work has been replaced by a much more software clause.

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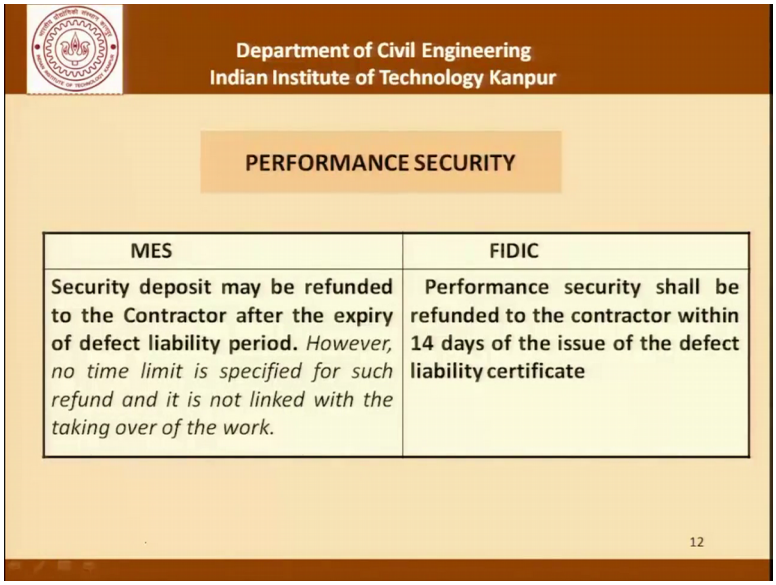

Coming to the item of performance security as far as MES documents are concerned, that usually we will stay the security deposit may be refunded to the contractor after the expiry of the defect liability period. But this does not is specify time limit within which the refund will be carried out whereas, the FIDIC contracts clearly state that the performance security shall be refunded to the contractor within 14 of the issue of the defect liability period.

We must remember that at the end of it the entire contracting process the entire process of construction management boils down to handling the cash flows the funds and of course, people and equipment and so on, but cash flow is a very important part of ensuring proper progress, proper quality, proper safety and proper schedules of the contracts. And if the cash flows are not proper if they are not timely it unnecessarily leads to difficulties as far as execution of the contract is concerned. And therefore, putting in timelines makes everybody a countable and if you do not follow the timelines it comes to non compliance and therefore, there are certain action that have to be followed.

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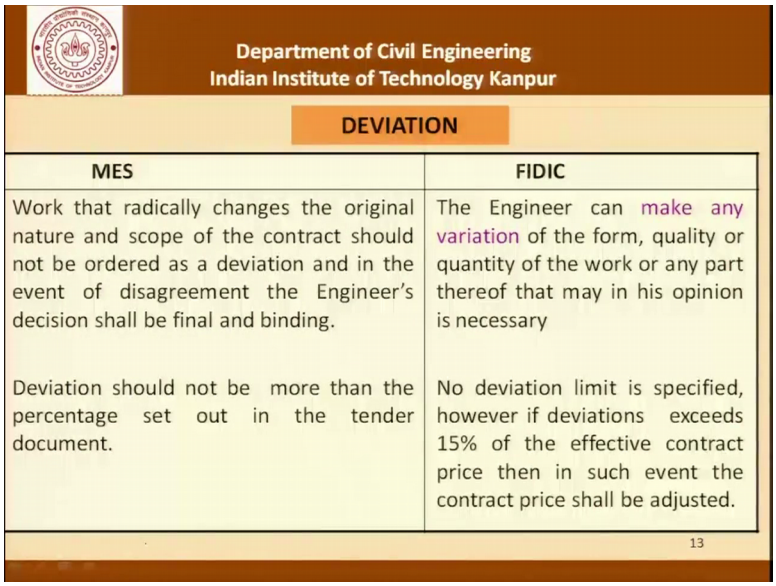

Coming to deviations as far as MES contracts are concerned the work that radical changes the original nature and scope of the contract should not be ordered as a deviation, and in the event of this agreement the engineers decision shall be final and binding the deviation should not be more than a certain percentage set out in the tender document. As far as the FIDIC is concerned it says the engineer can make any variation of the form quality or quantity of the work or any part their of that may in his opinion be necessary and no deviation limit is specified; however, if deviation exceeds 15 percent of the effective contract price when in such an event the contract price shall be adjusted.

