

Project Planning & Control
Prof. Koshy Varghese
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Indian Institute of Technology, Madras

Lecture – 56

Lesson – 08

Industry Perspective Prof. N. Raghavan

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Prof. N. Raghavan FNAE, FICE(UK), FIE(I),

- Currently Adjunct Professor, IIT Madras & Independent Director in some L&TIDPL and Tata Companies

Earlier

- Retd Head-Hydel & Nuclear Sector-L&T ECC
- Chief Executive- L&T Ramboll Cnsltg Engrs;
- Principal Consultant- STUP Consultants Ltd
- SB Joshi Memorial Award for Excellence in Bridges & Structures 2008
- B.Tech - IIT Madras (1970), M.Tech - IIT Bombay
- Over 180 technical articles & presentations
- Associated with design & construction of practically the entire gamut of structures

Okay, now, we move on to this very interesting talk by Professor N. Raghavan. I would like to introduce Professor N. Raghavan briefly. He is a colleague of us, he is an adjunct Professor here at IIT Madras, works closely with us and he brings in tremendous industry experience. As you can see, he in addition to being a director of several companies, he is the retired head of Hydel and nuclear sector in Larsen & Toubro.

So, Professor Raghavan was heading this before he retired and joined IIT Madras as an adjunct faculty. He was a chief executive at L&T Ramboll, he established L&T Ramboll in this, in its initial year, he headed it. He was also a principal consultant in STUP and he has been both in the structural design side, the Geotechnical design side, the project execution and delivery side. He has been in several, several projects, got a lot of experience, he was awarded the Joshi Memorial Award for Excellence in Bridges and Structures.

His B.Tech was from IIT Madras in 1970 and M.Tech from IIT Bombay, he has several

technical articles and presentation and like I said, he has been associated with several projects over his career span and he is still associated with several projects. So, I welcome Professor Raghavan to join us and give us his perspectives on planning in the industry.

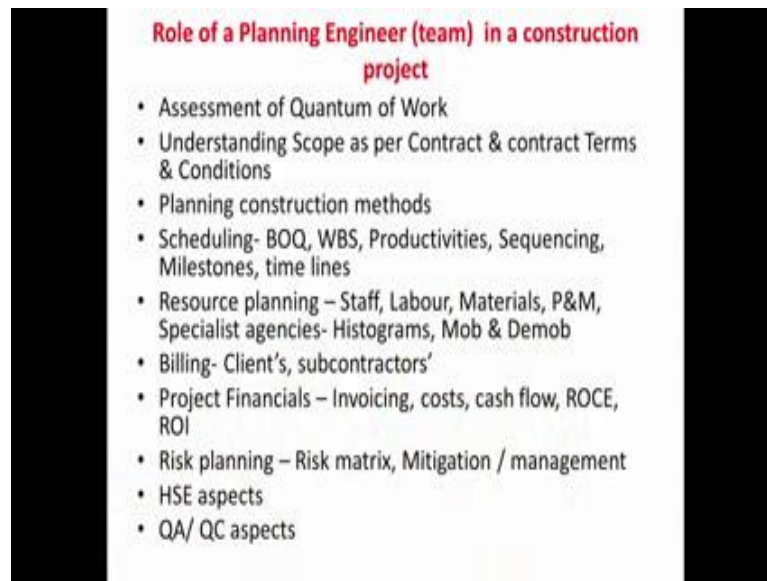
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Greetings Dr. Koshy Varghese, it is very interesting to note that you know we are recording a course on Project Planning and Control and thank you for inviting me to share my views on the planning and planning concepts. Planning, of course, is very interesting and very useful tool for project management and like all other tools and techniques, it depends on the people who are applying it.

