Project Delays - A Dragon that kills the Project

By BJ. Vasavada

Techno Legal Consultant, Advocate, Arbitrator

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1. Preamble :

Project is defined as a task to be completed within a prescribed cost, prescribed time. This task has to be of the desired quality. Time and cost overruns cast a negative impact on the cost benefit ratio and deprive the project beneficiaries of the project benefits.

Project Cycle :

- Pre-investment planning,
- Pre-feasibility analysis,
- Project appraisal,
- Project engineering,
- Project approval,
- Pre-tender planning and engineering,
- Project implementation and
- Construction, project monitoring and evaluation.

Any project, whether related to infrastructure development, manufacturing processes, services etc. starts at a point of project identification and ends at post project appraisal. During this journey of the project, it passes through various stages.

Every project therefore has to be meticulously planned and conceived so as to cover the entire project cycle efficiently and effectively.

In case of infrastructure projects, which are planned to provide services to the community, social cost benefit analysis is of critical importance. This is a method to evaluate investment in projects from social point of view and focuses on social costs and benefits of such a project (quantifiable and non quantifiable in terms of monitory values).

Time and cost therefore become important and paramount factors which affect the success of the project as well as its benefits. Delays in project, are like a Dragon which

not only kills the project but eats away the financial and economic benefits that are to accrue out of a project.

2. Delayed Projects:

EXTENT OF COST OVERRUN IN PROJECTS WITH RESPECT TO ORIGINAL SCHEDULE

(Status as on 31.12.2008)

Sr. No.	Sector	Total Projects: No. of Projects	Original Cost (Rs.Crore)	Anticipated Cost (Rs.Crore)	Cost Overrun %	Projects with cost overrun: No. of Projects	Original Cost (Rs.Crore)	Anticipated Cost (Rs.Crore)	% increase
1.	ATOMIC ENERGY	5	24291.26	23360.26	-3.83	0	0.00	0.00	0.00
2.	CIVIL AVIATION	29	2056.65	2117.58	2.96	8	391.16	452.09	15.58
3.	COAL	118	28625.64	30033.29	4.92	18	6850.94	8642.31	26.15
4.	I & B	1	35.00	35.00	0.00	0	0.00	0.00	0.00
5.	MINES	1	4091.51	4091.51	0.00	0	0.00	0.00	0.00
6.	STEEL	53	47016.94	51641.71	9.84	14	10448.57	15078.34	44.31
7.	PETROLEUM	49	70040.75	76674.02	9.47	19	38383.69	48515.29	26.40
8.	POWER	70	116828.85	120904.68	3.49	22	29401.94	34512.59	17.38
9.	HEALTH & FW	1	71.18	443.15	522.58	1	71.18	443.15	522.58
10.	RAILWAYS	251	42943.29	80735.94	88.01	183	32034.39	69926.81	118.29
11.	ROAD TRANSPORT & HIGHWAYS	204	57135.95	58117.55	1.72	19	5736.70	6909.64	20.45
12.	SHIPPING & PORTS	44	7454.62	7666.88	2.85	12	467.98	711.32	52.00
13.	TELECOMMUNICATION	44	15473.86	14547.85	-5.98	3	533.55	654.48	22.67
14.	URBAN DEVELOPMENT	29	15671.95	16235.39	3.60	2	8147.92	8714.14	6.95
15.	WATER RESOURCES	1	542.90	1187.00	118.64	1	542.90	1187.00	118.64
16.	INFORMATION TECHNOLOGY	2	64.90	86.86	33.84	1	20.00	41.96	109.80
	Total	**902**	**432345.25**	**487878.67**	**12.84**	**383**	**133030.92**	**195789.12**	**47.18**

EXTENT OF TIME OVERRUN IN PROJECTS WITH RESPECT TO ORIGINAL SCHEDULE

(Status as on 31.12.2008)