So, if you go back to our example of the boundary wall they were places we had extra items and now you can imagine how the Indian conditions of contract, let us say MES would operate them or would execute them and how they can be executed in the FIDIC model. And I am show that you will realize that the FIDIC model gives you a more rational much easier path as for as handling deviations and extra items is concerned.

One very important thing that you should notice here is that in the case of a disagreement on whether or not. The changes being made order of radical nature or whether the change this scope of the contract in a radical manner. That decision has been left to the engineer and that decision is final and binding. No such condition is imposed as far as the FIDIC is concerned. The moral of the story remains the same the engineer which had a lot of powers or which has a lot of powers as for as Indian contract systems is concerned, those

powers have been drastically reduced as far as the FIDIC model is concerned. Keeping in mind the fact that after all the contractors are also doing a professional job and therefore, they should be given advocate opportunity and responsibility to execute the job in a manner that is the best taking over of completed works.

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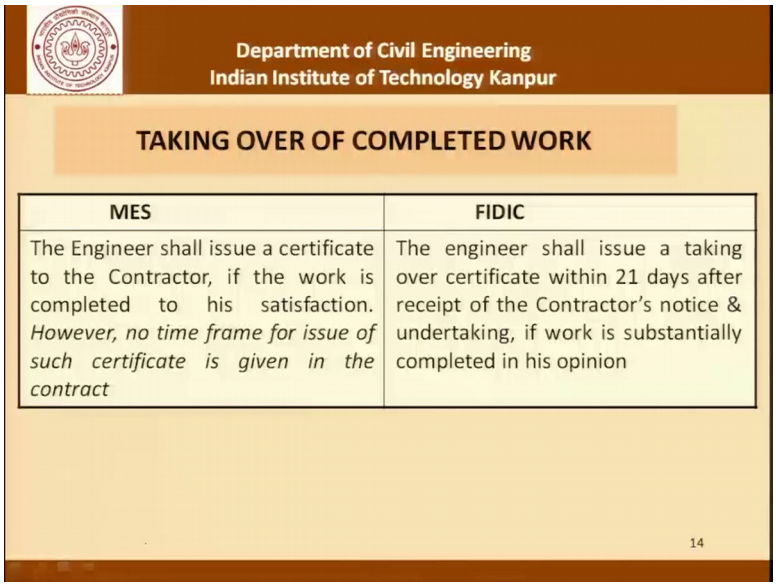

As far as the MES is concerned the clause say that the engineer shall issue a certificate to the contractor if the work is completed to his satisfaction.

But there is no time frame again for this issue of certificate as for the FIDIC conditions are concerned. It says the engineer shall issue at taking over certificate within 20 one days after the receipt of the contractors notice and undertaking if the work is substantially completed in his opinion. There is this substantial completion which is being mentioned here and I am living it you to as a home assignment to study what is substantial completion. And what is provisional completion that is an assignment that I am giving you, you please take a look at it and we will move forward as far as the discussion today is concerned.

So, with this we complete our discussion as far as the examples of clauses comparing MES and FIDIC is concerned of course, probably what I will try to do is had a few slide presentation and give you some more, comparisons on some other issues between the MES and FIDIC clauses, but for the time being as for as this class is concerned I think we will stop here and move to the next discussion that is on PPP models.

Now, before we get into a discussion of the PPP models let us recapitulate what the non PPP models or the traditional model of contracting set. We say that there is a client and there is this project which has to be completed, that contractor is the agency which is engaged to carry out this project which has been conceived and designed by the client.

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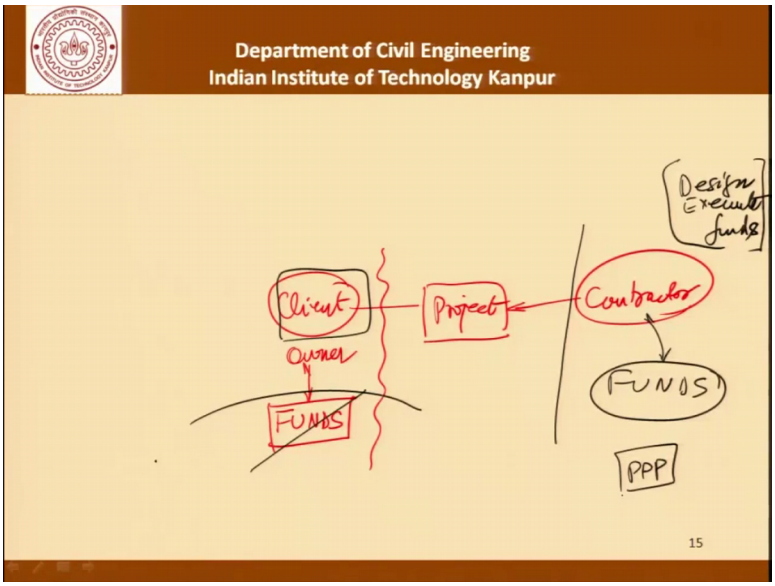

