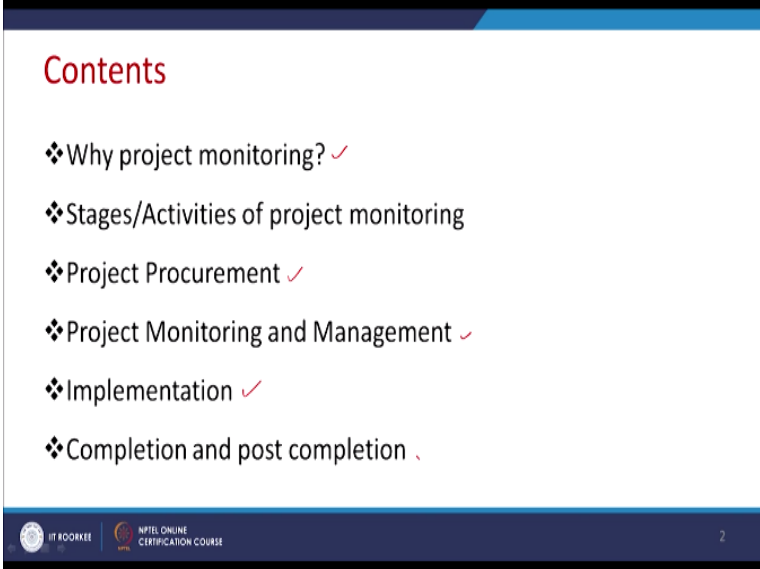


Urban Governance and Development Management (UGDM)
Prof. Uttam Kumar Roy
Department of Architecture and Planning
Indian Institute of Technology – Roorkee

Lecture - 48
Project Monitoring and Management

Welcome to lecture 48. Today's lecture, we are going to discuss the project monitoring and management. In the last lecture, we have discussed how to formulate the project and in this week, we are basically focusing various aspects of project planning and management. So today in the continuation of that we are going to discuss the monitoring part and the management part of the project when the project is implemented actually.

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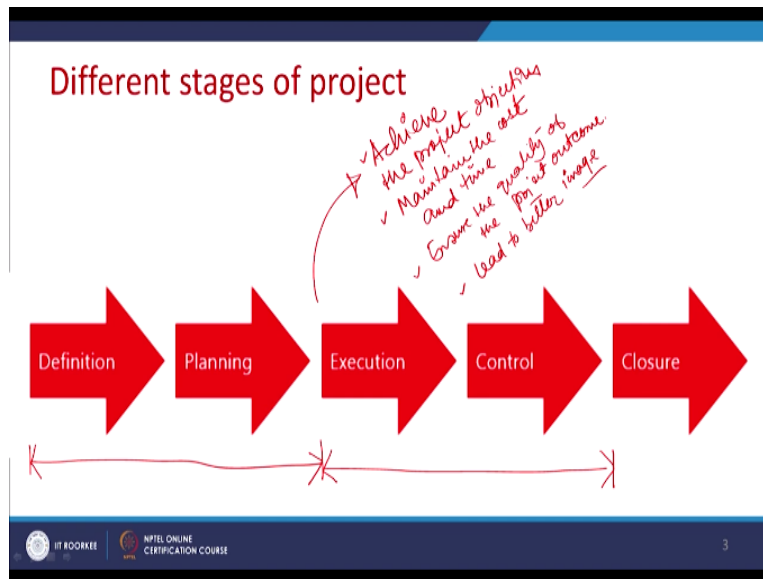
Contents

- ❖ Why project monitoring? ✓
- ❖ Stages/Activities of project monitoring
- ❖ Project Procurement ✓
- ❖ Project Monitoring and Management ✓
- ❖ Implementation ✓
- ❖ Completion and post completion .

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So under this lecture, we are going to cover why project monitoring is important. Then, what are the stages and activities of the project monitoring which is involved. Then, project procurement, the project monitoring and management including the quality control during the implementation stage and project completion and post completion activities.

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So to start with why project monitoring, I just showed the chart which I should earlier for the different stages of the project. Here you can see that from the conception of the project to planning is a very important task and after that when you start execution and quality control till the closer and the post closure. So a project planning and project formulation is one task but the objective of the project formulation is to implement the project.

