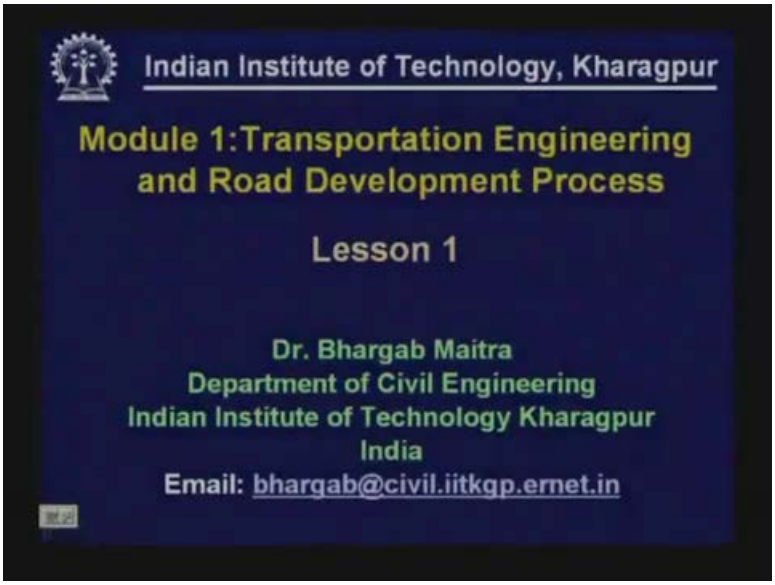
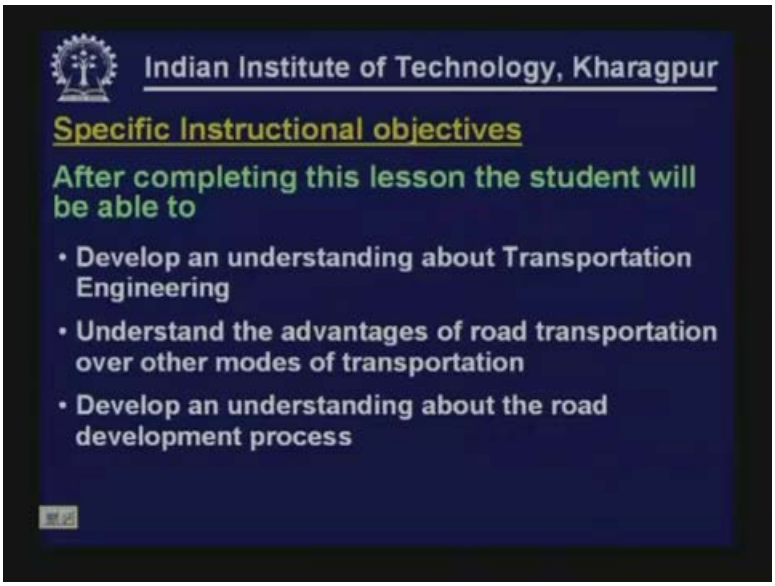
Introduction to Transportation Engineering
Prof. Bhargab Maitra
Department of Civil Engineering
Indian Institute of Technology, Kharagpur
Lecture - 1
Transportation Engineering and Road Development Process

(Refer Slide Time: 00:59)



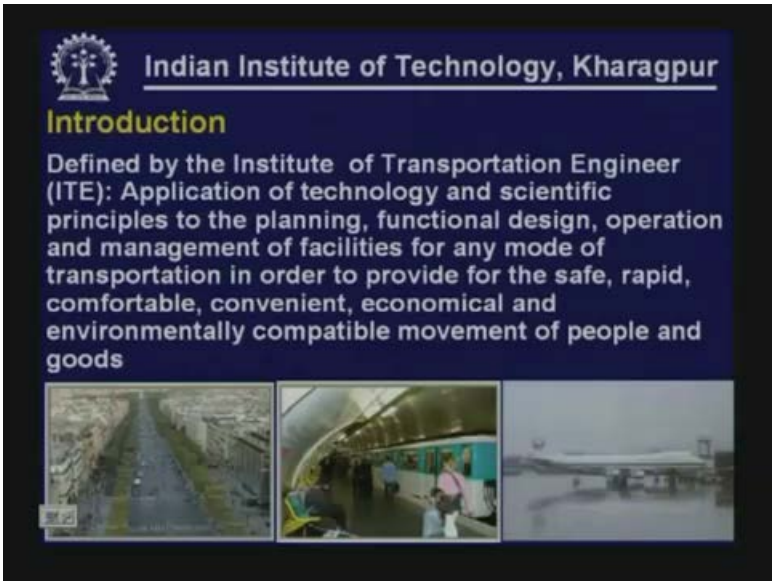
Welcome, this is module 1, transportation engineering and road development process. There is one lesson under this module.

(Refer Slide Time: 01:12)



After completing this lesson the student will be able to develop an understanding about transportation engineering as a subject. They will be able to define and understand the scope of transportation engineering. The student will be able to understand the advantages of road transportation over other modes of transportation and the student will be able to develop an understanding about the overall road development process.

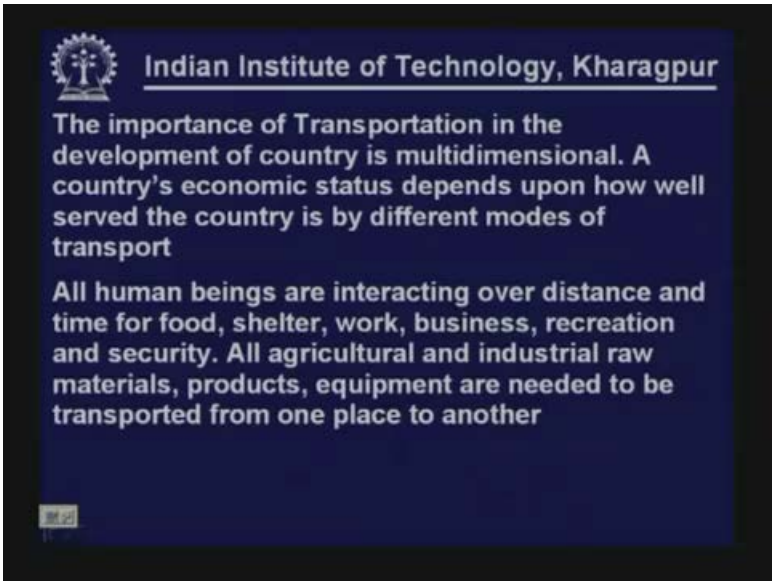
(Refer Slide Time: 1:51)



To start with transportation engineering is defined by the institute of transportation engineers popularly known as ITE as follows:

Application of technology and scientific principles to the planning, functional design operation and management of facilities for any mode of transportation in order to provide for the safe, rapid, comfortable, convenient, economical and environmentally compatible movement of people as well as goods. So one way it covers planning, functional design, operation and management. It takes into consideration different modes of transportation. Look at the aspects like safety also their comfort convenience and due consideration on environment aspects and it includes both movement of people and goods. So here you can see that in this photograph it indicates road transportation, this is an example of rail transportation, here it is an example of air transportation. Now the importance of transportation in the development of a country is really multidimensional. We normally say that the economy of a country rolls on transport. Transport is a major factor that can boost the economic development of a country.

(Refer Slide Time: 04:03)



We all know that all human beings are interacting over distance and time for food, for shelter, work, business recreation and security. We need to transport agricultural and industrial raw materials and also the finished products, equipments and that's why the need for transportation arises. So there is a special distribution of activity. People stay somewhere they need to go to various places, raw materials are produced somewhere, processed somewhere else, the market is again at different places and so on. So the special characteristics generate a transportation demand or travel demand for passenger traffic.

(Refer Slide Time: 05:04)

If you look at the development facilities it is really a cyclic process, that's what I am trying to convey. When you are trying to develop an area you go for initial planning then you carry out preliminary design, then once you screen alternatives take the best one and then go for detailed engineering design and then once the detailed engineering design is ready you can go for construction, once the facility is constructed it is used for the transportation of people and goods so operation takes place, over a period of time the demand grows the transportation demand grows the facility may get congested and additional demands will get generated so again you need to go for planning and this cyclic process continues.

So development or planning or whatever you say it is not a one time job, it is essentially a cyclic process, you develop facilities and for developing facilities you need for planning, you carry out preliminary engineering, screen the alternative, take the best possible option and then carry out a detailed design, construct it, put the facility for use and then over a period of time again operation problems will be there, demand will get generated, additional demands will come, demands will grow otherwise also so there will be additional demand for facilities so again you go for planning accordingly you keep adding facilities which should be compatible with the growth. So this is essentially a cyclic process.