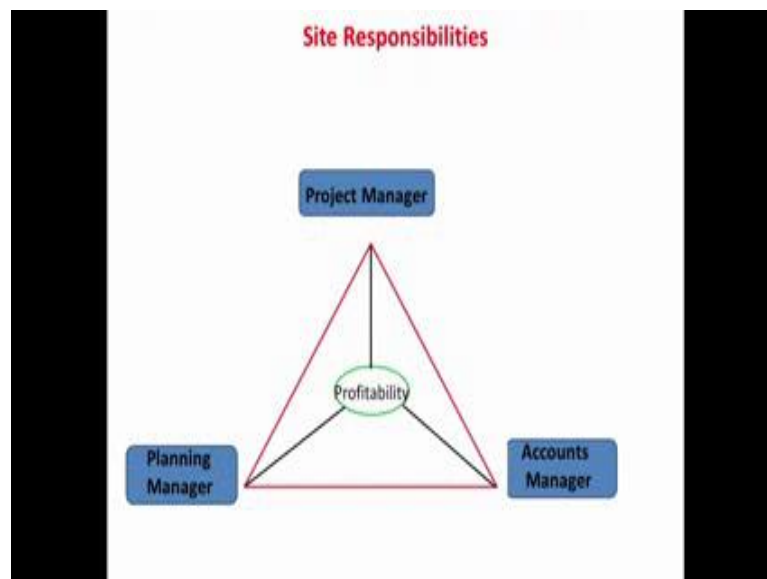
So, the planning department has a considerable significance and importance in the management of any project. I would like to share my views on some of the issues raised by you. I will take up the issues one by one and try to give whatever I feel on, on these issues.

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The first one you mentioned about the, you mention the role of a planning engineer or the planning team in the construction project. It is a vast role actually.

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In any site, if you see, the triangulate of the project manager, the planning manager and the accounts/administration manager, this team actually controls the project execution quite closely and they actually shape the outcome of the project and influence it quite a lot. So, the planning manager is a very important person in the project management team.

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If you look at the amount of kind of work what you know he does, right from assessing

the quantum of work to be done, understanding the contract document regarding the scope and the various terms and condition, planning the construction methods, then the actual scheduling part, covering the bill of quantities, work breakdown structure, the productivities, sequencing, milestones and the final timelines.

Planning all the resources, staff, labour, materials, planning and plant and equipment, specialist agencies and so on and then, the billing, clients billing as well as the subcontractors billing and very importantly the project financials, the invoicing, the costs, cash flow or return on capital employed and so on. Then, the risk planning part, very useful tool in the modern context, covering the risk matrix and the risk mitigation and management as well as the HSE, the safety aspects and the quality assurance and control. So, there is a wide gamut of work which the planning manager has to cover with the help of his team.

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And if you look at what kind of skills a planning engineer or the planning people have to have, it's again quite comprehensive. Apart from the basic technical skills, he has to, of course, know the scheduling aspects and the managerial site, the financial management, the human relation management covering the communication skills and interpersonal relationships, risk management, the contracts management.

And to some extent, the administrative aspects and the organisational aspects also have to be covered. All in all, the planning manager has to have a wide range of skills which have to be applied to the project in varying degrees at various stages.

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What are the skills required by a planning engineer

Specifics

- Knowledge of typical construction projects, preferably those similar to the one on hand
- Good appreciation of basic design aspects, construction methods, Scheduling (concepts, software), construction management aspects, construction financials, contract management, Risk management
- Basic knowledge of HSE, QA/QC

Specifically, he has to have a good knowledge of construction projects, how they are managed, preferably those similar to the one on hand, what kind of specific project we are talking about, how the project is managed. He also needs to have a reasonably good appreciation of the basic design aspects, the construction methods, scheduling concepts and the software like Primavera or MS projects, the construction management aspects, financials and so on.

Some of these aspects, he has to have in depth knowledge of the scheduling and some of them, you know, he may need to have at least the basic concepts. But, all in all, what works well is to have an integrated management aspect covering right from the engineering, the construction aspects, the methods and the managerial aspects. So, he has to cover a wide spectrum and the broader the knowledge he has, the better it is for managing and planning projects.

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I like to show these slides, this shows the many dimensions of project management and planning. The management and planning team at the site has to actually cover a wide range of skills, right from developing the project, preparing the project, contract management, engineering, planning, methods, equipment, materials and supply chain management, the personnel, financials, quality, safety and finally, of course, the client management.

I always like to say that the managing a project is much more complex than managing a typical business in the commercial management area.