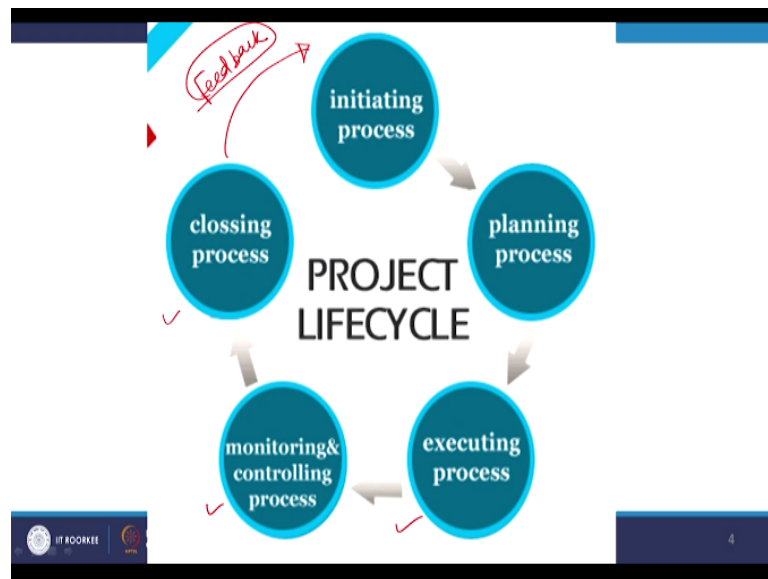
Now the implementation of the project is so crucial to maintain the cost, to maintain the money and to achieve the project target. It all depends how actually we follow the project, the formulated project and do the task as per the time schedule. Therefore, the effectiveness of the project completion depends on the day-to-day basis progress and the implementation of the project.

Therefore, it is very important to know the tricks and the methods of the project monitoring and the completion. So that whenever the projects are being implemented at your workplace or whatever projects you are going to do in future also, you can have a better grip of that and you can implement the project within time. So that is the essential component of the project monitoring.

So therefore project monitoring helps you to achieve the project objective, then it helps you to maintain the cost and time which is planned during the project formulation and also is to ensure the quality of the project outcome and definitely ultimately a better implemented project will lead to better image of the government and better branding of the organization.

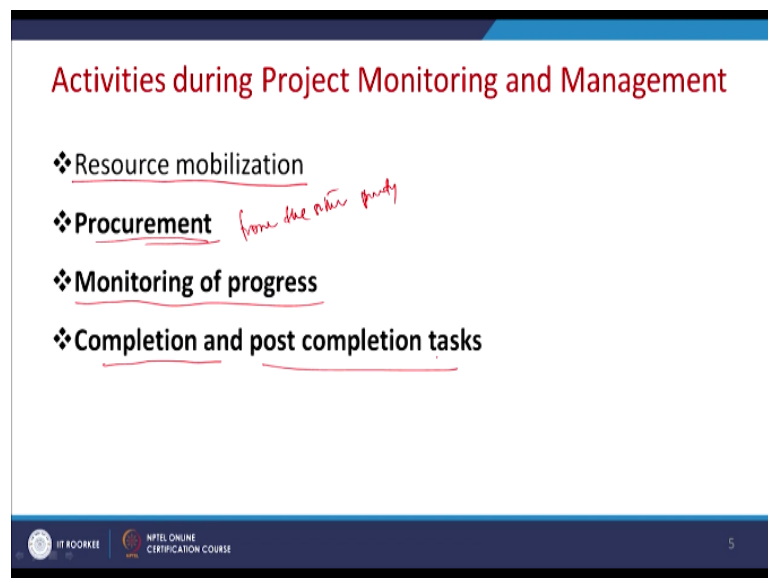
So therefore the project execution and monitoring and the management is important including quality control.

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With this respect, we have showed this cycle also. In this cycle, you can see that the execution process, monitoring and controlling process and closing process is also important and it is shown in a circular manner so that after the closing process there is a feedback mechanism to start new projects or to give feedback to the another project for the improvement. Now in this regard, so that is why the project implementation and the quality monitoring is important.

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Now please see the activities during the project monitoring and management. The first is the resource mobilization because whenever you are formulating the project, you are identifying

the possible resources but it is very important to mobilize the resources before starting because during the project formulation, you are identifying, you are making the full detail description of the project and as per the description you are estimating the project cost.