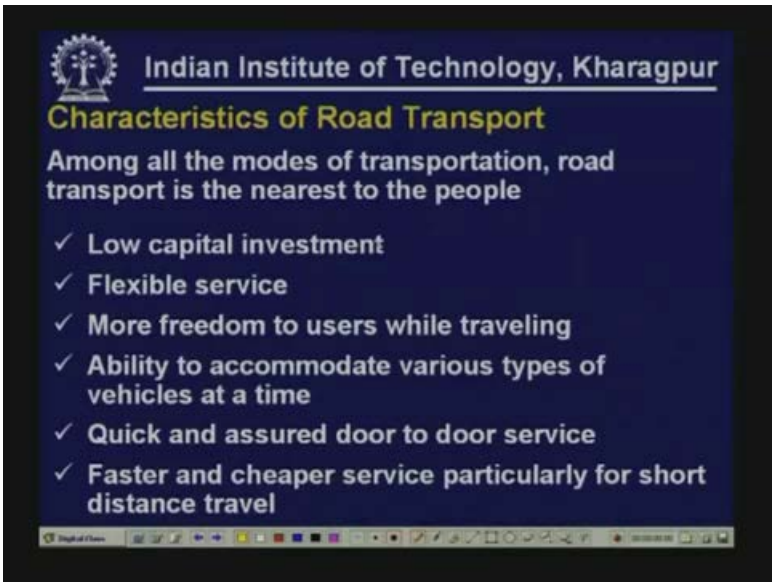
(Refer Slide Time: 07:11)

Now let us look at different modes of transport:

As I have already indicated it is necessary to consider the movement of passengers as well as goods. People are required to move from one place to another place, goods are also required to be transported from one place to another place so there are different modes of transport. Say for example the railways a popular mode of transport, under railways also you have surface railways, underground railways, elevated railways, then you have road transportation or road based transportation, you also have air transportation, you have water transportation, you also have sometimes ropeways also we use pipeline transportation. So there are wide variety of modes that can be used for transportation of persons or transportation of goods.

Now obviously in this course our focus is on road transportation sector. So primarily we talk about road transportation sector, we discuss about various aspects around road transportation. So although there are different modes of transport our primary focus will be on road transportation. With that background let us try to look at road transportation sectors. Among all the modes of transportation road transportation is the nearest to people for various reasons because of low capital investment these are all relative terms because we are generally making a comparison.

(Refer Slide Time: 09:01)



Of course it varies a lot, depends on what type of road you are talking, if you are talking of high speed facilities then it may be a very good quality road, it may be very expensive. So it also depends on what type of roads you are talking. But this is a general comparison, generally we can consider road or road transportation as low capital investment. Road transportation offers flexible service, they offer more freedom to users such as while traveling you can stop or you can go, they have the ability to accommodate various types of vehicles at a time, it is the same road space that is shared by a number of vehicles so different types of vehicles are sharing the same roads space for movement, it offers quick and assured door to door service.

Remember that we have other modes of transportation which are even faster say air transportation even the rail transportation. But rail transportation cannot offer door to door service. Air transportation cannot offer door to door service so that's another distinct advantage of road transportation. It offers faster and cheaper service particularly for short distance travel, if you consider very long distance travel that is travel between two countries then road transportation may not be a feasible option so there may be air transportation is faster. Even you consider big country like India from one corner to another corner it's a substantial distance so one may find that rail transportation is more suitable. But generally for short medium range travel and door to door service that it provides road transportation definitely has got distinct advantages.

Now let us try to see or try to understand the scope of highway engineering because as I indicated transportation really is a major factor which can accelerate or which can influence the economic development and growth of a country. It has got a very big impact on the development process. And since our concentration is more on road transportation road transportation has also got distinct advantages and with all this understanding the government and other bodies have realized the need for road sector or the importance of road sector, accordingly countries like India have taken up massive road development projects. So, essentially concentration is on road sector and more precisely on highway sector.

(Refer Slide Time: 12:22)

So let us look at the scope of highway engineering, or high development projects which includes planning and location of facilities. It includes alignment selection and geometric design. Once you have decided the alignment and decided the geometrics or designed the geometric component one has to go for payment design so this is a very major aspect of the overall work along with geometric design and alignment selection. Remember, that pavement constitutes about 40% of the total highway project cost on an average. It depends on what the terrain condition is and what is the soil condition, what types of roads we are talking about and so on. But generally it constitutes about 40% of the total project cost so this is a very important aspect.

Then we also have to look at the materials that are to be used for road constructions, what type of material, conventional material or any new type of material and also look at the construction technology aspect, how we construct road, how we produce better quality of construction faster construction and then obviously the maintenance aspect of the road this is also very important. Because for whatever you have constructed over a period of time you will require maintenance so the factors you need to look into will include the following: what should be the maintenance strategy, what should be the process for maintenance, how we maintain the roads, at what interval, what else we are about to do and so on. Then once the facilities are developed then comes the traffic operation and its control.

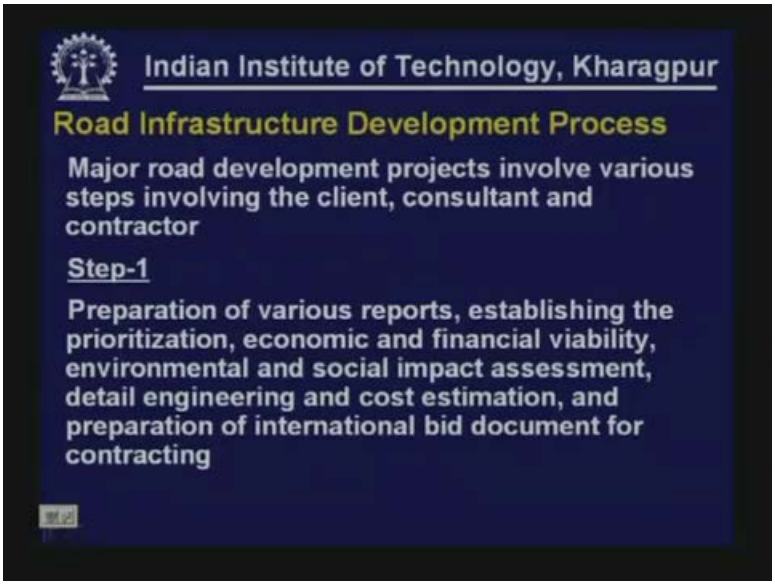
This is again another aspect. We want to create facility but at the same time we want our facility to operate at maximum efficiency. so given the supply, given the infrastructure we have to find out how best we can make use of the available infrastructure through efficient control on management system. So traffic operation and control has a very big role to play in the overall context. Then we have to look at the economic aspects finance and administration, all is important. In terms of road development we have to think about from where the funding will come so finance is an important part, the administration part of it is also important and we have to give due emphasis on environmental and social impacts. We must not carry out road development projects at the cost of environment. So certainly it will be called development when

we can make safe and efficient movement we can ensure safe and efficient movement without degradation to environmental quality. That means protecting the environmental aspect that's and that is very important.

Now as I have already mentioned India and many other countries have taken the road development projects in a massive way. So much emphasis is there now on road development projects; so many ambitious road development projects have been formulated. Particularly I am referring to the projects which are taken up in the recent time for making better quality national highways and also state road projects are taken up to improve the state highways and national highways.

Of course you have not learnt the functional classification but generally I am referring to highways where traffic uses the facility particularly for long distance travel. So in the context of road development or in the modern year road development we need to know how the road development is really done. We need to understand the overall process of road development and that's a major emphasis of today's lecture. The lesson is on developing and understanding the overall road development process particularly highways.

(Refer Slide Time: 17:02)



If we see, major road development projects involve various steps, it involves client, consultant and as well as contractor. Many of you are familiar with this term, what you mean by client? In India may be the upgradation of national highways is done by national highways authority of India so we can call the national authority of India as a client. They ask for technical help from consultants. A number of engineering consultant firms that are working they provide or help the client by making the design, making the project report and all other supporting documents. Once all those things are done the contractor is also important, they are also involved because they actually execute the construction part of the project. So it involves number of steps and also it involves the client, consultant and the contractors.