Sr. No.	Sector	Total Projects: No. of Projects	Original Cost (Rs.Crore)	Anticipated Cost (Rs.Crore)	Cost Overrun %	Projects with time overrun: No. of Projects	Original Cost (Rs.Crore)	Anticipated Cost (Rs.Crore)	Range of delay (Months)
1.	ATOMIC ENERGY	5	24291.20	23360.26	-3.83	3	16586.26	16586.26	16-31
2.	CIVIL AVIATION	29	2056.65	2117.58	2.96	22	1308.46	1453.47	2-50
3.	COAL	118	28625.64	30033.29	4.92	32	1884.71	1995.86	3-192
4.	I & B	1	35.00	35.00	0.00	0	0.00	0.00	-
5.	MINES	1	4091.51	4091.51	0.00	0	0.00	0.00	-
6.	STEEL	53	47016.94	51641.71	9.84	27	12184.09	16494.58	2-28
7.	PETROLEUM	49	70040.75	76674.02	9.47	30	45260.77	53270.13	1-61
8.	POWER	70	116828.85	120904.68	3.49	32	64376.21	68087.08	1-68
9.	HEALTH & FW	1	71.18	443.15	522.58	0	0.00	0.00	-
10.	RAILWAYS	251	42943.29	80735.94	88.01	63	14661.59	31628.98	1-180
11.	ROAD TRANSPORT & HIGHWAYS	204	57135.95	58117.55	1.72	111	24587.26	25063.59	1-96
12.	SHIPPING & PORTS	44	7454.62	7666.88	2.85	26	1953.36	2110.22	4-96
13.	TELECOMMUNICATION	44	15473.86	14547.85	-5.98	21	5874.92	5379.72	2-54
14.	URBAN DEVELOPMENT	29	15671.95	16235.39	3.60	12	8507.59	9065.09	1-65
15.	WATER RESOURCES	1	542.90	1187.00	118.64	1	542.90	1187.00	60
16.	INFORMATION TECHNOLOGY	2	64.90	86.86	33.84	0	0.00	0.00	-
	Total	**902**	**432345.25**	**487878.67**	**12.84**	**380**	**197818.12**	**232321.98**	

The data published by the Ministry of Program Implementation, Govt. of India as of 31st December, 2008 depicts the cost overrun in projects with respect to the original cost.

The data presented above is self speaking and reveals the loss in terms of time and cost suffered by the National Economy. The performance of sectors like water resources, railways, highways is very poor in terms of both time and

- Out of 902 projects, 14 projects are ahead of schedule,
- 236 are on schedule,
- 380 projects are delayed w.r.t. the original schedule.
- 142 projects were approved without original date of commissioning
- 216 projects the anticipated date of commissioning has not been firmed up.

cost.

3. Project Delays - Reasons :

The projects are delayed because of the following major reasons:

* Inadequate or improper planning;
* Inordinate delays in land acquisition and site selection;
* Loss of significant time in getting statutory approvals;
* Slow and inefficient procurement systems;
* Inefficient Project Management Systems;
* Lack of empowerment and authorization of Project Managers;
* Lack of proper and effective decision making processes;
* Absence of complete and exhaustive pre contract engineering;
* Unbalanced identification and allocation of risks and responsibilities in project contracts;
* Lack of articulation of Project Objectives and Policies;
* Weak and inefficient Project Organization;
* Project specific bids / contracts are not framed;
* Ambiguous drafting of Engineering Specifications;
* Prescription of Project Time without project specific time analysis;
* Poor Control and Information System;
* Neglecting Human aspects of Project Management;

4. Classic examples of delays:

The author, as a legal consultant and arbitrator had the opportunity of evaluating delay matrix and the reasons that resulted into critical disputes between the contractors and the project organizations. These disputes have not only delayed the projects but have resulted into heavy losses to the public exchequer. Some of the classic cases are presented so as to highlight the critical need of efficient Project Management Systems.

* Case 1 :

Construction of a bridge on the River Chapora on NH-17 near Kolvale in the State of Goa:

Govt. of Goa awarded a contract for in 1979 to National Project Construction Corporation (NPCC). Disputes cropped up because of the issues relating to designs, drawings, construction methodology etc. and NPCC could not complete the project.

Fresh tenders were invited and the balance work was awarded to U.P. State Bridge Corporation Limited in 1989. There were several issues relating to finalization of the General Area Drawing (GAD), change of vertical clearance, reorientation and reduction in bridge span subsequent to the award of the contract, lack of coordination in decision making between Govt. of Goa and the Govt. of India. The second contractor could not complete the work and the contract was terminated March 1995 i.e. after 6 years. New contract was awarded to M/s. Gammon India Limited. This was also delayed by two years.