And sending to the approval authority or the funding authority and once you get the approval of the fund and you get it, sometimes the fund is approved but you have not received the fund yet, so those kind of situations are there so that to avoid those kind of situation you have to be proactive so that the moment the project is approved, you get the fund on your account so that you can immediately start the project.

We have spent one week in few lectures on the resource mobilization and management of that. Therefore, I am not going into that particular segment specifically but definitely the next stage is the procurement. In this stage, basically you are going to procure either the product or the material or the contractor service so that the project can be implemented.

Definitely, you are not going to implement everything means your organization may not be in a position to implement and do everything. So there are services or the works which need to be hired by the external agencies. So those procurement from the other party need to be taken. Then, once the procurement is done, then you start the project and next is the monitoring of the progress.

Even if it is done under the terms and condition of the procurement but then as a controlling authority as implementation authority, you have the power and mandate to monitor the project, to ensure the quality control of the projects, to install the systems and the process so that you can have a real time database of the progress of the project. So that is what included in the monitoring.

In the last stage, basically it is the completion and the post completion task. How you complete a project and after the completion of the project what else you need to do. So let us start with the procurement.

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The slide is titled "Types of Contract" in red text. It lists two main categories of contracts:

- Asset creation contracts
 - Item rate
 - Lump-sum contract
 - Turnkey contract
- Service Provision contracts
 - Management contract, Lease Agreement, Concessions, Direct Private Investment, Divestiture
 - Eg. BOT, BOOT, PBDPS

At the bottom of the slide, there are logos for IIT Kharagpur and NPTEL Online Certification Course, along with the text "Pre-Execution Session" and the number "7".

Basically, in the procurement we basically take the services during the procurement through the contract. The contract could be like for asset creation or it can be to procure some service. So during the asset creation, we can take the contract like item rate. For example, you are procuring some furniture element in your organization so that furniture could be or some similar items could be listed as per some approved rates.

And as per the approved rates, you can take those elements time to time as and when required. Then, there could be lump-sum contract and the turnkey contract. Both are basically having the terms and condition to get some particular product or material within a contracted agreement. Then, you can hire some service provision, for example for the construction of the road, for construction of building, construction of the school building.


You can hire the services of a contractor and this service could be management contract, lease agreement, concession, direct private investment, divestiture and several methods like BOT, BOOT like build operate transfer, build operate own and transfer, this type of mechanism. So basically we had the services of the expert organization who has the expertise and the credential of the similar works which they have done in the past years.

And definitely beyond that there are few projects which are being executed by the public private partnership organization. So those we will be dealing later on separately but here we can take the management service like the service procurement from various contractor through this method.

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Bid Document

- Contents
 - Instruction to bidders
 - Drawings, BOQ & specifications
 - General conditions of contract
 - Special conditions of contract ✓
 - Bank Guarantee format ✓
 - Agreement format ✓
- Issues under Item Rate Contract
 - New Items - minimum
 - Quantity variation - < 30% (normative) or else new tender
 - Change in specification - (Bituminous)
- Staff
 - Involvement, Continuity & training


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Pre-Execution Session
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Now for procuring any service or any material, we have to make a bid document. Bid document is nothing but a document which is giving the full description of the procurement, terms and condition of the procurement so that a third party or another private party can give a proposal to supply that material or supply that particular service within a given rate or within a given price component.

And after that you can compare the price components or the technical component and you can select or choose one contractor or one supplier. So that is what is bid document. So bid document basically consists of instruction to the bidders; basic informations like drawing, bill of quantity and specification; general conditions of the contract; special conditions, if there are any special condition which is outside the general condition.


Then, bank guarantee, bank guarantee is taken to ensure that the contractor or the suppliers they follow the financial norms. Then, agreement format, so these are the contents in a bid document, general bid document which is provided. Then, under the rate contract there could be items from minimum to maximum, quantity variation. If the quantity varies after a certain amount what kind of changes in the rate will be there, those kind of specification is there.

Then, for the road change of specification like say bituminous to other change of specification those kind of that means the customization specification will be there in the rate contract bid document. Then, staffing in terms of service procurement what kind of involvement, continuity and training is required for the service sector.