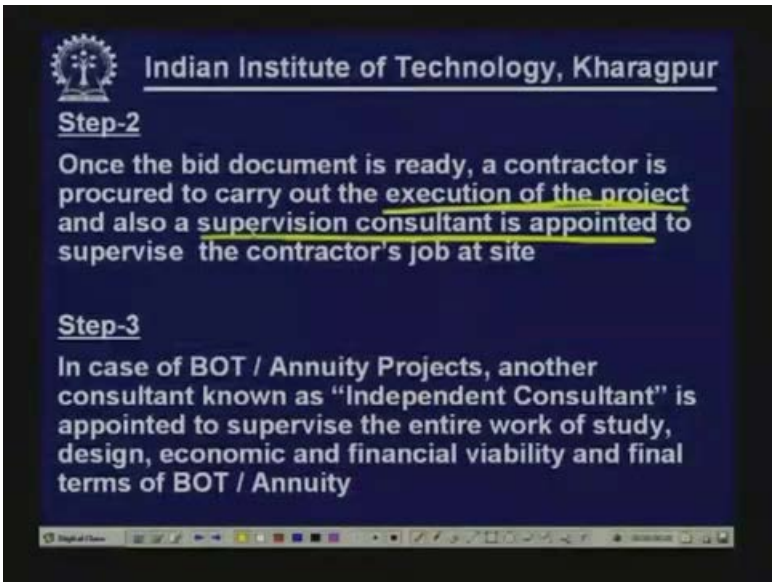
I will describe the overall road development process in three broad steps. There will be essentially three broad steps through which I will try to explain it. Let us look at step one. it includes basically preparation of various reports including establishing the prioritization because certainly you may have several thousand kilometers of road which needs upgradation. You cannot take up ten thousand kilometers of road in one year due to physical constraints, due to man power constraints and all other supporting logistic constraints so you need to prioritize the road. You prioritize it, one needs to check the economic and financial viability, do the environmental and social impact assessment then after preliminary screening and PPR go for detailed engineering, need to carry out the cost estimation and then preparation of international bid document what is commonly known as ICB document.

Hence up to the preparation of document we can consider it as step one. That means by the end of step 1 everything has been decided as to which road to be taken up and all other options have been studied, we have selected the best one, we have checked the economic viability of the project, we have ensured the environmental protection part of it related to road development, for every element the detailed design is ready, drawings are ready the report is ready and it is now ready for construction, we can go for construction.

Step 2: Once this bid document is ready normally a contractor is procured or appointed to carry out the execution of the project so now the execution part comes. Whatever we have described in step one all the detailed engineering, drawing and everything is known as to how it is to be constructed. Thus the contractor will carry out part of the project in terms of construction and also at this stage for bigger projects a supervision consultant is appointed basically to supervise the contractor's job and site, to provide additional and technical support, help and cooperation to contractor may be some changes might have occurred in the area, some changes may be necessary in the design so the contractor also gets the support from the supervision consultant. Therefore minor changes in the design, in the drawing may be necessary at this stage.

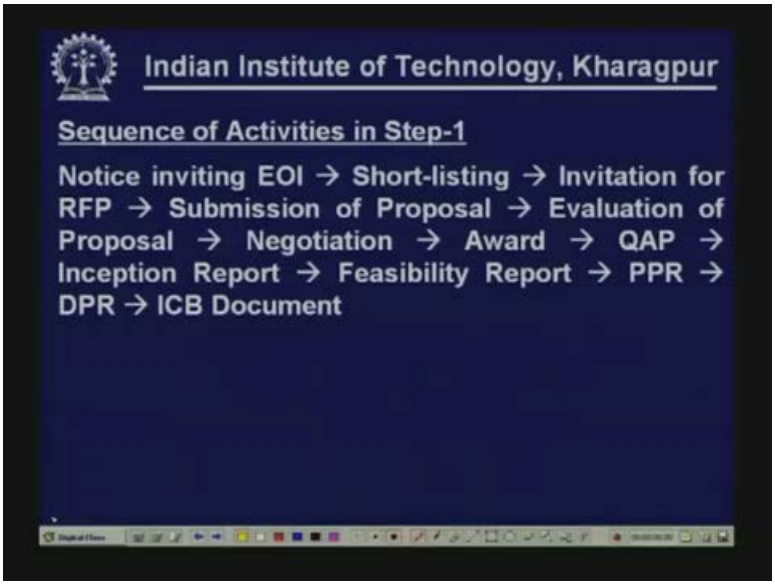
Step 3: In case of BOT or may be annuity projects with modern road development the concept of BOT projects are also gaining popularity what we normally say the tool roads there are many structures of BOT but BOT we normally refer to as Build, Operate and Transfer so private operators private investors are encouraged to invest in road sector through this mechanism so for this kind of BOT or annuity projects another consultants are appointed they are known as independent consultants. They basically supervise the entire work of study including the design carrying out the economic and financial viability, deciding the final terms of BOT, annuity, etc.

(Refer Slide Time: 22:11)



Although we have described three steps our focus will be primarily on step one. Now let us look at the step one particularly the sequence of activities in details.

(Refer Slide Time: 22:25)



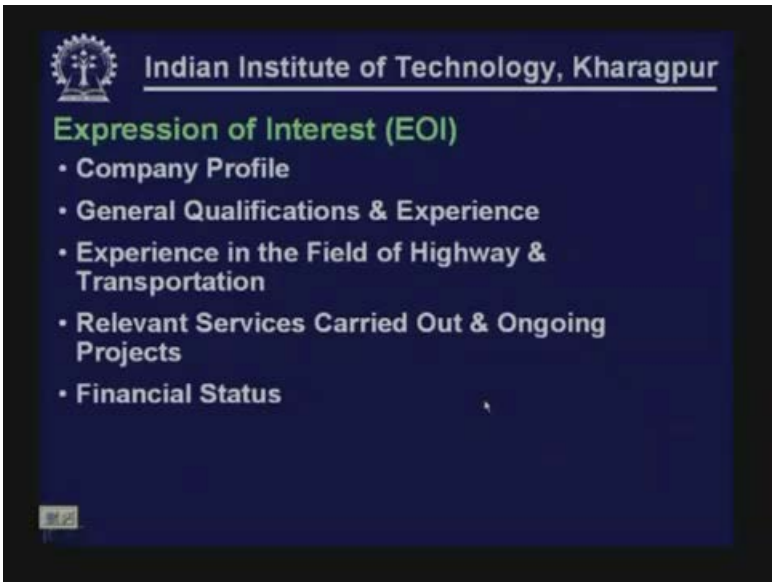
It starts with notice inviting, Expression of Interest etc. We will describe each of these steps then number of consultants they express their interest for their project try to show the capability for the project then the client carries out short listing may be twenty consultants applied so they may decide okay we will pickup five and six the best in the lot and they will only submit proposals for further consideration. So this issue invitation for RFP Requests For Proposals, based on RFP

the selected consultants submit each proposal then the proposals are evaluated and the best one is selected. Then the client goes for negotiation and then finally the contract is awarded.

Once the contract is awarded to the consultant the first thing the consultant normally does is he submits the Quality Assurance Plan QAP then prepares the inception report and submits it and carryout the feasibility study and submit the feasibility report and then submit the PPR Preliminary Project Report then carry out the DPR detailed engineering and submit the Detailed Project Report and finally prepare the ICB document. That's a typical flow activity not that for every project it has to be exactly the same but what I am trying to indicate is this is a typical project. I have tried to indicate all the steps we do in a typical project. So EOI, short listing, invitation for RFP then submission of proposal, evaluation of proposals, negotiation, and final award of contract up to this it is selecting a particular consultant most suitable one for carrying out the job.

Then what the consultant does is prepares QAP Quality Assurance Plan, inception report, feasibility report, preliminary engineering and submit PPR and carry out detailed engineering and submit DPR Detailed Project Report and finally terminates with the preparation of ICB document. Now let us discuss about each of these activities in detail.

(Refer Slide Time: 25:02)



First let us discuss about Expression of Interest.