The client is going to be also the owner of this project. Now we have talked about it briefly in some of our discussion previously that there may be conditions in which the client may outsource the design also to the contractor and we have EPC contracts and so on. But the principle issue that is funds that always remains in the control of the client. The client is the funding agency. So, these funds is the client responsibility to arrange and no matter what happens as for as design and construction is concerned, the funds are provided by the client.

Now, if this constraint that the funds will be provided by the client is removed. And it is said that the funds will be arranged by the contractor then the whole ball gain changes. The client only defines the project or conceives of the project maybe designs it maybe does not even design it and leaves it to a contractor or a set of companies to design execute and fund the project. So, if these 3 functions are all outsourced then we have a very different model as for as contracting is concerned.

And that is what is the essence of PPP? So, with this understanding let us try to understand a little bit about the PPP models as far as construction industries concerned.

So, the PPP is the public private partnership it is a partnership between public and private sectors with clear agreement. On shared objectives for the delivery of public infrastructure and or public services especially in the transportation and power sectors.

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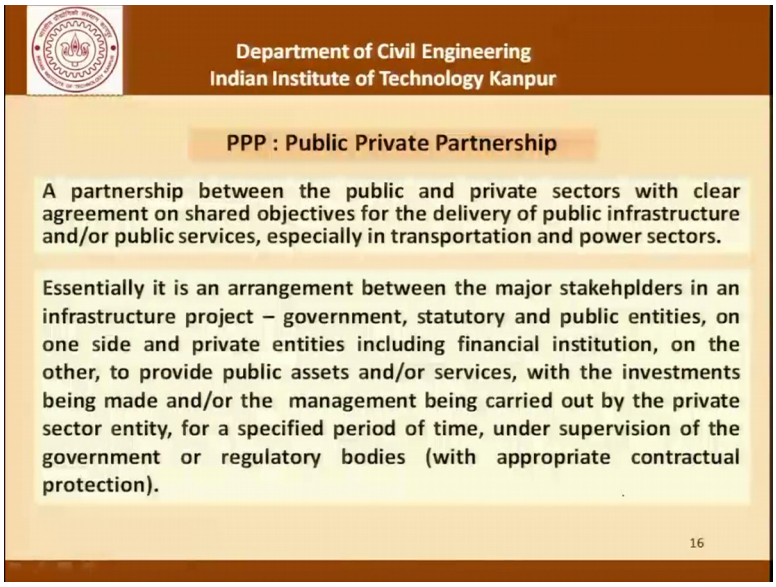

Now, why is transportation and power sectors the most simple areas in which PPP can be practiced. Because in both these sectors there is a huge initial investment whether it is roads or it is railways or it is airways there is a huge initial investment. And then after the facility is completed there can be a regular revenue which can be 4 seen to be flowing out of this specific use of only that particular infrastructure facility. So, if you build the high from 1 place to another that cost the certain amount of money to build, but beyond that point there is the possibility that through toll and so on.

Some amount of recovery can start similarly with a power sector setting up a power plant we will have certain amount of investment in initial investment going over certain number of years to build the power plant. And then by selling the commodity that you produce that is power that investment can be recovered. These features make these 2 sectors the prime targets to introduce PPP models. Now essentially PPP is an arrangement with images stakeholders in an infrastructure project.

The government the statutory and public entities on one side and the private entities including financial institutions on the other to provide public assets or services with the investments being made or the management being carried out by the private sector

entities for a specified period of time under the supervision of government or regulatory authorities with appropriate contractual protection. Now as for as the stakeholders and a BOT that is the build operate and transfer projects are concerned that is the simplest form of PPP the host government that is normally the government is the initiator of an infrastructure project and decides if the BOT model is appropriate to meet it is needs the government generally provides normal support for the project in some form it could be in the form of provision of land and so on.