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Bid Document

- Work programme
- Setting up quality control lab
- Joint measurement, bill preparation and payment
- Penal clause for delay
- Reject of poor quality work ✓
- Variations – time and cost ✓
- Rates for new item and variation in quantity (>25%)
- Revision in rates - as per contract
- Mobilization advance and recovery



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Then, apart from that the bid document also should ask about the work programme, setting up the quality control lab, the joint measurement, the mechanism of the joint measurement, bill preparation, how the payment will be done, then penalty clauses, rejection of the poor quality of work, the variation of time and cost, what will happen if the time and cost is not maintained by the contractor.

Then, rates for new items and variations in quantity. If any new item is required during the project execution, what will be the rate and what will be the variation. Revision in the rates as per the contract, mobilization, advance and recovery so these are the typical other information apart from the basic information which I told should be there in the bid document. Then, after the bid document you ask for the proposal and after getting the proposal, you compare the proposal and select one.


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Procurement Procedure

- Transparency Act
- Competitive Bidding
- Electronic Tendering - e-pre-bid meeting, e-opening, e-payment, etc.
- Eligibility of Contractors ✓
 - Prequalification / post qualification ✓
- Bid Packaging – size, location, similarity / complexity, cost, etc.
- Scheduling of tenders : interconnected works, serial / parallel works
- Tendering Process
 - Advertisement at National / State level
 - Pre-bid Meeting ✓
 - Modifications to bid document ✓
 - Bid submission and opening – presence of contractors ✓

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So during the processing, you have to maintain the transparency act, the competitive bidding so that everybody can participate, no one should be excluded from the process, anybody eligible should be able to bid for the project. Then, nowadays we always do the electronic tendering because it is better, it can reach many people within a very quick time and it is also very cheaper.

If you advertise in a newspaper or any offline media, it will cost a few thousands or lakhs rupees and in electronic tendering you do not have to incur much cost. So what organizations do, they give a small announcement in the newspaper and they refer the complete document in the electronic format that is from the website. Then, eligibility of the contractor, we have to check the prequalification and the post qualification.

I will come to this point later. Then, bid packaging, what kind of size, location, similarity, complexity, cost, etc will be there in the package of the proposal. Scheduling of the tender, interconnected works, how the service providers will schedule the work that also need to be mentioned and in the tendering process advertisement could come as the national, state level. There could be a pre-bid meeting.

Modification may be required during which based on the queries and the clarification made during the pre-bid meeting and after that bid submission and opening in the presence of the contractor. This is the mechanism or the process which is taken for any procedure. So please follow this process which is required to maintain for procurement.

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Pre-qualification of contractors

- Pre-qualification
 - For types and classes of works
 - For the project period
 - Subsequent re-evaluation
 - Criteria – organisation, technical & financial capacity
- Post qualification
 - Basic requirement
 - Two stage evaluation

Then, the pre-qualification of the contractors are basically the particular types and classes of work what they have done for the project period, the subsequent reevaluation and the criteria of the organization, technical, financial capacity. So pre-qualification is based on whatever qualification and the expertise or the credential they have based on that the pre-qualification is judged and based on that they are allowed or not allowed.



The post qualification is basically done in two stages like basic requirement whether the firm or the company can fulfill the basic requirement which is given in the bid document for doing the project or not and the two-stage evaluation is also mandatory like technical stage and the financial stage. Some of you know that initially the technical stage is evaluated.

And if they perform well, if they are allowed or if they are evaluated, accepted during the first stage evaluation then their costs are compared and based on that lowest cost is considered for selection.

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Bid Evaluation

- Tender Evaluation Committee — *Technical + Adminis + Representative*
- Single bid / non-responsive bid
- Conditional Bids ✓
- Evaluation of Bids
 - Verification & correction of bid prices } *Technical team*
 - Comparative statement }
- Approval of Tender Evaluation Report
- Letter of Acceptance / Work order
- Contract Agreement → *Signed — Terms & Condition Bid Documents*
- Performance Security
- Freak rates – increasing security/ negotiations



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So during the bid evaluation basically you have to make a tender evaluation committee consisting the technical persons, technical, administrative and also the representative in your local body. There could be single bid, non-responsive bid, conditional bids, evaluation of the bids could be verification and correction of the bid prices, comparative statement, these all you have to make by your technical team and put up to the committee.