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Discuss any project in which you felt the planning was good and the project was executed smoothly due to good planning

- Construction of a Gas-based power project, as associate to an international contractor went off quite well
- Good Project Manager & Planning Manager team
- Planning Mgr got a god idea of Engineering & Procurement inputs from the external agencies responsible
- Site was able to tie up with good agencies for erection and civil works
- Sequencing for receipt of materials was well planned and synced with the Suppliers
- With good liaisoning with HQ, the major equipment required were also tied up in time
- The Mob & Demob were handled well in good sync with receipt of supplies & construction → less costs

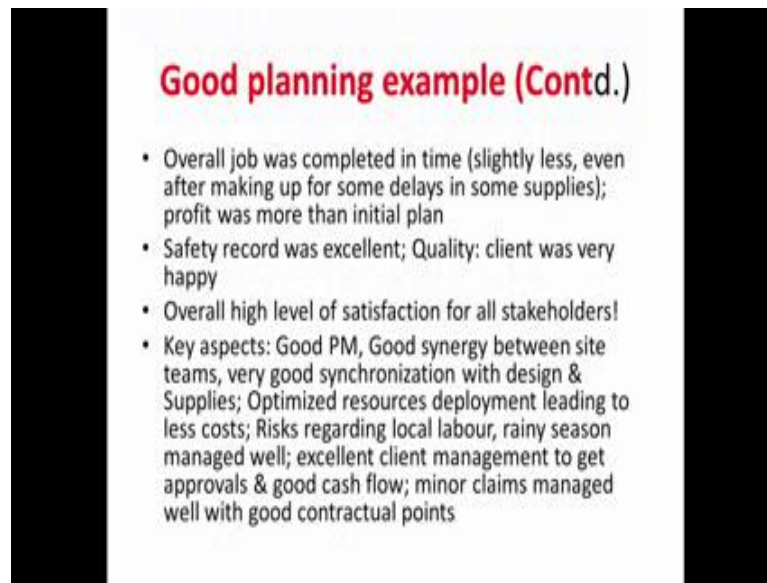
The next one you are asking me about, a project which was managed quite well and which ran well on account of the good planning. I can think of a gas based power project we had done some time back as an associate with an international contractor. That went on quite well, I think basically because we had a good project manager and a good planning team also. They had a good idea of the engineering and procurement inputs, which have to come from the outside agencies like supplying the main equipment and the other materials and so on.

So, with this, they were able to tie up the agencies for the erection and the civil works well in advance and then also brief them properly on the actual work to be done. The sequencing of the receipt of materials and deploying them on the project, you know, the erection and commissioning and so on, that was planned quite well and well synchronised with the various stakeholders.

So, the planning the good planning which was done in the beginning, regarded to the supply chain management, the various agencies involved in doing a complex projects like that, that thing that was what carried the project at the end of the day and with good liaising with, the companies own headquarters, they were also able to get the major equipment well in time along with good teams.

And the project manager and planning manager were having good interpersonal relationships. So, the entire site team was welded quite well and synchronised properly for doing the project effectively and also the mobilisation and demobilisation were done quite well in time. So, the deployment of resources at the site proper was managed quite well through, with minimal cost and that led to the overall good control on the costs and good profitability.

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Good planning example (Contd.)

- Overall job was completed in time (slightly less, even after making up for some delays in some supplies); profit was more than initial plan
- Safety record was excellent; Quality: client was very happy
- Overall high level of satisfaction for all stakeholders!
- Key aspects: Good PM, Good synergy between site teams, very good synchronization with design & Supplies; Optimized resources deployment leading to less costs; Risks regarding local labour, rainy season managed well; excellent client management to get approvals & good cash flow; minor claims managed well with good contractual points

So, all in all, we completed the project on time; in fact, with some amount of saving in time, even though we had some delays in some other supplies due to reasons beyond our control and the final profit actually was more than what we had envisaged originally. The safety record was so good that the international client, you know, we were very happy with that and the quality also was top class and overall, even all the stakeholders you know, the staff, the labor, the subcontractors and agencies they were all very happy with the way the project was done.

And all in all, you know, people go back go home with a good feeling having done a project like that. So, planning was actually a very key cornerstone for this project and was executed quite well with the, by the planning department.

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Discuss any project in which you felt the planning was poor and the project was impacted due to the poor planning.