Whenever a project is there, for a big project may be highways have to be upgraded. So the consultant will put it in media and it is known to others that the government or the client is taking up a project and they say that they might invite all interested consultants to apply to show their interest. If they are interested in their project if they have to their interest to the client by submitting a document what is called as Expression of Interest. By the name itself you can understand it is Expression of Interest to show that you are interested to carry out the work or a group or consultant is interested to carry out the work. Once they submit the document they have

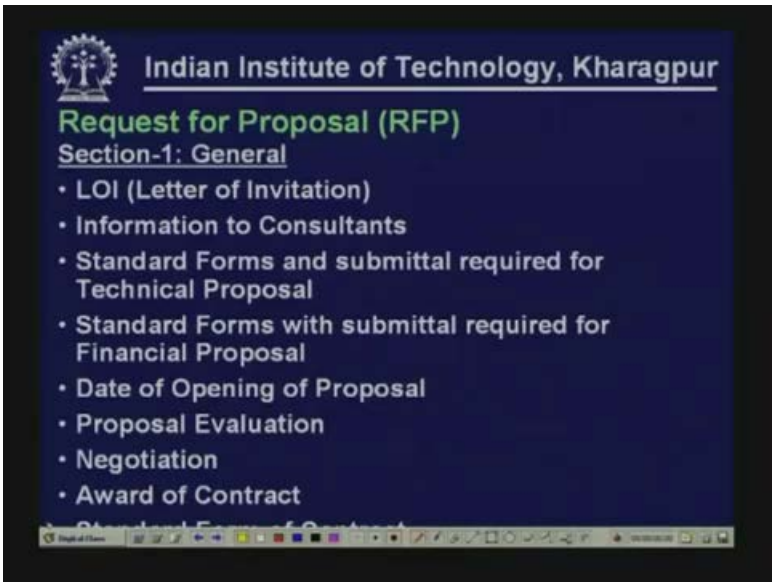
to show their interest based on credentials. So again I am not trying to give a comprehensive list of items but only trying to touch some of the major items what normally are included in the Expression of Interest. Let us now look at those things.

It gives an idea about the company profile, like what is the man power, what are their areas of interest in work, what are the types of services they work with and then general qualification and experience, what kind of stuff it has, what kind of experience the company has then what is the experience in the field of highway and transportation engineering road in general.

I am mentioning all these things keeping in mind the highway transportation engineering projects so they have to say what is their experience in the field of highway and transportation engineering, and tell about their ongoing projects, what is the type of project the government or the client has put up, what is the experience of the firm specific to that kind of project apart from general highway transportation engineering project and they also have to indicate their financial status.

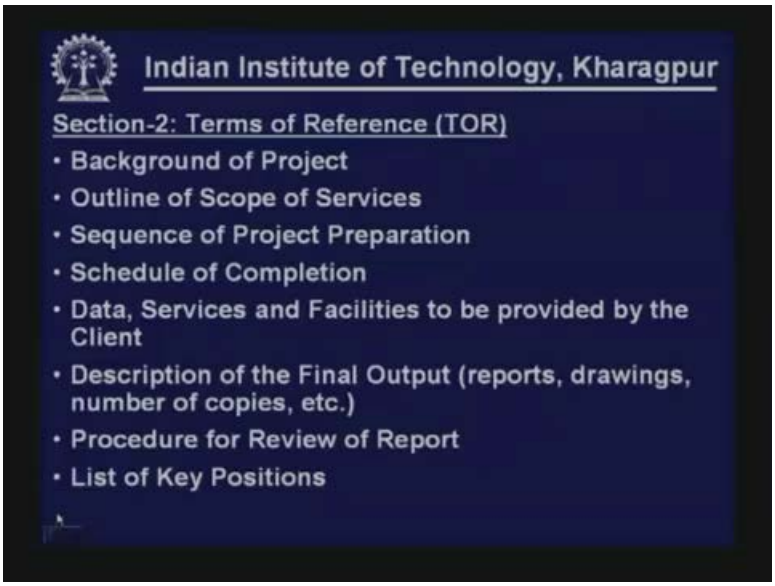
The whole purpose is you include all the papers showing a background of the company saying that, yes 'C' company provides services in this area, you document it saying about the works you have carried out in the related area and also in the area specific to this kind of project, what is the man power available, the different specialists available with you or with the organization and also one has to include the financial status that is also to be reported. So all this material will go together under one cover known as Expression of Interest and that will be submitted to the client and the client after receiving this Expression of Interest from number of consultants they will go through the documents and they will pick up some numbers may be 4, 5, 6, 7 or whatever it is and once they get convinced then it means everyone has the potential to carry out the job. Hence among all the people or among various companies who expressed interest for the work the client may pick up some four or five consultants where they think that they are the best in the lot and to them the client will issue the RFP. That means only those consultants will be allowed to submit a fully fledged proposal. So the client will indicate or send a letter of invitation and the whole RFP document only to selected consultants. That's what an RFP document is.

(Refer Slide Time: 29:31)



Normally it has got two sections. Section one is general includes the letter of invitation. We have the general information to consultants, it gives the standard forms and submittal required for technical proposals, standard forms with submittal for financial proposal because normally technical and financial proposals are submitted under different covers. So one will be technical proposal and the other will one will be financial proposal. So there will be two different proposals under two different covers. So if say all the formalities and the requirements of technical proposals and also in which form the financial proposal to be submitted all the forms and [not audible 30:18]. It also indicates the date of opening of proposals, the process for proposal valuation, the process for negotiation, award of contract and it also includes normally the standard form of contract.

(Refer Slide Time: 30:33)



Part 2 or section 2 is known as terms of reference. This is a very crucial component in any crucial project because if the TUR is specific the project will run smoothly. For every project it is absolutely necessary that the TUR remains very specific and clear and does not have any ambiguous statements or should not keep any gray area. The more precise you are the more comfortable will be the execution part of the project. It will run smoothly and comfortably.

TUR includes background of the project. It outlines the scope of the service which is a very important component, it has to be very specific, the consultant should know very clearly from the client what is the exact scope of service, what is the exact or what are the exact works that the client is expecting and how the consultant should carry it out. Then it tells about the sequence of project preparation, the schedule of completion, how much time is required for any type of activity, it also tells what data services and facilities the client will provide to the consultant, it describes the final output precisely which is again very important, what are the reports that the consultant have to submit to the client, how many copies of the report or how many copies of the drawings and so on should be mentioned very precisely.

If really a TUR is good all this formation should be given with clarity and without any ambiguity. Then it also should indicate the procedure for review of report and it tells what are the key personnel or key positions that are required for carrying out the project. Suppose it is a highway project then in most of the cases TUR would itself say what are the key personnel required for the project, what are the key positions and key staff requirement. Obviously there will be junior support staff who will also get involved in the project but they will clearly like to see you mention the key positions.

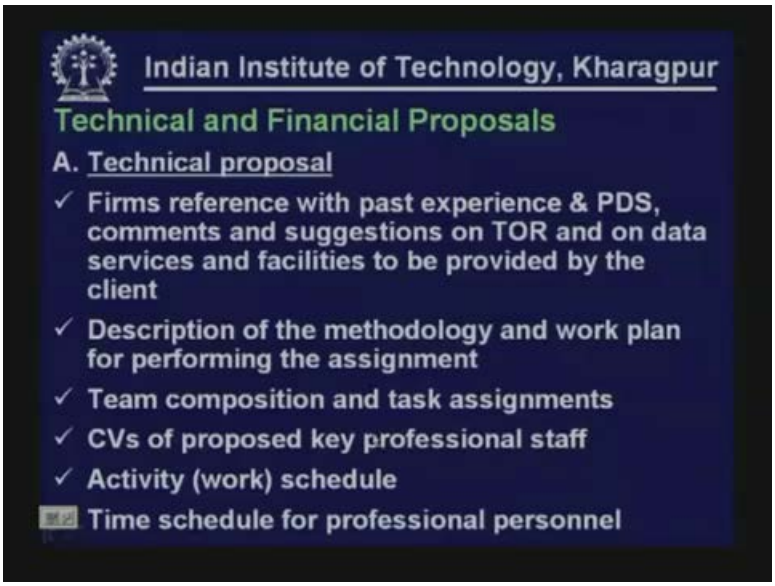
(Refer Slide Time: 33:16)

Now let us look at the key positions for a typical highway project. This is a typical key staff composition and it is not that for every project it will be the same but it also depends on the other aspects that are important for the project so some key positions may be there. In some projects some key positions may be omitted but in another project may be the time duration also may vary for different key positions but this is just an indication. It includes senior highway engineer cum team leader. There will be one team leader responsible for the overall project and normally he will be a senior highway engineer. Then you have deputy team leader in some cases who is also a highway engineer, then you have pavement specialist sometimes under senior pavement specialist and pavement specialist, then you have bridge specialist again it may be senior bridge specialist and bridge specialist.

Sometimes if foreign experts are necessary then senior bridge specialist may be a foreign expert and bridge specialist may be a domestic expert or may be senior payment specialist may be a foreign expert and payment specialist may be bridge experts and likewise indications may be given. Then traffic engineer is another key position then material cum geotechnical engineer, senior survey engineer, survey engineer, transportation economist to carry out the economic evolution of the project, environmental specialist to carryout AEF of the project then resettlement specialist to look after the resettlement and the rehabilitation aspect of the project.