So that committee can check and approve it. Then, approval of the tender evaluation report, letter of acceptance and work order to be issued. Then, a contract agreement will be signed. So contract agreement will have all the terms and conditions which are given in the bid document and in addition the additional terms and conditions also can be put as per the work order or as per the subsequent discussions.

Then, there could be a system of performance security, freak rates, increasing security and negotiation, what kind of negotiations will be required during the execution, those kind of provisions also need to be specified in the contract agreement.

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Consultancy services

- Use of consultants
 - International / Domestic ✓ Common - CSS
- Shortlisting of Consultants ——— CRITERIA - Technical (CRUD)
- Procurement of consultancy services
- Terms of Reference —————→
- Evaluation of Technical Proposals :
 - Biodata based, short or full technical proposals
- Monitoring of consultancy services
 - Performance w.r.t. deliverables -
- Consultancy fees linked to outputs
 - Pre - Execution Phase
 - Execution Phase


KNOWLEDGE SOCIETY

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Then, if you had a consultancy service which is basically services in nature then it is also important that you take the international and domestic consultant. Nowadays, it is very common in like centrally sponsored schemes like Smart City, AMRUT and many other schemes. The municipalities, even ministries and the state governments they are hiring the international and domestic consultants.

Because it has been found that many cases the urban local government they are not able to do each and every thing of a large programme like Smart City or the AMRUT or Swachh Bharat Mission all these large programmes. Then, for the consultancy service it can be done separately like you can make a shortlisting of the consultant based on some criteria mostly technical criteria.

And before I discuss the capacity building for urban development project under this capacity building for urban development projects is it is a capacity building and transfer of knowledge and skill. So the shortlisting of the consultant or the training entities were done based on the past credential of the similar activities. So it is basically the technical criteria which makes the consultant eligible.

Next is the procurement of the consultancy service. This procurement is done based on like similar to bid process but sometimes the procurement can be simplified because here you are hiring the consultant. Terms of references will be there as the detail terms of reference and the conditions. Then, similarly you do the evaluation of the technical proposal based on biodata, short or full technical proposal, monitoring and the consultancy service.

Performance, what kind of performance and deliverables are linked. Then, consultancy fees linked to output. So there could be pre-execution phase. Now here there is another trend that which is becoming very much popular in India that it is also very much difficult to hire each and every aspect of the development, hire different consultant and managing so many consultants in a small organization is also difficult.

And the quality control also becomes very much challenging. In this situation, sometimes the government, state government or the large municipal corporation they hire a master consultant who will be given the mandate or the responsibility to manage other small consultants. That is how the overall procurement of the consultancy service also could be made simpler and easier.

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Then, during the project monitoring and management after the procurement is done, you start the project and during the project you have to maintain the project timing and the cost and during that time basically we do a concrete work plan.

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Project Management

- Work plan → DPR → *Revised*
 - Bar chart ✓
 - Network diagram ✓
- De-composition of activities → *Tasks and sub tasks*
- Activity sequencing /scheduling → *Time*
- Activity duration
- Activities with & without Floats
- Critical activities & critical path
- Duration compression techniques
 - Crashing ✓
 - Fast tracking ✓
- Use of PM tools: MS Project, Primavera ✓ *SOFT WARE*