A small hydro power project

- Poor contract management
- Poor investigations & choice of construction methods
- Crucial delays in appointment of specialist agencies and planning lead to river work in high flood period leading to losses
- Poor client management
- Poor attention to details
- Initial Mob delays

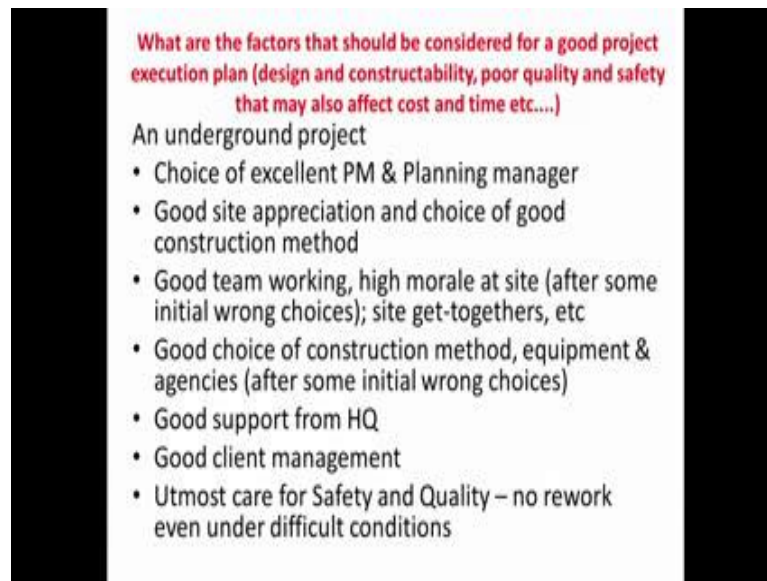
Overall :20% delays, 40% less profits than planned

And on the other hand, what did not go well, we had a small hydropower project in one of the states, that did not go well on account of a number of reasons. The contract management was not good, then the initial investigations over a team had done was not appropriate, so that the, resulting in the construction methods chosen were not fitting well with the project. So, we had to make major changes and then again, the planning department had not done that thorough investigation about the specialist agencies required.

So, we had to change some of the agencies midstream and all these delays ended with, you know a crucial amount of work having to be done with the water river in spate and that leads to higher costs, more time and a general loss of morale and so on. And the client management also was not done that well by the project manager and the planning department and not good attention being paid to the final details.

So, with all these we ended up with about 20 to 25 percent delays in time and 40 percent, think, appropriately less profits than what we had envisaged originally. So, this kind of projects you like to forget afterwards, but we need to learn the lessons from them, so that you know, in future we are able to improve and do the projects in a much better manner.

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What are the factors that should be considered for a good project execution plan (design and constructability, poor quality and safety that may also affect cost and time etc....)

An underground project

- Choice of excellent PM & Planning manager
- Good site appreciation and choice of good construction method
- Good team working, high morale at site (after some initial wrong choices); site get-togethers, etc
- Good choice of construction method, equipment & agencies (after some initial wrong choices)
- Good support from HQ
- Good client management
- Utmost care for Safety and Quality – no rework even under difficult conditions

Another underground project we had done went on very well. We had an excellent project manager and a planning manager. The initial team was not that well equipped, so we have to make some changes in the people and also the choice of our associates. But, having done that the final team actually delivered quite well, here I think I would cite the team working as the main reason for the project having succeeded.

The planning manager and the project manager were able to get all the work synchronised quite well with the remaining site people. A very high morale was maintained all the time at the site, you know, they had a number of get-togethers at the end of the day and other, you know team building exercises and so on. With all this, the team worked very well, they choose the right methods and got the good equipment and associated agencies and also have got a good support from the headquarters.

The clients having seen that this team was putting in the best of efforts, the client also came forward to help as much as possible and there was a very high commitment towards quality and safety. The client again was an international company and you know, they place a lot of importance on the safety of the site. So, they are also very happy with the way the safety work was being done and at the end of 3 years, we never had a single accident in this very difficult project.

We had to actually go much deeper in the underground and carry out a lot of work by drilling and blasting, but with all that there was not a single accident and the client was extremely happy with all these. And all these staff and labour and the associates we had

on the project, they were all very happy at the end of the day and the planning team actually had played a very crucial central role in all these.