So it is quite interesting to see that you have essentially all specializations of civil engineering and even beyond that. You have highway engineer, you have pavement engineer, you have traffic engineer, you have structural engineer, you have the bridge engineer, you have geotechnical engineer or specialist, you have environmental specialist, you have survey engineer, you have a transportation economist, you have resettlement rehabilitation experts so it is completely a team activity or a group activity including all different specializations of civil engineering and also it goes beyond that.

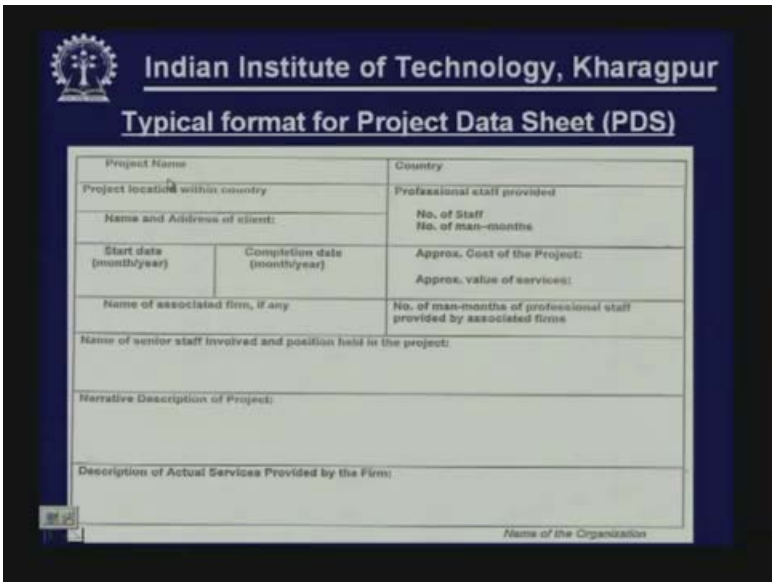
(Refer Slide Time: 35:56)



Now let us look at the technical and financial proposals.

Technical proposals as I have already told technical and financial proposals are submitted separately under two separate covers. Technical proposals normally include firm's reference with past experience & PDS. If the consultant has got any comments and suggestions on the terms of reference and on the data, services and facilities to be provided by the client that also should be included. It should include description of the methodology and work plan in detail, team composition and task assignments, what are the people you are appointing and what work they are supposed to do includes the task assignment, then the CVs of the proposed key professional staff for all the key position one has to provide the CV in required format, it should also include the activity schedule how the different activities are planned and time schedule for professional staff. For different staff what will be the time they work in the project, the project may be for a twelve month duration but the traffic engineer may work only for two months, a transportation economist may work for one month during which period they will work either full time or part time and sometime may be they will work continuously and for some time they may be working partly so all these things should be included.

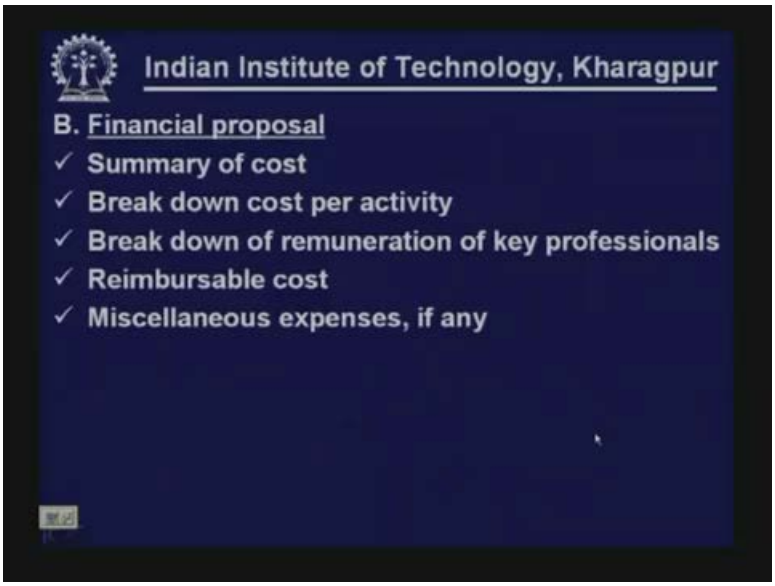
(Refer Slide Time: 37:22)



I am showing a typical data format for project data sheet that is given, this is just an indication, you can see it includes the project name, the country whose assignment has been carried out, project location within the country, number of professional staff provided, start date, completion date, approximate cost of the project, approximate value of service, name of the associated firm if any, number of man months of professional staff provided by the associated firm, name of the senior staff and position held in the project, narrative description of the project and description of actual services provided by the firm.

So in one page in a summary form you try to provide all the information. So, if a company has carried out may be ten project in related areas then for every project there will be one page PDS normally. Sometimes it will also include the photographs showing the relevant features whatever improvement has been done and whatever mechanism has been followed indicating something with that. So for every project this PDS will be included so PDS is in a crisp form, it tells about the task that has been carried out by the firm.

(Refer Slide Time: 38:40)

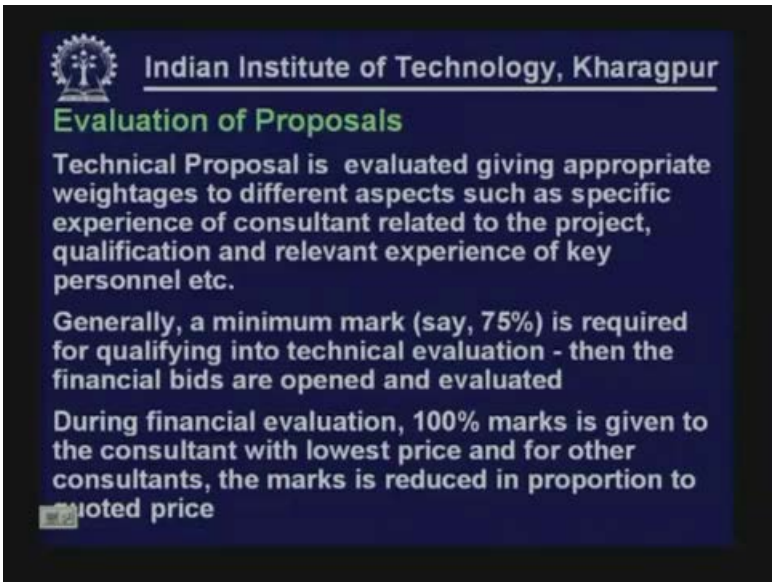


Financial proposal includes:

- Summary of cost
- Break down of cost per activity
- Break down of remuneration of key professionals
- Reimbursable cost
- Miscellaneous expenses, if any

Hence there will be different components. You have the total cost and then the different components as indicated in the terms of reference.

(Refer Slide Time 39.01)

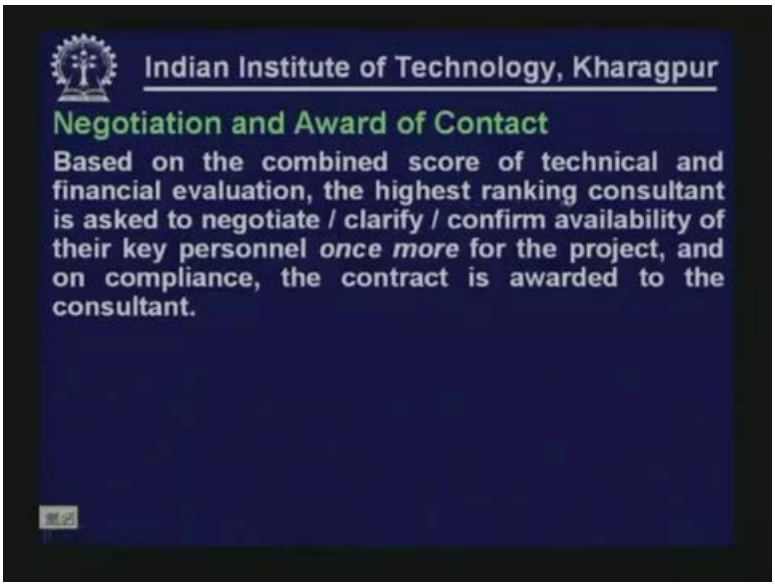


Coming to the evaluation of proposal technical evaluation is done first in most of the cases and then the financial evaluation is done. In the presence of technical evaluation there will be marks on different aspects how the methodology has been written for the work, what are the CV's that the consultant has provided for different key positions and so on. thus there will be the marks for every CV and then there will be different marks for different key positions, there will be some marks for comments, some marks for the experience and then an overall evaluation will be done. Generally a minimum of 75%, 75 out of 100 is required for qualifying into technical evaluation and only for the consultants who have qualified technically that is for technically qualified consultants only the financial bid will be opened and for others normally it will be returned without opening.