Then there is the concessionaire and the project sponsors who act as a concessionaire create a special purpose entity which is capitalized through the financial contributions. So, this concessionaire is basically the role of a contractor plus a financer and then we will see there it becomes also the owner of the project for a certain amount of time.

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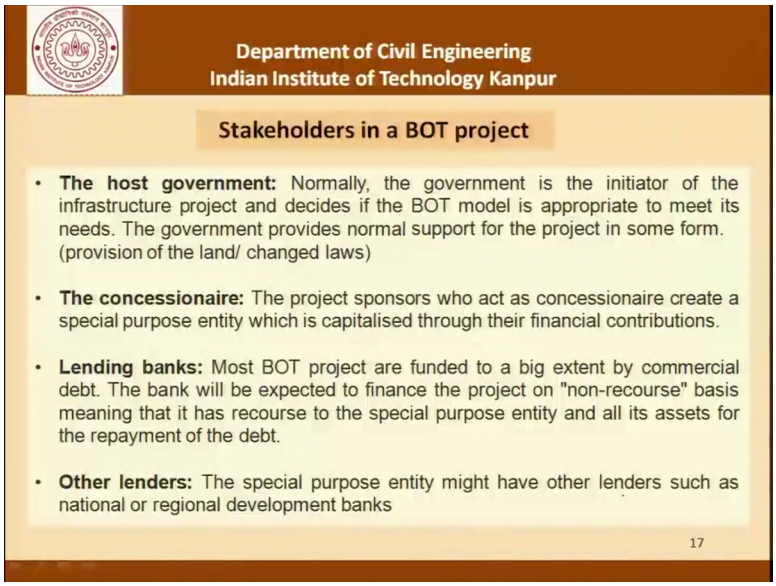

Lending banks most beauty projects are funded to a large extent by commercial banks. The banks will be expected to finance the project on a non recourse basis meaning that it has the recourse to a special purpose entity and all it is assets for the repayment of the debt. There could be other lenders involved that is this special entity might have other lender such as national or regional development banks.

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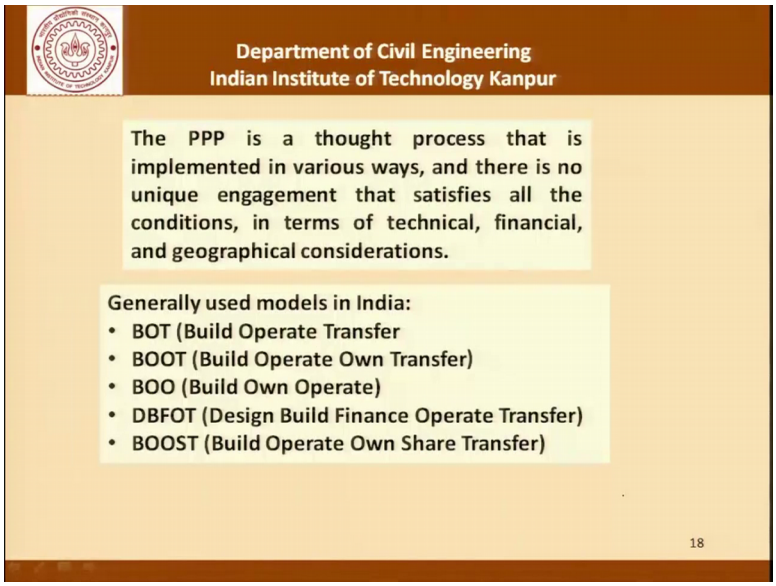

We must remember and I had like to emphasize Then the PPP is a thought process that is implemented in various ways. And there is no unique engagement that satisfies all the conditions in terms of the technical financial and geographical conditions. If a PPP model succeeds in 1 place does not mean that it will succeed in another place if it succeeds with one technology does not necessary mean that we will succeed with another technology.

So, it is a very complicated decision making, but that is possible because of the technical advancements that have been made in the recent years as far as engineering is concerned as far as our understanding of project management is concerned and so on. So, some of the models that have being used in India's for as PPP is concerned are listed here the BOT which is the build operate and transfer. The boot that is the build operate own and transfer. The BOO which is the build own and operate the DBFOT which is design build finance operate and transfer and boost which is the build operate own share and transfer.