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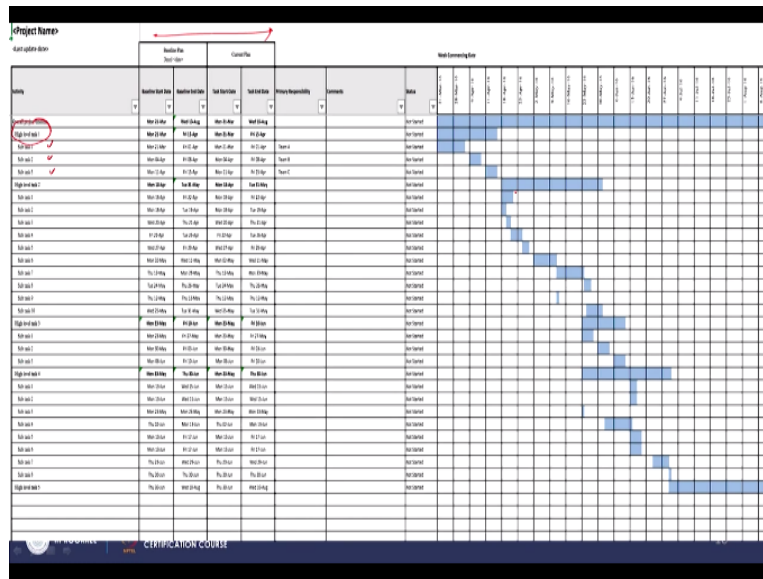
Even though work plans are mentioned in the project formulation DPR but here we make a revised one. Based on the current status of the project, we use bar chart, network diagram. Basically, we decompose the activities so that the project could be shown into various small tasks and subtasks. Then, after that we make a sequencing of the task, then every sequencing we put activity duration that is time.

Activities with or without floats, how much time can be there and how much time could be extended that also we have to see. Critical activities in the critical path, critical path is nothing but the causes or the connections between two or several tasks which are most critical and could be done in a more quicker way, those are the critical path has to be identified and to be detailed out.

Duration compression of the technique, so this kind of crashing or fast tracking, this kind of provisions are there to undertake some amount of changes happening during the projects which is natural. Then, apart from that we can use project management tools like MS Project or Primavera these are the softwares used for project management. So using software will maintain the database of the day-to-day project management progress.

And also will project or predict the possible completion time, possible cost and everything and it helps engineers and the project implementer in a better way so that the project can be implemented on time.

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Then, this is a typical project management bar chart, you can see how under every task the subtask are maintained and every subtask has the time limit like baseline time to the time plan and here the time plan is shown and every task is shown as per the date wise, week wise or month wise. So similar type of bar chart can be prepared, you can use if you do not have the sophisticated software you can use simple MS Excel.

Every office must be having the MS Office software, so MS Excel also can be used to prepare this type of bar chart and you can revise time-to-time during the project execution period.

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Project Implementation

- Variations – time and cost ✓
- Approval procedure ✓
- Inter-agency co-ordination ✓
- Progress reports ✓ *internally*
- Project management software ✓
- Project completion report
- Documentation of lessons learnt and best practices
- Project Benefit Evaluation
- Management Action Plan – O&M
- Auditing and Quality Controls

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During the implementation, basically some criterias which you need to consider is the variations; the approval of the project during and before the project; inter-agency

coordination, every project needs coordination between the other organizations. If you are constructing a road projects, definitely it needs coordination between the water supply, sewerage, the PWD all the organizations, so those kind of coordination is required.

Progress report, the intervals, what is the frequency of the project report and the outcome of the progress report and what is the further action taken after the progress report that need to be detailed out. Project management software as I told project management software can be used. Project completion report to be done, then documentation of the lessons learnt and best practice.

Benefit evaluation could be done; management action plan may be required based on the progress or lack of progress and the quality control.

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Annexure-1
Format for Annual Quality Monitoring Plan for the year.....

A. PARTICULARS:

Name of State/UT

No of towns under PRAY

No of projects proposed under PRAY*

ISSR	AHP	BIC(N)	BIC(E)	Total

* As per MHA/MS/MS

No of projects approved under PRAY

B. Desk review/ field visits proposed

Category of project	No. of visits for each project	No. of visits proposed during the year
"In situ" Slum Redevelopment (SSR)		
Affordable Housing In Partnership (AHP)		
Beneficiary Led Construction (BLC) (New)		
Beneficiary Led Construction (BLC) (Enhancement)		
C. Others		

Fees proposed/ approved for each visit of TQMA under each category of projects (Rs. Lakhs)

Total fees proposed/ approved in the year..... Rs. Lakhs

Whether same or different agencies have been proposed/selected for TQMA

Whether transparent competitive bidding process has been adopted/ envisaged for the selection of TQMA Agency

Signature (State Level Nodal Officer) Signature (Secretary/Principal Secretary, Concerned Department)

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In the quality control, I give you an example that how Government of India under Pradhan Mantri Awas Yojana they have made some templates, forms and formats to maintain the quality control. Just have a look you will understand. So these are basically the basic information of some projects. Then, these are the project overview and these are some salient information related to cost and progress so total fees approved or what kind of activities are going on.