The original price of the first contract was Rs. 3 Crores and the final actual cost was around Rs. 11 Crores. Delays resulted into a financial loss to the State. Arbitration awards are yet to be given, which are likely to add to the cost in terms of compensation with interest to the contractors.

* Case 2:

Construction of Bridge across Damanganga River at Daman :

The contract was awarded in November 2003. The tender provided for river discharge at the place of construction of the Bridge as 15000 Cumecs. River Daman Ganga was un-precedently flooded in August 2004 and the river discharge was revised to 28289.15 cumecs. The design and construction methodology had to be changed from simple well sinking to usage of floating caissons. The Govt. took up revision of the design of foundations and the designs could be finalized only in April 2005. The contractor requested for revision

in the original contract price (Rs. 16 Crores) to Rs. 34 Crores due to the change of design which was not accepted and the contract was terminated. Fresh contract was awarded to other contractor at a higher cost then what was claimed by the contractor. Delays resulted into loss of time and extra expenditure on the part of the Govt.

There are several such cases which bring out that project delays really

affect the project economy and the project finance.

5. Strategy to avoid Project Delays :

5.1 Pre-investment Planning :

* Critical analysis of Project needs to justify Project Investments
* Project Priorities - Local, Area specific, State / National
* Diagnostic study of the Project Area covering the existing facilities, future requirements, gaps to be covered
* Overview of Project Cost
* Overview of Project Benefits - Quantifiable / Non-quantifiable
* Cost Benefit Analysis / Social Benefit Analysis

5.2 Technical Analysis :

* The issues to be addressed are:

* Whether preliminary tests like site surveys, topographical studies, soil characteristic, geology and geo-hydrology, ground profiles etc. are properly and adequately done ?

* Whether the technology proposed for the project is appropriate and user friendly? Answer to this question is very critical because the technology has to be selected and applied keeping in mind the existing situations and local conditions prevailing in the project area.

* Whether the proposed scale of operation is optimal in the context of the project?

* Whether the engineering options are selected after careful and conscious comparison of different options?

* Whether the processes proposed for the project are suitable to the conditions prevailing in the project area?

* Whether the equipments, machineries, tools and tackles that are proposed under the project are optimally suitable in relation to the project objectives and output efficiencies?

* Whether the quantum of work involved in the different components of the project has been rightly and correctly estimated?

5.3 Project Planning - Key to Effective Project Management :

Project Planning Stages

- Preliminary Engineering
- Bidding and contract negotiation
- Detailed engineering design
- Purchase and procurement
- Construction and commissioning

* Projects involving few activities, resources, constrains and inter relationships can be visualized by the human mind and planned informally.

* When Project crosses a certain level of size and complexity formal planning is a must.

* Without effective planning there may be chaos.

5.4 Functions of Planning :

* It provides a basis for organizing the work on the project and allocating responsibilities to individuals.

* It is a means of communication and coordination between all those involved in the project.

* It induces people to look ahead

* It instills a sense of urgency and time consciousness

* It establishes the basis for monitoring and control.

5.5 Areas of Planning:

* Planning the Project Work: The activities relating to the project must be spelt out in detail. They should be properly scheduled and sequenced.

* Planning the manpower and organization: The manpower required for the project (managers, technologists, and manual labour) must be estimated and the responsibility for carrying out the project work must be allocated.

* Planning the money: The expenditure of money in a time phased manner must be budgeted.

* Planning the information system: The information required for monitoring the project must be defined.

5.6 Work Breakdown Structure :

* Effective planning by dividing the work into manageable elements which can be planned, budgeted and control.

* Assignment of responsibility for work elements to project personal and outside agencies.

* Development of control and information system

5.7 Complete & Exhaustive Pre-Contract Engineering

* Recon Surveys

* Detail Engineering Surveys

Bill of quantities are of much value and importance to the bidders. This is because;

- i) They form part of the contract.
- ii) They constitute the exact measure of the work undertaken by the builder.
- iii) They serve, under the terms of contract, as the basis for valuation.
- iv) On pricing, the bill of quantity gives an estimate of the total cost of work.

* Geo-tech surveys and investigations

* Firming up locations of structures and clear identification of land sites

* Land acquisition

* Right of User

5.8 Bill of Quantities - Based on site investigations

• The quantities of each item of work should also be worked out on the basis ofaccurate site investigations and designs of work. This is very much essential, so as to arrive at a near-to-correct cost estimate of work based on which bids are to be invited.

