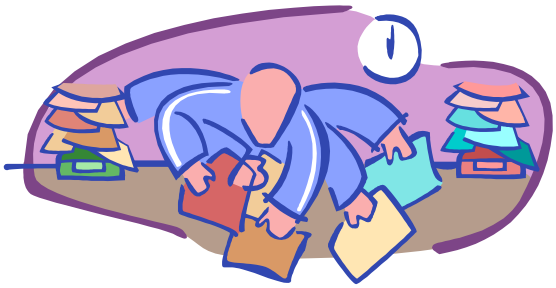
PROJECT AND TECHNOLOGY MANAGEMENT FOUNDATION

(A non-profit Organization)

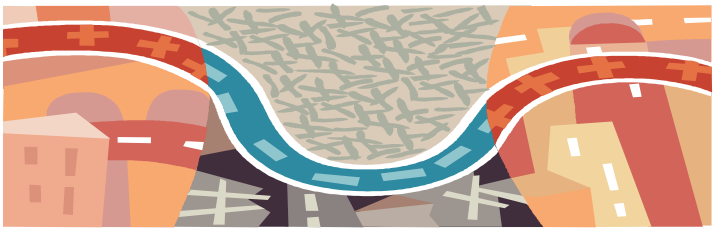
Website http://www.ptmfonline.com/

Project planning, scheduling and management



project management

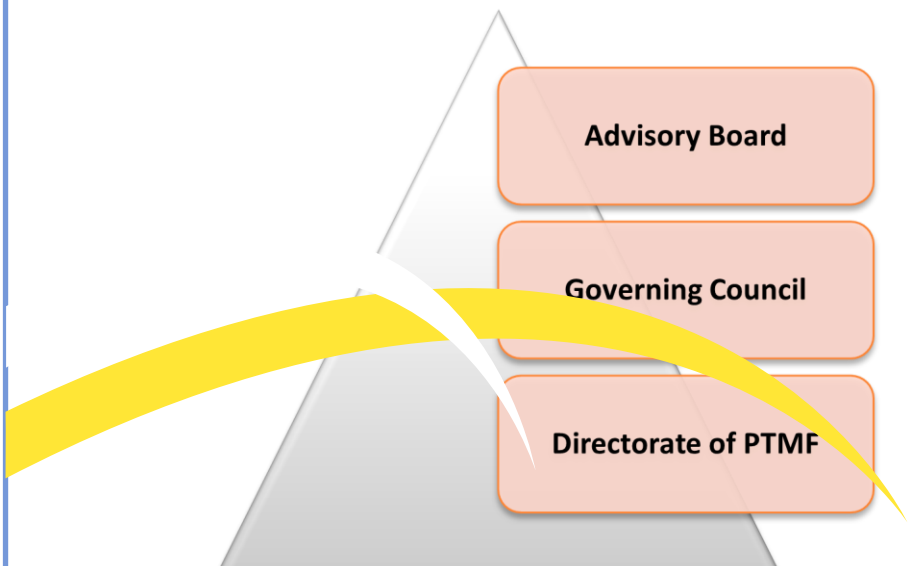
for Infrastructure development



PTMF Overseas Associates

- LENS LIVING LABORATORY, Slovenia
- NETLIPSE , Netherland

PTMF Organizational Structure



Advisory Board

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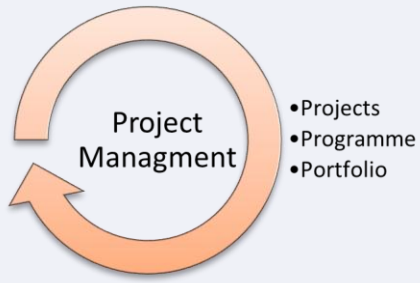
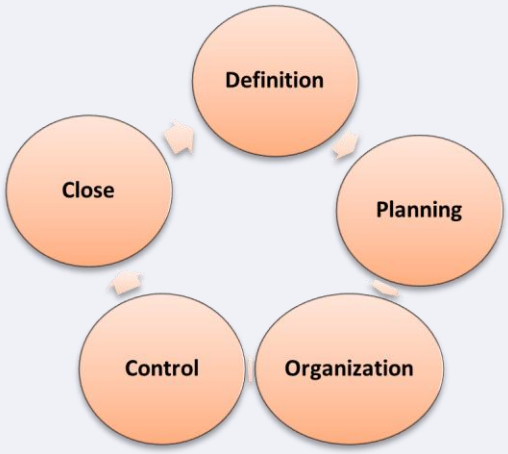