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And looking at the modern concepts such as the lean construction management concepts this kind of management concepts, which plays good emphasis on adapting the manufacturing concepts on to the construction projects. That I think has got a very good role in India in the future, near future and you can use systems for the various aspects of construction and that is again you know, is done better with a good planning department.

And orientation towards the production concept at the project management site, good collaboration between the various teams and collective and inclusive working of all the people at the site and continuous improvement, repeated brainstorming and supportive working between all the teams at the site, developing innovative mindset, that is again a very important aspect of the lean construction management which can help tremendously for completing the work on time and within the cost.

Bringing the right culture of working, that is a very key concept for lean construction management and the planning department can play a major role in this. Apart from the various technical training, the planning department can also introduce HR kind of training, so that the mindset of people can be improved towards having a productive way of working and also the production orientation. Some other useful tools we had seen in the recent past is, are the collaborative planning system, work sampling, value stream improvement and so on, which have worked quite well to reduce the project time

duration as well as the costs.

So, with all this I would say the planning team has a very vital role to play at the site and they can build, you know they can help in building the site team together to and properly hone their skills and managerial inputs so that the overall project goes on quite well very smoothly toward successful completion. That is what think, I can add towards the planning and controls at your lecture, program.

Thank you.

Thank you, Professor Raghavan, for your talk.

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PROFESSIONAL CERTIFICATIONS

aace International
THE ASSOCIATION FOR THE
ADVANCEMENT OF COST ENGINEERING
Sustaining Cost Management

- Learning Practice Related From Experienced Professionals
- Software Training
- Contribute to knowledge –journals & conferences
- Network to Share & Discuss Issues & Ideas

PMI Scheduling Professional (PMI-SP)[®]

I would now like to kind of summarise what, what it means to be a professional in terms scheduling. So, there are things you can learn in the course, we teach to you the concepts or you know, you are able to practice some concepts, might be you are able to translate some other concepts you have learned into software and use the software tools. But, when you actually become a scheduling professional or a planning professional, you need to be able to get things from a professional perspective and there are organisations for example, the Association for Advancement of Cost Engineering AACE International.

It is a leading organisation, which kind of takes concepts we have covered in this course into practice and makes it from a practitioner perspective. So then they have a certification, they have several certifications. So, if you are certified as a professional in AACE, it means not only do you know your concepts properly, but you know the application aspects of the concepts also well and your certifications are at several levels.

So, you go from a novice, a certified person to an expert certified person and you have to certainly meet their requirements to be certified and they are one of the good agents, professional groups to be a part of, if you want to be a professional in this area of planning and scheduling. Another one, you might have heard of PMI, the Project Management Institute, they have a scheduling professional; that is the PSP or the Project Management Scheduling professional is a special certification addition to the PMP certification, which they give which is helpful for scheduling professionals.

Now, what is the advantage of being a part of such professional bodies? Certainly, you can you know, you have like minded professionals, you have people who are working on the same problems, same issues and there is a lot of learning you get from experienced people in the area. So, this is very important, these experienced people are not just doing practice, but they have also got their concepts, they have tested the concepts, they have adapted the concepts and there is a lot of learning that takes place and also as we know, the software is important for this.

Several of you have asked for software, we will touch upon this little later, but the software does keep changing. You know, whether it is Microsoft project or primavera, the version every 2-year changes, features change and you have to be effective, you have to be trained on the software, the latest features of the software. These agencies or these institutions offer such kind of training and you know not only that, the network keeps you abreast of what is happening in these fast paced areas too.

And they have certainly got journals and conferences which you attend, not only to gain knowledge but also to contribute knowledge. If you have done something novel, you can visit, you can go these conferences, present what you have done and you will get feedback from other professionals in this area and similarly, networks to share, discuss if I mean there are several online forums these groups have. That if we have issues in a particular practical situation, others will actually discuss to help you out and see what the, what, how would to solve a particular problem or issue.

So, these professional certifications are important and you know, in addition to being a civil engineer if you actually look up on some of these, you will get an idea if this is an attractive profession for you.