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Reference Guide for Third Party Quality Monitoring - 2017

Annexure 3
Third Party Quality Monitoring Report of BLC projects under PMAY

Name of TPQM Agency	
Date of Visit	
Current Visit No.	
Date of Previous visit	

A. PARTICULARS OF PROJECT

1	Name of the State /UT:	
2	Name of the City:	
3	Name of Project:	
4	Project Code:	
5	Implementing Agency/ UoB:	
6	Location of the Project (State name, Ward etc. as applicable):	
7	Type of Project (i) BLC (New Construction) (ii) BLC (Enhancement):	
8	No. of EWS Houses in the project:	
9	Date of Approval by SLSMC:	
10	Approved Project Cost (Rs. Lakhs):	Centre share State share UoB/Implementing Agency share Beneficiaries share Total
11	Date of sanction of 1 st instalment of Central assistance by CMHC:	
12	Duration of the project:	
13	Date of commencement:	Scheduled Actual
14	Date of completion:	Scheduled Expected
15	Inspection undertaken by (Name) (with contact details):	1. 2.
16	Name of State representative present during visit:	
17	Name of UoB representative present during visit:	

Ministry of Housing and Urban Poverty Alleviation

Similarly, they have templates like this which is used for a third party monitoring report. So this is I have just shown only the first page, there are many pages you can have a look of the document. So it is a very exhaustive document. So you can also do the third party quality monitoring if you are unable to make the quality monitoring at your own level.

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Pradhan Mantri Awas Yojana (Urban) - Housing for All Mission

Annexure 6
Action Taken Report based on Third Party Quality Monitoring (TPQM)

The following actions have been taken based on the TPQM Report

S. No	Recommendations by TPQM Agency	Action Taken/Reasons for not acting on TPQM Report
1		
2		
3		
4		
5		
6		

(Add additional rows, as required)

- It is hereby certified that a detailed report of TPQM in respect of the PMAY(U) Project(s) has been received by the SLNA from the TPQMA.
- The TPQMA report has been scrutinized/examined by SLNA and preventive and curative actions have been taken based on the TPQM.
- An Action Taken Report (ATR) in this regard has been placed before SLSMC in its _____ meeting held on _____.
- The overall quality of houses constructed under PMAY(U) has been found satisfactory as per latest NBC norms.
- The TPQM report has already been placed in the SLNA website.

Signature (State Level Nodal Officer) Signature (Secretary/Principal Secretary, Concerned Department)

Similarly, there could be action taken report based on the third party quality monitoring because third part quality monitoring report will be based on the actual status of the project. So based on that there could be some gap, some lacking in the project, so some action could be taken so this kind of report also is required right.

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Project Completion Report

- Project Proposal & subsequent modifications with reasons
- Administrative and technical approval procedures
- Problems encountered, delays occurred and solutions
- Pre / Post-qualification, bid packaging, tendering, types of tenders, etc.
- Scheduling of tenders and its effect
- Details of Contract Management : delays, effects, penal measures, etc
- Utilization of completed assets.
- Comparison of actual v/s projected fund flows of ULBs
- Project monitoring process.
- Best practices (if any)
- Analysis of tender premiums, time extensions, cost escalations, variations, etc.
- Audit reports & replies ✓
- "As Built Drawings"