Project life cycle



Performance

Upcoming Events

1. Workshop on:

   Core issues in management of road and highway projects-

   February 17 and 18, 2012, New Delhi

2. Global Conference on:
   Management Challenges in Large and Complex Infrastructure Projects
   November 2012, Venue-New Delhi

Editor's Note

Ramesh S. Tyagi

We have great pleasure in presenting the **inaugural issue** of the e-newsletter of Project and Technology Management Foundation (PTMF). The foundation was constituted by a group of professionals, academics and practitioners as a non-government, non-profit registered trust in the year 2010. The main objective of the foundation is to contribute to development and promotion of the latest concepts and practices in the profession of project management, programme management and technology management.

Effective management of projects is critical in view of its **economic importance**. According to the World Bank report (2007), about one -fifth of world's $ 50 trillion gross domestic product is spent on new capital formation. India spends about one third of its GDP and China a massive 45 percent on new capital formation which is almost **entirely project-based.**

During the last forty years there has been substantial progress in technological development of tools and techniques for project planning and management. However, projects, particularly large infrastructure projects, still suffer severe cost and time overrun.

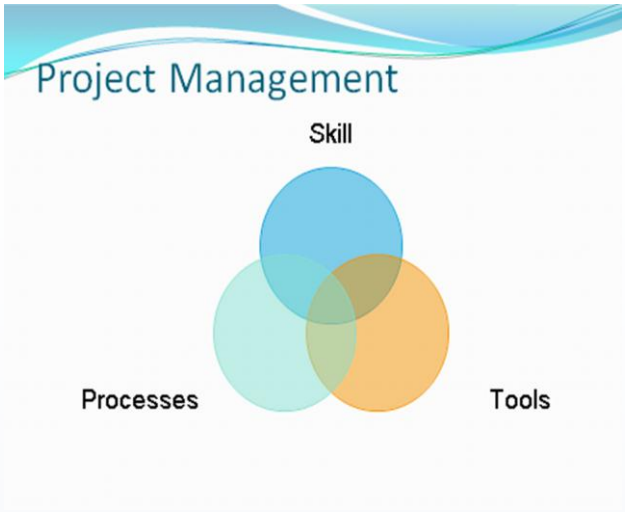
Every project is unique and no standard formats can be applied. Different framework of methodologies and processes are required for different types of projects. This requires the right skills and experience, leadership and innovative approach, application of right tools, techniques, methodologies and processes.

Project and Technology Management Foundation (PTMF) lays great emphasis on sharing of experiences of practical aspects of project management practices in India and overseas and development of project managers as leaders who can effectively manage cost, time, quality risks and change in a project.
The foundation provides training and education and undertakes research on concepts, principles, best practices, techniques, tools and methodologies in the areas of project and programme management and technology management. Knowledge will be disseminated through case studies, workshops and seminars.

This issue contains two interesting and must read articles on 'avoid cost overruns in Megaprojects' by Mr Bhaumik Himansu and 'World class projects being built in India' by Prof Rajat Baisya.

All professionals are invited to share their experiences, views and ideas through this e-newsletter, which will be published quarterly and distributed widely in India and overseas.

PTMF



Skills

A set of skills:

- Specialised Knowledge;
- Experience;
- Leadership qualities**;**

Processes

A series of processes required for planning, scheduling and Managing the projects:

- Time management;
- Cost management;
- Risk management;
- Change management.

Tools and Methodologies

A sample of **modular tools** currently in use:

- Artemis (Artemis International Solutions Corporation);
- Asta team Plan (Asta Development Plc);
- Open Plan (Deltek);
- Planview (Plan View Inc);
- Primavera (Primavera Inc.);
- Clarity (Commuter Associates –formerly NIKU);
- Hydra (Program Management Group).