So, depending on what kind of for modality is adopted as for as funding is concerned as far as the ownership, or a temporary ownership is concerned and at what point the transfer of the acid finally, takes place to the government. We can have any of these models. We must remember that finally, the public infrastructure belongs to the government belongs to the people.

It cannot be owned by the concessionaire for all the time. Even the temporary ownership of the concessionaire has to be governed by public loss, but the concessionaire has to be protected through contractual provisions, that radical and fundamental changes in the rules of ownership will not be introduced during the period of the concessionaire ownership. Because that is the period when the concessionaire is trying to recover the investment that they make through the financial institutions. So now, with that kind of a background let us move forward.

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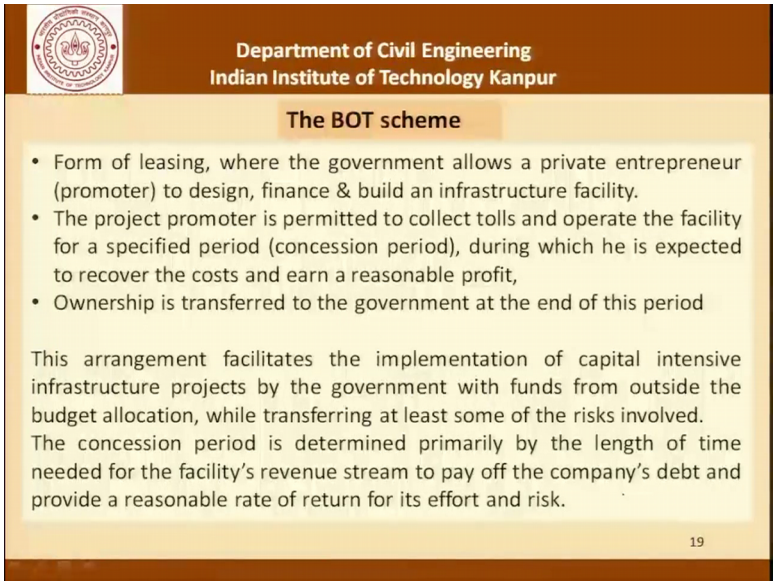

And as far as the BOT is concerned let us try to look at it once again it is a form of leasing where the government allows a private entrepreneur or promoter to design finance and build an infrastructure facility. The project promoted is permitted to collect tools or operate the facility for a specified period which is called the concession period during which he is expected to recover the costs and earn reasonable profit.

Ownership is transferred to the government at the end of this period and this arrangement facilitates the implementation of capital intensive infrastructure projects by the government with funds from outside the budget allocation, while transferring at least some of the risk involved. And the concession period is determined primarily by the length of time needed for the facilities revenue stream to pay off the companys debt and provide a reasonable return on the investment. As far as the efforts and risk are concerned what would be the acceptance criteria for the BOT projects?

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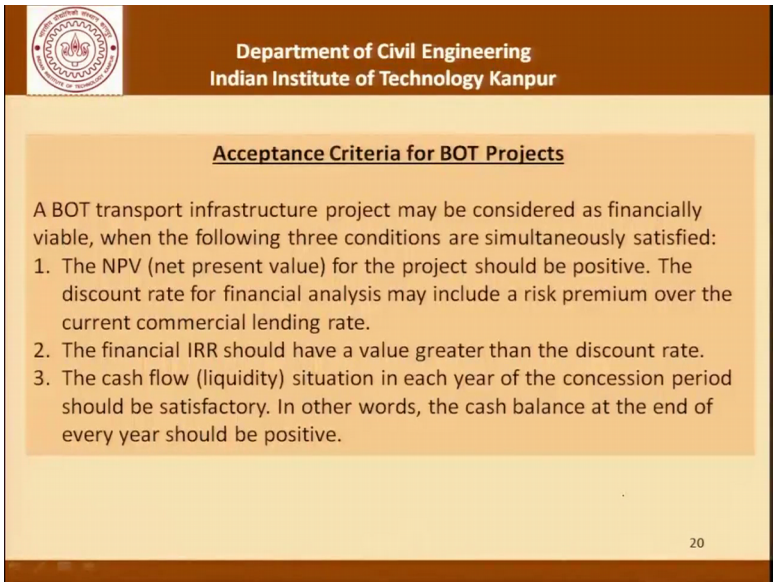

BOT transport infrastructure project may be considered to be financially viable when the following 3 conditions are simultaneously satisfied. The NPV that is the net present value we have done the calculations for that for the project should be positive. The discount rate for financial analysis may include a risk premium over the current commercial lending rate.