Project Plan
+
Bid
+
Monitoring Execution
+

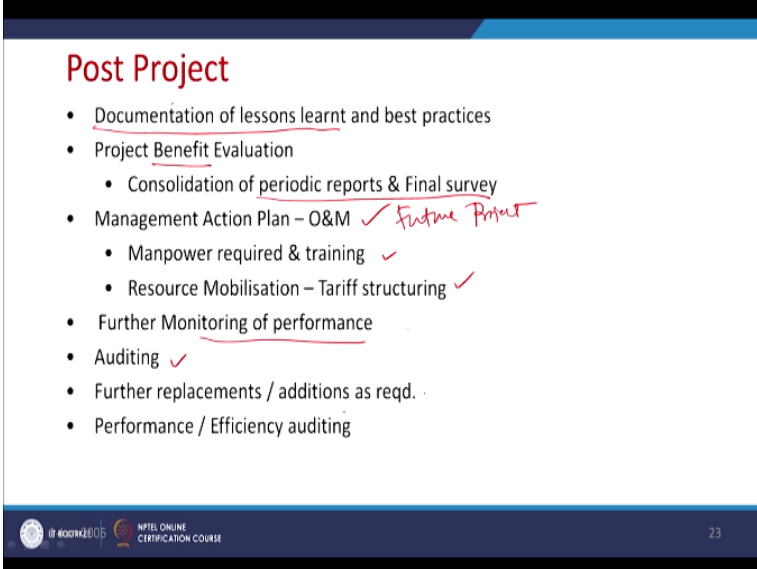
So I go forward then okay. Now in the completion and the post completion period when you complete the project basically we make a project completion report so that it becomes a complete document which will help the future city managers to execute similar projects and also to refer this document if any clarification, any references are required for that particular projects.

So just have a look what are the contents of the project completion report. So it consists the project proposal details and the modification, administrative and technical approvals. Then, problems encountered, delays occurred and the solution adopted, pre and post qualification of the contractor, bid packaging, tendering, types of tender, scheduling of tender, details of contract management if there is a delay and effect and penal measure everything.

Utilization of the completed assets, comparison of the actual versus projected fund, monitoring process, best practices if you have adopted anything and analysis of the tender premiums, what kind of time extension, cost escalation are allowed, then audit reports and also as built drawing. So you can see that the project completion report consist of like the project plan, bid or the procurement papers.

And also the monitoring, during the monitoring whatever so these 3 stages monitoring and execution stages whatever we are doing all those papers are included. So most of the stages of the project cycle is included in this project completion report.

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Post Project

- Documentation of lessons learnt and best practices
- Project Benefit Evaluation
 - Consolidation of periodic reports & Final survey
- Management Action Plan – O&M ✓ *Future Project*
 - Manpower required & training ✓
 - Resource Mobilisation – Tariff structuring ✓
- Further Monitoring of performance
- Auditing ✓
- Further replacements / additions as reqd.
- Performance / Efficiency auditing

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And after the project completion basically we do a documentation of the lessons learnt and best practices. This documentation may not be very large. A project completion report is an exhaustive report which can be very much thick but documentation of the lessons learnt could be very much brief and it can be circulated through websites or through other media. Then what kind of benefit you have achieved, then consolidation of the periodic reports and the final survey.

Then, what kind of management action plan is taken for the future project, that also could be taken, then all this action regarding manpower and the resource, then further monitoring of the performance for the future projects, auditing, further replacement, additions as required, performance and efficiency auditing. So these are the post project actions, which is required

to maintain the project or to document the project for the future project proposal and for future project execution.

So in brief we have discussed today the project monitoring and the management. We have told you that in a project cycle, the project monitoring, quality control and its management for the implementation is very important stages and in the stages we do the resource mobilization, we procure the material or the services and then we execute the project through the strict quality control and we make the completion report and the post completion actions.

In the procurement process, we make a bid document, we make tender evaluation committee and based on the two-stage evaluation, technical stage and the financial stage, we identify the lowest bidding contractor or the supplier and then we select them for execution of the project and not only that due to time to time we make quality monitoring. We have shown the examples how the nationally coordinated programs are being monitored through the third party quality agency.

But for the small projects definitely you can take up the quality monitoring at your own and in the last we compile each and every information starting from the earlier project plan, the deviations, delay or the expansion, divisions of the project, bid document terms and condition, the as built drawing and the all the approvals everything together compiled and it is called as a project completion report.

The project completion report is a very important document which helps in future for any reference or any clarification of the project and also it helps to execute future project, similar projects and also other projects and after the project completion report is done and submitted, there are few post project completion actions which is required to maintain the particular project and to help the other project or to document the best practices or the lessons learnt for the better understanding. So with this, I would like to conclude today's discussion.

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Next LECTURE
49. Essentials of Infrastructure and Engineering Design

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Next day, will discuss some of the essential terminologies and the features what we do in the engineering design so that when you execute any project you understand the languages of the BOQ and the project DPR and whenever you are handling the constructors or engineers, you can understand at least some terminologies so that you can ensure the project and target the project completion time in a better way. So thank you very much for attending this lecture.