Methodologies

Structured project management requires use of recognized Methodologies.

- BS6079-A guide to project management;
- PRINCE 2 TM;
- ISO 10,006-Guidelines to quality in project management;
- PMOK RGuide: A guide to the project management body of knowledge

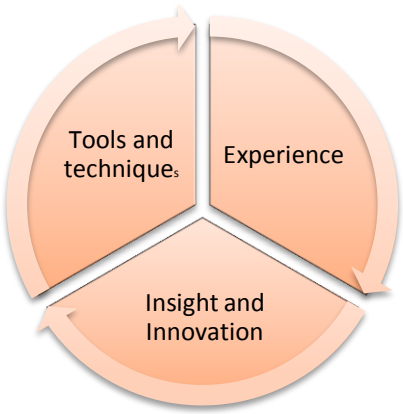
Techniques

- **Earned Value Management (EVM)** for monitoring projects combining specifications, time and cost;
- **Critical Chain Method by** Eliyahu M. Goldrat

Most common reasons cited for time and cost overrun:

- Unrealistic estimates of time and cost
- Delay in land acquisition;
- Issues related to rehabilitation;
- Delay in environmental clearances;
- Poor law and order situation;
- Paucity of financial resources;
- Poor performance of vendors and contractors
- Contract disputes and court cases;
- Changes in the scope during construction

The issue of cost and schedule overruns in major infrastructure projects and programmes is of great economic significance and needs to be addressed. Effective Projects and programmes management is the key for infrastructure development. Every project is unique and no two are quite alike. In essence, systems and methodologies are tailored to suit particular functions using innovative and creative approach. Tools and techniques are very important but not enough. Effective project management happens where blend of science (tools and techniques), craft (experience) and art (insight and innovation) is judiciously utilised..



Avoid Cost Overrun for Megaprojects

Bhaumik Himansu
President, AGB Project Management Inc, Canada

Cost overruns are becoming an increasingly common occurrence for megaprojects. Although some of the causes of cost overruns are outside the project team's control, a great many of these incidences can be traced back to a lack of detail in the early stages of project definition, budget estimates, and financial approval. Cost parameters may not be defined in sufficient detail during the development of many estimates, leading to subsequent cost growth. Issues of concern may include design growth, start up and commissioning, financing costs, interest costs, insurance, land acquisition and social issues, construction indirect, logistics, escalation, and contingencies.

Typically, the cost overrun of megaprojects refers to the degree to which the final cost of the project exceeds the 'base' estimate. It is important to identify the timing of the estimate, as it is not uncommon to have three or more estimates throughout the life of a single megaproject. Usually, the earliest cost estimate prepared for the purposes of obtaining project approval is known as the 'base' estimate. Sometimes it is also known as the 'AFE' (Approval for Expenditure) estimate.

The common methodology used by the estimator is to break down the total scope of a megaproject into smaller elements and then to estimate the cost of each of these elements. Each element, in a simplistic way, is the product of 'quantity', 'unit rate', and 'unit price/cost'. Examples of the 'quantity' are cubic yards of excavation, square feet of paving, liner feet of pipes, tons of structural steel, etc. Examples of 'unit rate' are craft-hour per ton of steel erected, man-hours per drawings produced etc. Examples of 'unit cost' are $ per liner foot of pipe, $ per ton of structural steel, $ per cubic yard of cement, $ per piece of a pump, $ per carpenter-hour, etc.

The conventional method used for estimation is to work out the single point values of quantity, unit rate, and unit cost of individual elements, multiply as required, and then combine the estimate for each element to arrive at the total estimated cost of the project. However, since it is impossible to determine exact costs at the point of project completion, these estimates are merely predictions of future values based on the information available at present.

Because of the inherent uncertainty associated with prediction, the estimated cost is subject to variance from the actual costs incurred during implementation. For most megaprojects suffering from significant cost overrun, it can be concluded that the early estimates may not have adequately covered the factors contributing to the variance. If serious efforts towards applying adequate methods and processes were undertaken to improve on the quality of the estimate, any discrepancies between estimates and actual costs would be far less drastic.