The financial IRR should have a value greater than the discount rate and the cash flow that is liquidity situation in every year of the concession period should be satisfactory. In other words the cash balance at the end of every year should be positive. These are some of things that we have covered when we are talking detail about the construction economics. As for as the advantage of BOT projects is concerned use of private sector financing is to provide new sources of capital which reduces the public borrowing and direct spending.

And which may improve the host government's credit rating ability to accelerate the development of projects that would otherwise have to wait for and compete for sovereign resources or government resource. Use of private sector capital initiative and know how to reduce the project construction costs, shorten schedules and improve operating efficiency. Allocation to the private sector of project risk and burden that would otherwise have to be borne by the public sector the government.

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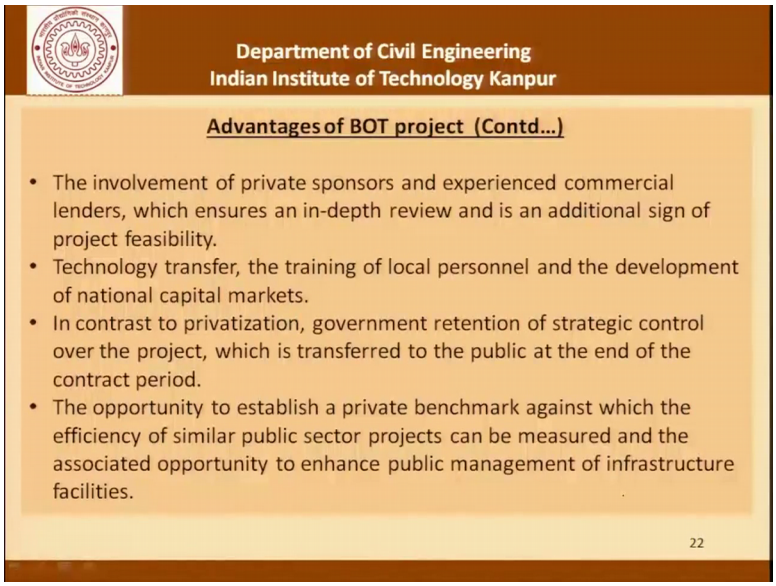

Involvement of private sponsors and experienced commercial lenders which ensures and in debt review. And is an additional sign of project feasibility, technology transfer the training of local personal and the development of national capital markets. In contrast to privatization government retention of strategic control of the project which is transferred to the public at the end of the contract period. The opportunity to establish a private bench mark against which the efficiency of similar public sector project can be measured. And the associated opportunity to enhance public management of infrastructure facilities.

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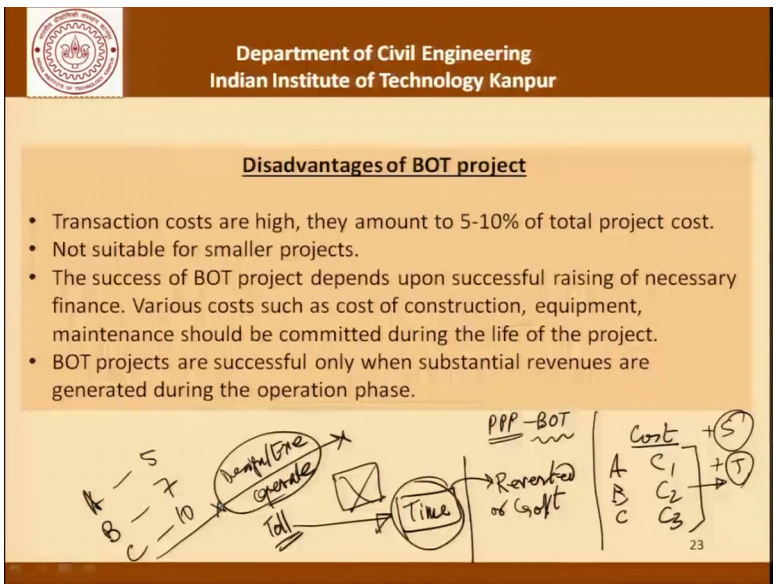

But of course, it is not only advantages there always 2 sides of a coin. And we have some disadvantages transaction cost or high and the amount about 5 to 10 percent of total cost. Not suitable for small projects the success of BOT projects depends on, successful raising of necessary finance, various cost such as cost of construction equipment maintenance should be committed during the life the project BOT projects are successful only when substantial revenues generated through the operation phase.