This 75 is again is an indication. Different organization may follow different procedures. Some of them might follow 80, some of them follow 70 but normally it is 75% that is taken as a benchmark. Then during financial evaluation hundred marks is given to the consultant with the lowest price so he gets full marks because of the lowest prize and for the other consultant the mark is reduced in proportion to the coated price.

For example 18 lakhs is the minimum and if twenty marks is for the financial part so if the consultant has coated 18 lakhs he gets 20 and a consultant who coated 20 lakhs gets 18 marks that is 20 into 18 by 20 so it's again 18 marks. Like that in proportion the mark is reduced and then finally both the technical and the financial aspects are considered marks obtained in the technical evaluation, marks obtained in the financial evaluation then sometimes they give 60% weightage for technical and 40% for financial and in some projects it may be 80% on technical and twenty percent on financial this again varies. But then again finally whatever is the criterion as mentioned in the RFP based on that the technical score and financial score may be added and the company or the consultant who is scoring the maximum will be awarded with work.

(Refer Slide Time: 41:41)



So based on the combined score of the technical and financial evaluation the highest ranking consultant is asked to negotiate clarify confirm the availability of their key personnel once more because sometimes it might have taken some time after the submission of proposal so they once again confirm whether all those key staffs are available whether all the facilities are available till now and then on compliance the contract is awarded to that particular consultant. Now once the work is awarded the very first thing the consultant does is the submission of the Quality Assurance Plan.

(Refer Slide Time: 42:22)

Quality Assurance Plan is the consultant's commitment of producing a quality DPR. The consultant will produce the report and this is a commitment that they will produce a quality DPR. Now Quality Assurance plan comprises of quality goals and objectives basically which includes the compliance with codal provision and TOR by controlling human skill. It tells about the purpose of QAP basically to spell out in written terms the sequence and steps to be followed to ensure a quality project. It also indicates about the elements of quality assurance system and includes a detailed approach and methodology for carrying out the work.

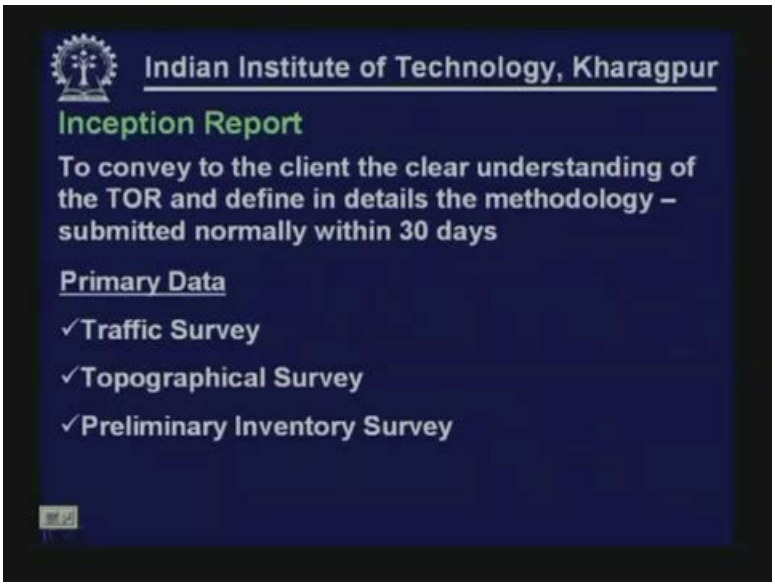
(Refer Slide Time: 43:13)

Now the QAP needs to be formulated for various activities like:

- Topographic surveys
- Traffic surveys
- Geo-technical and material investigations
- Condition survey and design of bridges and structures
- Design of highways and pavements
- Economic and financial analysis
- Environmental and social impact assessment

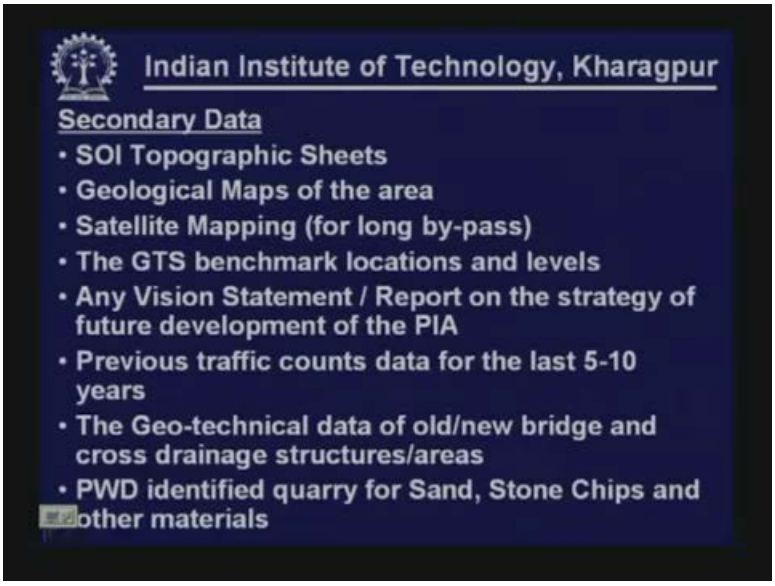
For all these aspects QAP need to be formulated. So the QAP is formulated and submitted.
Next is submission of inception report. Inception report is basically to convey to the client the clear understanding of the terms of reference and define in details the methodology. Normally the inception report is submitted within thirty days. Inception report should include whatever all primary data that have been collected by the consultant. Normally it includes the traffic survey data, topographical survey data either partly or fully and talks about the preliminary inventory survey.

(Refer Slide Time: 44:15)



So if any primary data collection had been done that had to be reported either partly it is done or fully it is done and accordingly it is to be mentioned. Then it should indicate about the status for the secondary data collection. It is a big list and the consultants should indicate in their report so far till that time whatever secondary data he has been able to collect. This secondary data includes the number of items, I will quickly go through it.

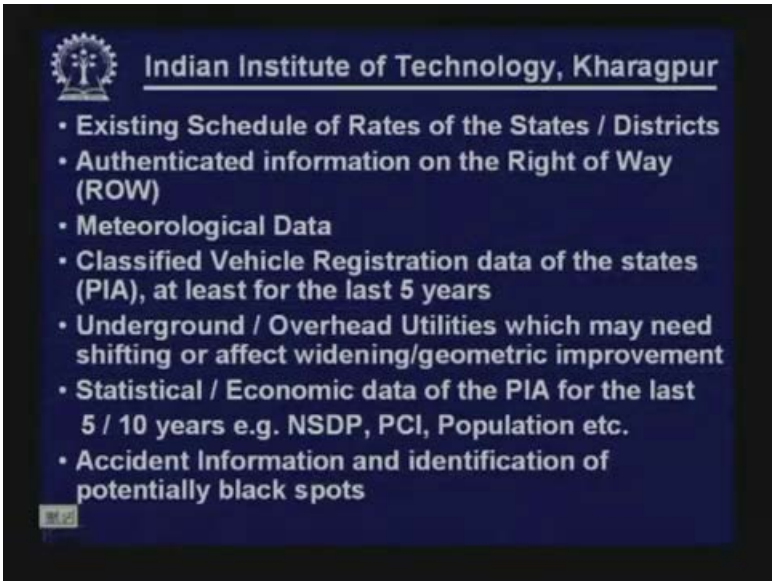
(Refer Slide Time: 44:55)



- Survey of India topographic sheets which are required
- Geological maps
- Satellite maps if available particularly for construction or planning of by-pass

- The GTS bench mark locations and levels
- Any vision document, statement or report available on the strategy of future developments in the project influence area based on the future developments that the local authorities or bodies are planning to achieve
- Previous traffic counts data for last 5-10 years
- The Geo-technical data of old and new bridges is available and cross drainage structures
- PWD identify Public Works Department identified quarry for sand, stone, chips and other materials because all these materials are to be transported from quarries so what are the PWD identified quarries that also should be known so all this secondary information will be required.