Once the project scope is defined, current levels of engineering knowledge can disseminate the scope information into a set of definitive quantities for major commodities. The uncertainty associated with quantities is usually related to timing. Unless the megaproject is a repetition of an earlier project design, the quantities predicted for the major work at an early stage of engineering is never accurate enough to match the final quantities.

Although the basic engineering data in terms of plant capacities, climatic condition, geo- technical investigation, and environmental requirements are known with satisfactory detail, most of the equipment dimensions and weights are not available during the early stages of engineering. Engineers are required to predict the weights and dimensions based on historical data and/or preliminary vendors' data. The net effect is a corresponding uncertainty about the equipment layouts and the design of foundations, which in turn affects architectural, structural, piping, electrical, and instrument layouts.

Another area of uncertainty associated with engineered quantities is related to mass site work. This consists of clearing, stripping, grubbing, excavation, backfilling, soil stabilization, drainage, and road work. The design basis required for finalizing the extent of these works is available during the early engineering phase. However, the quantities are not engineered with sufficient definition and are usually left to site verification. This results in considerable variance between the estimated and actual quantities, leading to quantity growth.

Quantities associated with indirect costs are dependent on a time element such as duration of the concerned activity. For example, rental of construction trailers depend on the duration governed by the period of construction. The point to note here is that for a number of indirect cost items, the period of construction introduces another round of uncertainty.

While estimating construction cost, unit rates usually refer to construction productivity in terms of man-hours needed to construct a unit quantity of work. Usually reliable databases are available, and in some cases EPC companies maintain their own in-house databases. However these databases are prepared using a standard productivity index (gulf coast assumed as 1.0). The uncertainty associated with the unit rates mainly concerns the assigning of an appropriate productivity index to suit an actual project condition. This can be challenging for many overseas locations, as local productivity numbers are not available. Moreover, estimated productivity may not match actual project levels, due to sources of labor originating from countries other than the ones indicated in the estimate. Therefore, decisions regarding alternate sources of construction labor are desirable early in the project as a part of the overall construction strategy.

There are a few other cost elements those are not traditionally covered by engineered quantities, and these elements may constitute a substantial part of the project estimate. Underestimating these costs often leads to cost overrun. Examples are:

- Freight cost and logistic
- Financing cost
- Start up and commissioning cost
- Insurance cost
- Social costs
- Land acquisition cost
- Operation ramp up cost
- Owner's cost

Escalation and contingency are normally addressed separately and included in the cost estimate as separate line items. Escalation is included to cover the change in price of labor, materials, and services due to inflation and other market conditions. It is normally not related with the degree of engineering completeness and as such can be estimated even during the early stage of the project. There are usually two parts to the process of estimating the escalation. The first part is to determine the point in time when a certain commitment of project expenditure is made. The second part is to predict the applicable escalation rate from the time the base estimate is prepared. There is, however, uncertainty associated in predicting both of these factors.

Contingency is added to the estimate to cover uncertainties associated with estimation. AACE defines contingency as "an amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs". Many megaprojects include this cost based on experience and find it to be inadequate while executing the project. It is recommended to estimate the contingency using statistical means through risk analysis and adopting range estimation techniques.

WORLD CLASS PROJECTS BEING BUILT IN INDIA

PROF RAJAT K.BAISYA*

India is a fast emerging global economy. Developed western world is closely watching the fast track growth of India and is trying to be a part of this growth process. India is growing and surging ahead despite several constraints, contradictions, corruptions and all other form of limitations. Our growth trajectory of over 8 % will speak volumes of our envious records. It looks like that whole world is watching us and trying to formulate their own growth strategy looking at entry strategy options to become part of this phenomenal economic growth. Obviously, to support that fast growth numerous investments in various sectors are happening and the whole nation seems to be in a project implementation mood. It is like managing business through projects.