• Accurate site investigation gives a very vital data based on which the estimate of work put to tender is worked out. Following data should be collected on the basis of careful and in depth site investigation. o Depth of ground water table

• Classification of sub soil strata based on trial pits and trial bores o Actual lengths measured on site in case of road, canal & pipe line works

• An accurate survey giving realistic ground levels connected to a standard datum level like the GTS bench mark o Soil bearing capacities based on testing of soil samples. This base line date should be properly documented

5.9 Maps & Drawings :

In all bid documents, it is essential to attach the followings maps and drawings.

• An index plan indicating the site and location of the work.

• The plan showing the outline of the work with the basic governing dimensions, e.g., in case of a work pertaining to a building, a plan, elevation and a cross sectional view should invariably be given.

• These drawings should be properly and uniformly dimensioned as per the prescribed Bureau of Indian Standard specifications

• Should be prepared in a manner so as to make it possible for the contractor to visualize the scope of work by way of a simple reading of the drawing.

- The drawings should also be prepared in a way so that the quantities of work mentioned in the schedule of quantity match with the details of the drawings and it represents a true and complete description of the works to be undertaken by the contractor when read along with specification of the work.

- There will be cases wherein it may not be possible to attach all the detailed engineering drawings containing complete design details etc. along with bid documents.

- However, thesedrawingsshouid invariably be prepared, finalized and got approved from the competent authority prior to the invitation of the tenders.

- These drawings should be kept ready in the office of the authority inviting tenders so that the intending tenderers have an access to these drawings.

- Such detailed drawings should be issued to the successful bidder in the form of working drawings for smooth and speedy execution of the work.

- AH drawings should be authenticated by the competent authority so as to avoid disputes as regards the correctness or the authority of the drawings.

- More over, it should also be in kept mind that normally all the work implementing organizations issue the blank bid documents on sale and the cost of the blank tender copy includes the cost of the drawings.

5.10 Prescription of Time of Completion :

- Every work awarded to a contractor has got to be completed in a prescribed period of time.

- This time is decided on the basis of the over all project

Time period shorter than the reasonable time required. for completion of work, prescribed, also lead to quotation of prices tendering. It should appreciated that time monetary value.

importance with a view to achieve the project goals in time.

- Each of the bid document, therefore, should contain a very clear and unambiguous clause indicating the limit of time in which the work is to be completed.

- The clause should be so drafted calling upon the contractor to give a detailed schedule of performance indicating the quantum of work to be completed in a prescribed portion of the total time of contract.

- While designing the performance schedule for incorporation in the bid documents, the engineer or the owner or the organization inviting the tenders should make his own realistic assessment of the time in which the work can be completed.
- The modern management theory of work-time study should also be carried out for major works. It should be very clearly understood that time has relation to the quantity of work. Construction work has the vital component of labour.
- The basic time for each item of the work can be worked out keeping in mind the specifications of the work.
- The estimates of time required for completion of a particular work shall also depend on the type and nature of work and in many cases, local site conditions also play a vital role.
- There is no point in prescribing time schedule which is humanly not possible to achieve.
- While assessing the time of completion of work items, factors like curing period of cement concrete transportation time, time of procurement of materials etc should be taken into consideration.
- If the owner/engineer has to supply materials to be used in the work, the delivery time of these materials should also be considered.

5.11 Project Controls :

concern

Poor Control And Information System

- Delay in reporting performance
- In appropriate level of detail
- Unreliable information
- No sooner the project is launched, control becomes a dominant
- Planning and control become closely intertwined in an integrated management process.

- Project control involves regular comparison of performance against targets
- Search for the causes of the deviations
- Commitment to check adverse variances, ensures regular monitoring of performance,
- Motivates project personal to strive for achieving project objectives.

5.12 Project Performance Analysis :

- Is the project as a whole (and its individual parts) on schedule, ahead of schedule or behind schedule? If there is a variation, where did it occur, why did it occur, who is responsible for it and what would be its implications?

Project Management Tools

- Bar Chart
- Simple to understand,
- Can be used for manpower planning
- Does not show inter relation of activities
- Network Techniques - PERT / CPM / MS Projects
- Effectively handle inter relationship among project activities
- Identify critical activities and float (spare time) available
- Can handle large and complex projects
- Can be computerized and updated
- More complicated than traditional Bar Chart for the project personal
- Does not define an operational schedule which tells who does, what
- Has the cost of the project as a whole (and its individual parts) been as per budget estimates, less than the budget estimates, or more than the budget estimates? If there is a variation, where did it occur, why

did it occur, who is responsible for it and what would be its implications?