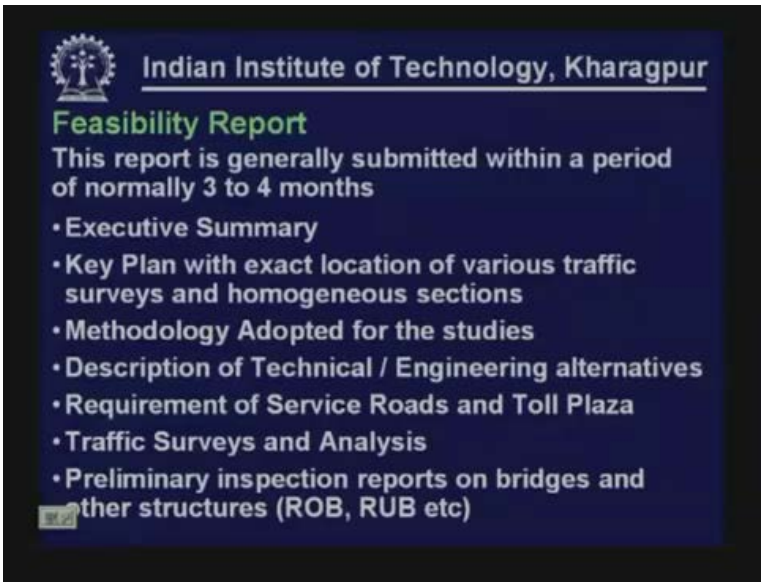
(Refer Slide Time: 45:53)



- Existing schedule of rates for calculation of the cost of the states or districts
- Authenticated information on the Right Of Way (ROW), it is a very, very crucial components, it is extremely difficult in most of the cases to get right information and correct information about the Right Of Way (ROW)
- Meteorological data
- Classified vehicle registration data of the states Project Influence Area at least for the last 5 years
- Underground overhead utilities which may require shifting or which may affect widening or geometric improvement proposals
- Statistical economic data of the PIA for the last 5 to 10 years including the net state domestic product, per capita income, population may be at the national level, the GDP data Gross Domestic Product data
- Accident information and identification of potentially black spots

All these come under secondary information so it is a big list. So when this report is submitted the consultant should indicate to what extent or how much secondary information he has been able to collect by that time and whatever information is available some of the analysis is to be done and accordingly reported.

(Refer Slide Time: 47:18)

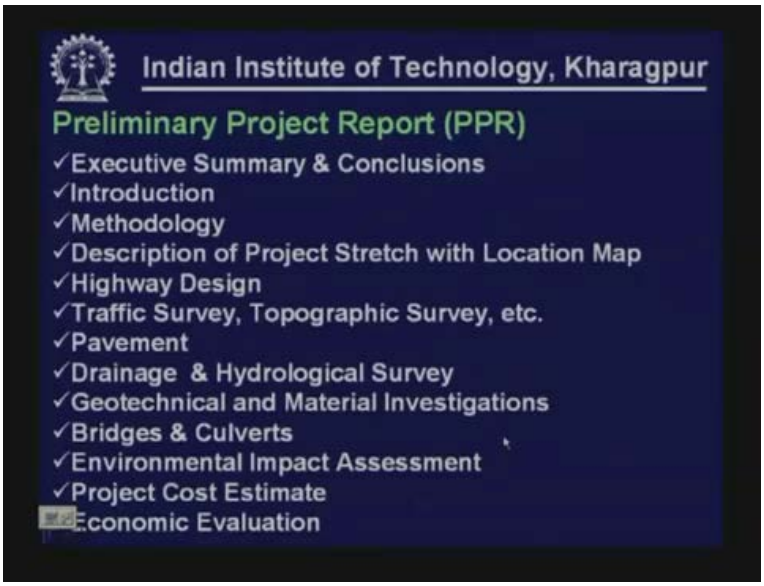


Then we have the submission of feasibility report. Now this report is generally submitted within a period of normally 3 to 4 months. It includes executive summary, telling the summary of the whole report, key plan with exact location of various traffic surveys and homogenous sections, it should show the locations where the traffic surveys have been carried out and how homogenous sections have been divided or decided. It should indicate about the methodologies that where adopted for the studies. It should describe engineering and technical alternatives whether two different technical options are there, it should indicate or compare. It should talk about the requirements of service road and toll plaza and other facilities, report about the traffic surveys and analysis, also include preliminary inspection report on bridges and other structures like road over bridges, road under bridges, ROB, RUB etc.

(Refer Slide Time 48:38)

It also should include requirements or talk about requirements of new ROB, RUB bridges, flyovers and all other sort of structures that are required, give a detailed project description. It should include a preliminary environmental analysis and screening, preliminary social impact screening, include the strip plan showing details of utilities that may require shifting or relocation, include about the pavement study and identification of sections for carrying out required tests related to design of pavements and investigation on sub-plate and other properties. It should include Ball Park cost estimate not a detailed cost but some block cost estimate. It should also report preliminary economic analysis that has been carried out based on block cost and whatever information and analysis are done till that time best on all those and whatever preliminary economic evaluation that is available and then indicate design standards and specifications and then finally conclusions and recommendations. All these aspects are to be covered.

(Refer Slide Time: 50:10)

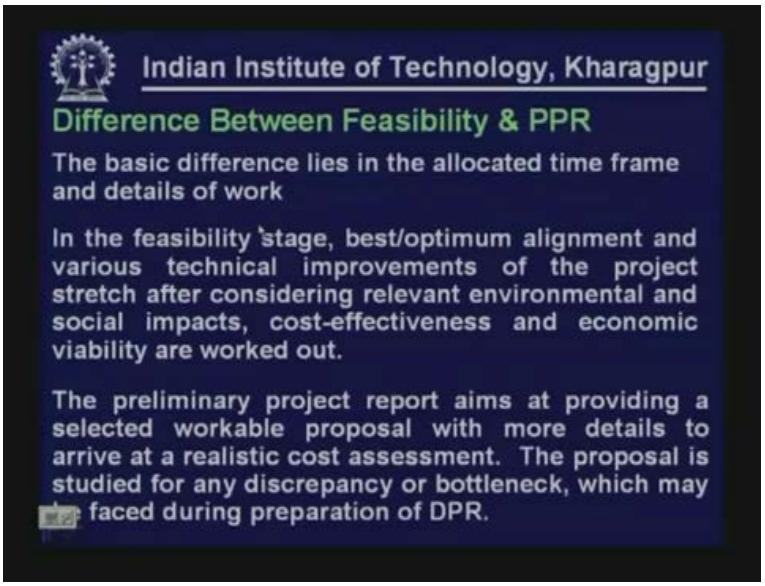


Then comes the submission of Preliminary Project Report PPR structure-wise it is more or less similar to whatever I have mentioned in the feasibility study report.

- Executive summary and conclusions
- Introduction
- Methodology
- description of the project stretch with location map
- Highway design
- Traffic survey, topographic survey
- Pavement design
- Drainage and hydrological survey
- Geo-technical and material investigation
- Bridges, culverts
- Environmental impact assessment
- Project cost estimate and
- Economy evaluation

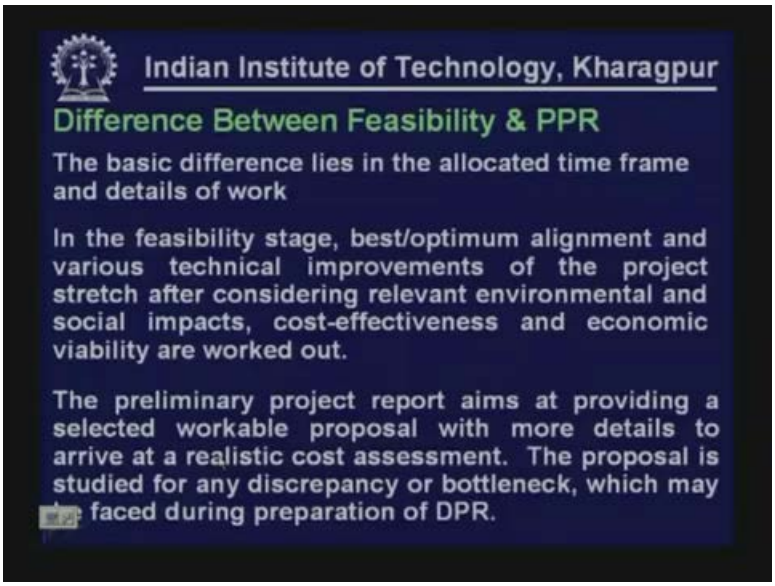
So, item-wise if you see this feasibility study and PPR they are not different but generally the same items are there. Because the items are same it is necessary for us to understand the difference between feasibility and PPR. Because once I have showed that these are the things to be included in feasibility report and then once I show about the PPR more or less the same items are shown. So it is necessary to clarify or to understand clearly the difference between the feasibility report and a PPR report.