Project management discipline is thus fast emerging as most important to make sense of the huge fund being committed to numerous such projects for nation building. Our past record of project performance is not very encouraging. Large public sector projects are normally completed with huge cost and time overrun in India resulting into huge drain into national resources in addition to benefits being derived much later than planned. Some of the large infrastructural projects were said to have been completed spending three times the original planned and approved budget so much so that planning commission , the nodal agency for monitoring public funded projects are now seriously looking into finding out mechanisms to significantly improve the scenario. The primary reasons are cited as delay in getting several clearances such as the bureaucratic hurdles involving multiple agencies in central and state governments including those requiring cumbersome environmental clearances. Careful analysis of those projects , however, will reveal that with appropriate planning and monitoring mechanism for project management in place much of those delays could have been controlled. Some projects even got delayed for the reasons that the large and heavy equipments were found to be impossible to be transported through some sections of the road which were found to be not suitable for carrying such heavy load of these heavy equipments and the road has to be re-constructed involving different agency to carry out and that too was discovered after equipments have arrived to be transported to project site resulting into huge delay which could have been avoided with proper planning. The large infrastructure projects which are now implemented in PPP mode have better record in terms of managing cost and time overrun. Where government is very keen to see that timely completion is achieved, results were seen to be better.

Project management is not matured in India and we don't have many certified project managers in the country. However, we have excellent project managers who have accomplished significant success and created records. For example, Delhi Metro Rail Corporation who has set up Delhi Metro Project will soon become larger than London metro and was installed and commissioned in record time and it is headed by an experienced railway engineer Mr E. Sridharan who took over the charge couple of years after his retirement. They had , of course , one major accident in one section of the construction site causing death of some workers but besides that everything went off like clock wise precision. Recently, in Mumbai one section of the of the Mono rail project which is under construction collapsed causing death of two workers at site. Whereas Bandra- Worli Sealink project in Mumbai is often being cited as an example of successful project. The same Sealink is now going to be extended further up to Nariman point in south Mumbai. There are several such infrastructural projects are now being undertaken in various parts of the country. Some of them are mammoth engineering marvel in the making. In spite of several constraints, India is embarking upon to create world records. I am describing below that mammoth engineering excellence.

A sky bridge in Chenab in Jammu district in north India is one such engineering marvel. It is the highest ever railway bridge in the world scheduled to be completed in 2016- a project in which highly skilled team of Indian and foreign engineers are involved. This sky bridge is being constructed on the Chenab river upstream of the Salai dam between the villages of Bakkal and Kauri. The 1.3 Km long bridge is a part of the 73 km long section of the Udhampur-Srinagar- Baramulla Rail Link (USBRL) being executed to provide rail connectivity to the Kashmir Valley. This bridge will soar 359 meters over the river bed, six times the height of the Panvalnadi bridge in Maharastra (the tallest so far in India), more than five times the height of the Qutab Minar in Delhi (a monument constructed during Moghul empire time and is a heritage site), 35 meters taller than Eiffel tower in Paris and 19 meters taller than the world's tallest rail bridge on France's Tarn River with its tallest pillar rising 340 meters.

Konkan Railway Corporation Ltd (KRCL), a public sector enterprise under the railway ministry is executing this Rs 512 crore (USD 115 million)project for northern railway. Rajesh Tripathi , Director (way and works) and Rajesh Agarwal , General Manager (Projects) of KRCL are controlling the project. Other senior people associated with the project are Mudit Bhatnagar, chief engineer (Bridges) and P.S Gupta , chief engineer (design) both are on deputation on this project.

While KRCL is the executing agency, the bridge is being designed and constructed by Chenab Bridge Project Undertaking, a joint venture between AFCONS, Ultra Construction and Engineering Company of South Korea and VSL India. This JV has further appointed two design consultants- WSP Consulting Kortes of Finland for bridge viaducts and foundations, and Leonhardt Andra & Partner of Germany for the main steel arch. In addition, a proof consultant from the UK has been appointed to re-verify the designs. Overall, it is a huge team of engineers, contractors and foreign consultants working together in the project. Project of this magnitude which is being built in challenging terrain requires experience and knowledge of the experts from all over the world. AFCONS has deployed at least forty engineers at the work site for this bridge project which is in addition to the foreign experts who keep visiting have to provide extra incentives and bonuses for the engineers associated with this project