Now, let me ask a question. What do you think would be the model for a bidding process in this a scheme of things? In the traditional scheme of things the bidding was primarily done on the basis of cost. We asked contractors ABC or with putout the public beat and contractors ABC. They quoted cost c 1 c 2 c 3 in some way of form we try to find out which of these contractor supposed to be awarded the job. And the decision was primarily on the basis of cost of course, we have gone through examples when we said that there is going to be a composite evaluation we have cost, plus maybe safety or plus maybe technical ability that will be counted. But one of the very important components most cost. Now in this model that we have talked about which is PPP of the BOT is what we have talked about in greater detail, what would be the or what could be the bidding criteria.

One of the answers could be that well the government defines that this is a project which consists of building a road from this point to this point. Bidders are invited to submit a bid in terms of time. That is the bidders would design execute and operate this highway, collect the toll at that highway for a certain period of time before the facility is reverted to the government or the people. So, this time becomes the bench mark. The contractor if we have concessionaires a b or c somebody we will say 5 years somebody we will say 7 years somebody we will say 10 years. Now obviously, in this case what should be the decision? A situation where the facilities coming back to the government at the earliest is the bidder that will have an advantage. So, usually it will be decided on the basis of the least amount of time that the bidder wants to or the concessionaire wants the keep the facility with itself.

So, this is some of the things that we have as for as the biddings are concerned, as for the tendering process is concerned that this, but I do not think we will go into much details of that and I leave it to you to kind of figure out a little bit on your own. And if you have the interest there is enough literature available on the net to educate yourself.

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Now, we will continuing from BOT there are some other variations a couple of them. I would like to cover that is design build and operate that is DBO. In this a design and construction contract is linked to the operation and maintenance contract, and the service provider is usually responsible for finance in the project during construction. And the government purchases the asset from the developer for pre agreed price prior to or immediately after commissioning and takes all ownership risks from that time.

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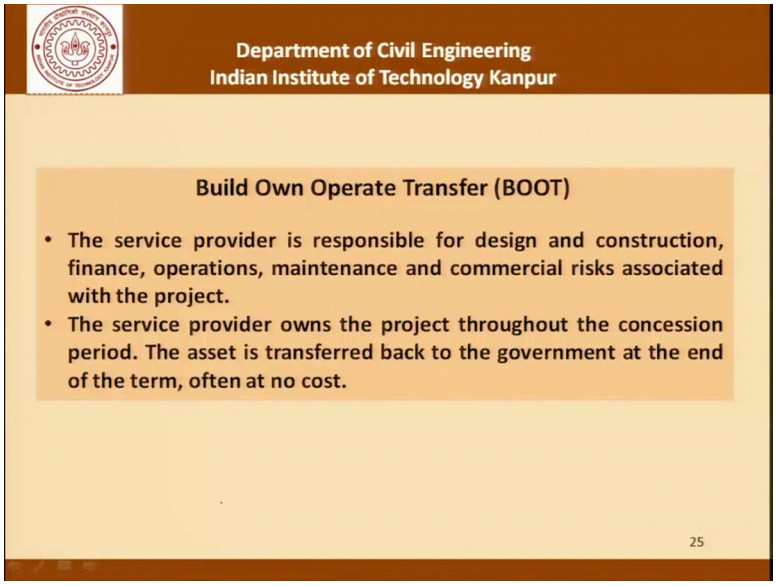

So, that is what is the features of our DBO, and continuing there is there BOOT where the service provider is responsible for design and construction finance operations maintenance in commercial risks associated with the project. And the service provider owns the project throughout the concession period and the asset is transferred back to the government at the end of the term often at no cost. I am not going into the details of the other forms of BOT or the PPP that we talked about and I will leave it to you to do some. Soul searching and homework on your own and we come to the references which will help you understand the subject matter slightly better, and I look forward to see you once again in a subsequent discussion.

Thank you.