(Refer Slide Time: 51:21)



The basic difference lies in the allocation of time frame and details of work. Items remain same. May be you are reporting traffic survey but at that stage feasibility state it may not be completed. The topographic survey may not be over by that time and pavement related investigations whatever is required even for carrying out the PPR they are not over. So whatever is the status in some places some investigations have been completed and some are yet to be completed and whatever is the status based on this status we try to prevent the overall summary or the overall findings. In the feasibility stage best or optimum alignment and various technical improvements of the project stretch after considering relevant environmental and social impact, cost effectiveness and economic viability are worked out. The PPR report aims at providing a selected workable proposal with more details to arrive at a realistic cost assessment.

(Refer Slide Time: 52:20)

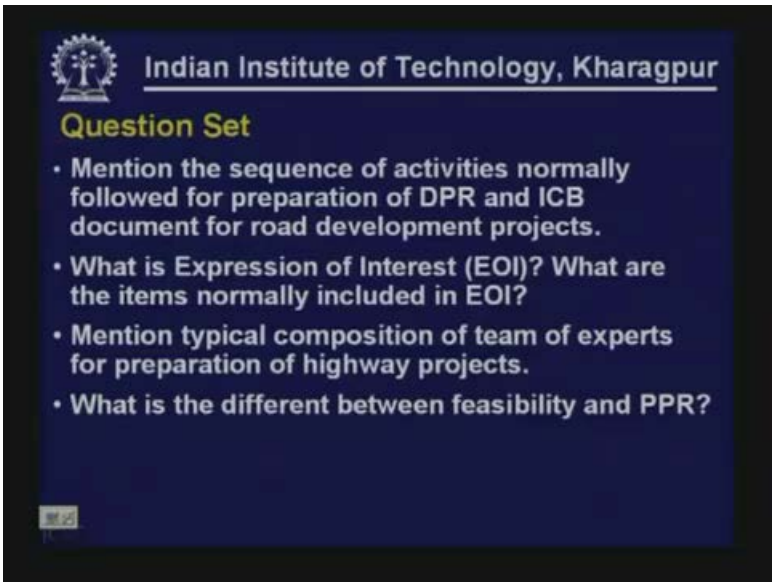


Obviously more data is available; more investigation report is available so we can have a better cost estimate, better assessment, better economic evolution and report. The proposal is studied for any discrepancy or bottleneck that one may face during preparation of DPR. So essentially items remain the same but the difference is in the allocated time frame and details of work.

Then we have the DPR and the ICB document the Detailed Project Report. This includes detailed designs and drawings preparation of detailed cost estimates based on detailed engineering. Already we have detailed engineering available with us so accordingly one can calculate the detailed cost, preparation of bid documents etc as per the approved PPR and RAP complying with all directions given by the clients while approving the PPR and RAP.

May be clients may give some suggestions, comments and advices that is to be considered and the final detailed engineering is to be done by taking all the items detailed project report and then the ICB document is to be prepared. Now ICB document comprises technical specifications, bill of quantities and detail drawings as in the DPR, conditions of contract etc as per international standards and following World Bank or ADB guidelines as the case may be so finally the DPR is ready. so we screen the preliminary alternative at the PPR stage itself, take the final one and then go for detailed engineering, detailed design and then prepare the final report what is known as DPR and once the DPR is ready based on that the ICB document is prepared.

(Refer Slide Time 54:30)

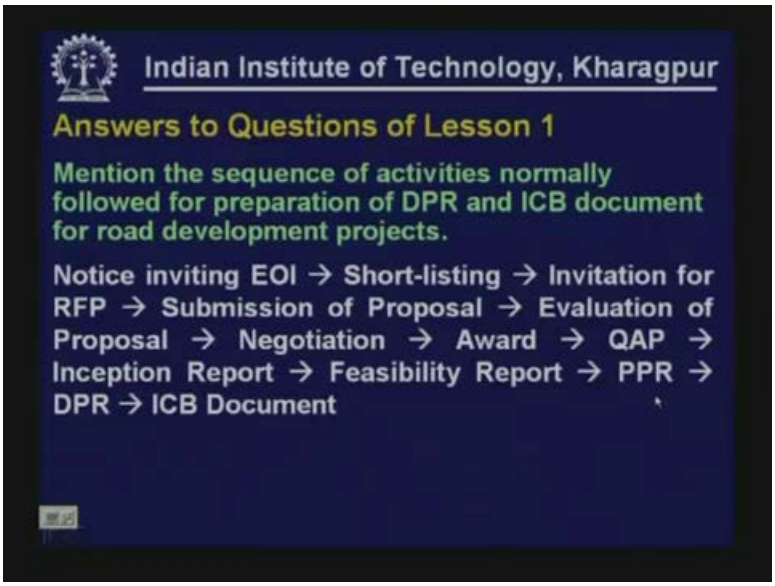


Now let me ask quickly some of the questions.

- Mention the sequence of activities normally followed for preparation of DPR and ICB document for road development projects.
- What is Expression of Interest or EOI? what are the items normally included in EOI
- Mention typical composition of team of experts for preparation of highway projects
- What is the difference between the feasibility and the PPR?

Because there is only one lesson in module one I will also answer this questions now itself. Let us quickly go through the answers. Mention the sequence of activities normally followed for preparation of DPR and ICB document for road development projects. It starts from notice inviting tender, notice inviting Expression of Interest, then short listing, then invitation for request for proposal, then submission of proposal by the selected clients, evaluation of proposal, negotiation, award of contract, submission of Quality Assurance Plan, submission of Inception report, carrying out the Feasibility and submission of feasibility report, carrying out preliminary engineering and submission of preliminary project report, carrying out detailed engineering and submission of detailed project report and preparation and submission of ICB document, that's the sequence.

(Refer Slide Time: 55:56)

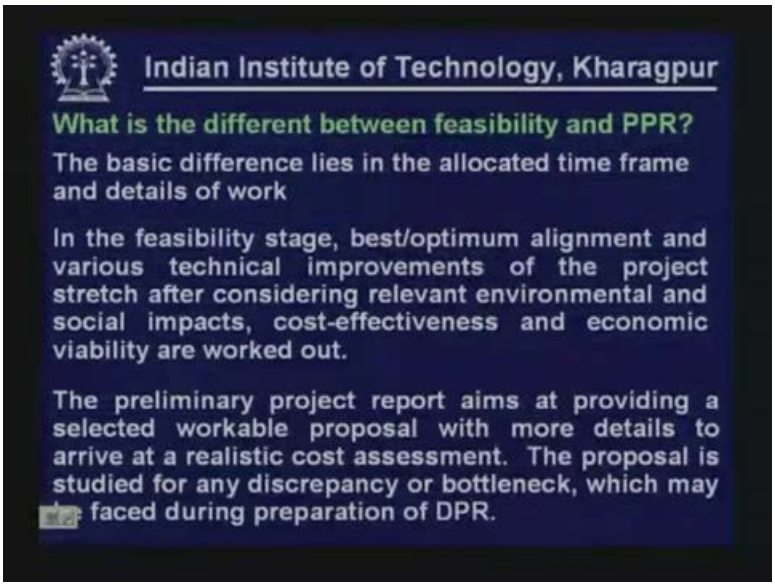


Then question two is what is the Expression of Interest (EOI). Whenever you work in a company it is showing the interest in their job so it includes basically company profile, general qualification and experience, experience in the fields of highway and transportation engineering, relevant services carried out and ongoing projects and financial status. So, when there is a project that is to be taken up by the client all consultants should think themselves qualified for the job may submit the Expression of Interest showing that they are interested for that job and also indicating that they have the required capability, experience, profile for carrying out the job. So one way it is showing the interest and other way it is expressing their credibility or background and their qualifications for the similar job.

(Refer Slide Time: 56:57)

Mention typical composition of team of experts for preparation of highway projects. It includes highway engineer, pavement engineer, bridge specialist, traffic engineer, material cum geo-technical engineer, survey engineer, transport economist, environment specialist and resettlement specialist. Thus all sorts of specializations are included in civil engineering and beyond that.

(Refer Slide Time 57:26)



What is the difference between the feasibility and PPR?

The basic difference is the allocated time frame and details of the work. Some of the investigations might not be over at feasibility stage which may be completed at the TPR so cost estimates and all assessments are more realistic and relatively more accurate in the PPR report. Feasibility reports the then status of the project. So the basic difference lies in the allocated time frame and details of work. Thank you.