The design of the 1.3 km long bridge is divided into three segments- a 467 meters steel arch in the center, a 185 meter approach deck from Bakkal end and a 650 meters approach deck from the Kauri end. While the bridge will emerge from single track tunnels on both sides, it has been designed to accommodate a double track. Overall, the bridge will span 11 concrete and five steel pillars. The construction being carried out in a geologically sensitive terrain where at times wind blow at a speed exceeding 266 kilometer per hour at the location which is also a highly active seismic zone with possibility of terrorists attack. This is really a test case for engineering and project management skills of the organization created to execute this project.

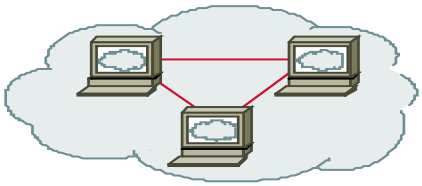
In addition to the multinational and multicultural global team working on this project there are fifteen prime Indian institutions and other research agencies including Indian Institute of Technologies (IITs), Indian Institute of Science (IISc), Research, Design and Standards Organization (RDSO), Defence Research and Development Organization(DRDO) and an equal numbers of foreign contractors are grappling with the daunting task of erecting this mega bridge. The paint being used for the bridge is being procured from Japan. It has been approved by RDSO and can withstand extreme weather conditions for 35 years as against 5 years that normal paint lasts. "With a project of this magnitude, everything we do become a world record" said a senior KRCL executive.

About Prof Rajat Baisya

Prof Rajat K Baisya is a Fellow of Institute of Engineers and Indian Institute of Chemical Engineers. He is an acknowledged expert in Project Management, written four books and over 300 research articles. He is in the board of several public and private companies in India, a member of PMA of India and editor of Research Management Board, IMPA Newsletter and also an assessor of the Project Excellence Award of IPMA. He is in the editorial board member of many International journals. He is an academic advisor of PM- Forum and founder President of Project & Technology Management Foundation. He can be contacted at rkbaisya@hotmail.com

MAIN FOCUS OF PTMF

NETWORKING



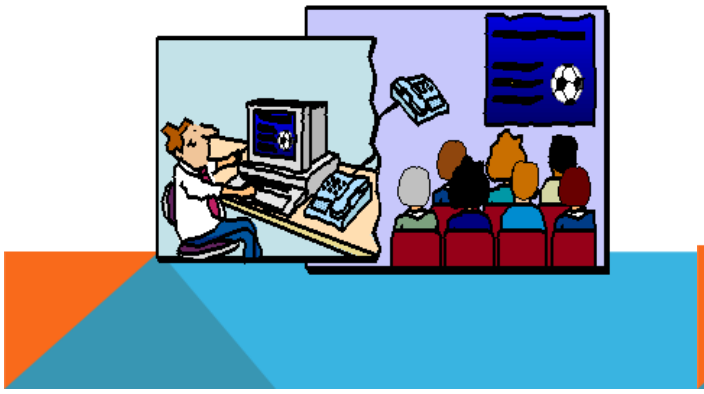
GLOBAL PERSPECTIVES

Conferences, Seminars

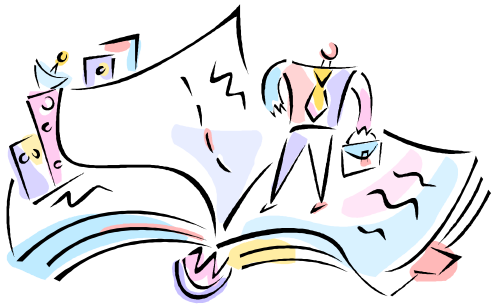
BEST PRACTICES IN PROJECT MANAGEMENT

SHARE EXPERIENCES

TRAINING AND DEVELOPMENT
KNOWLEDGE TRANSFER



UNDERTAKE RESEARCH ON CONCEPTS, TOOLS AND TECHNIQUES AND DEVELOPMENT OF **CASE STUDIES**



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