- What is the trend of performance? What would be the likely final cost and completion date for the project and its individual parts?

5.13 Pre requisites for successful project implementation

- Adequate formulation
- Sound project organization

- Proper implementation planning
- Advance action
- Timely availability of funds
- Judicious tendering and procurment
- Better contract management
- Effective monitoring.

5.14 Human aspects of Project Management

- Satisfactory human relation system is essential for successful execution of a project.
- Technical problems can be solved with additional investment of resources
- Peoples' problems may not be amenable to a satisfactory solution in the short span of the project life.
- Satisfactory human relations require successful handling of problems and challenges relating to:
- Authority o Orientation o Motivation o Group function

5.15 Project Management Philosophy :

- Adopt a project management methodology and use it consistently.
- Implement a philosophy that drives the company toward project management maturity and communicate it to everyone.
- Commit to developing effective plans at the beginning of each project.
- Minimize scope changes by committing to realistic objectives.
- Recognize that cost and schedule management are inseparable.
- Select the right person as the project manager.

Ten commandments to improve project performance :

- Bypass an obstacle
- Cause people to stretch, not break
- Focus on the goal
- Follow a standardized process
- Learn from the past
- Maintain ongoing communications
- Record the work being done
- Reuse previous work
- Seek buy-in from all involved
- Seek simplicity, not complexity, in goal and path

- Provide executives with project sponsor information, not project management information.
- Strengthen involvement and support of line management.
- Focus on deliverables rather than resources.
- Cultivate effective communication, cooperation, and trust to achieve rapid project management maturity.
- Share recognition for project success with the entire project team and line management.
- Eliminate non-productive meetings.
- Focus on identifying and solving problems early, quickly, and cost effectively.
- Measure progress periodically.
- Use project management software as a tool- not as a substitute for effective planning or interpersonal skills.
- Institute an all-employee training program with periodic updates based upon documented lessons learned.

5.16 Nine Factors - Critical to Project Success:

- Appropriate senior management levels of commitment to the project
- Adequate project funding
- A well-done set of project requirements and specifications
- Careful development of a comprehensive project plan that incorporates sufficient time and flexibility to anticipate and deal with unforeseen difficulties as they arise
- An appropriate commitment of time and attention on the part of those outside department who have requested the project, combined with a willingness to see it through to the end

Defining Project Success

- Within the allocated time period
- Within the budgeted cost
- At the proper performance or specification level
- With acceptance by the user
- When you can use the user's name as a reference
- With minimum or mutually agreed upon scope changes
- Without disturbing the main work flow of the organization
- Candid, accurate reporting of the status of the project and of potential difficulties as they arise

- A critical assessment of the risks inherent in the project, any potential harm associated with those risks, and the ability of the project team to manage those risks
- The development of appropriate contingency plans that can be employed should the project run into problems
- An objective assessment of the ability and willingness of the organization to stay the project course

5.17 Roles and Responsibilities of an Efficient Project Manager:

- The project manager is responsible for coordinating and integrating activities across multiple, functional lines

Project Managers have to deal with challenges

- Unscheduled changes in the project plan
- Unpredicted lack of progress
- Unplanned absence of resources
- Unplanned breakdown of resources
- Unplanned loss of resources
- Unplanned turnover of personnel
- Managing human interrelationships within the project team
- Managing human interrelationships between the project team and the functional organizations
- Managing human interrelationships between the project team and senior management
- Managing human interrelationships between the project team and the organization, whether an internal
or external organization
- Setting a selection criterion for projects
- Establishing priorities among projects

6. Conclusion :

Project management, is a management input combined and integrated with engineering and finance inputs. It is not necessary for the engineers to go a management school to learn project management.What is required is a change in attitude. Let us not think that once we have awarded a contract, it is the contractor who has to take the load of Project Management and we act as observers. We are not only Project Supervisors, Project Implementers. Project Monitors and Project Managers. Project Management is a human quality which has to come from within. Project Managers have to carry the Project on its head from the day of start to the day of commissioning. Project Managers must think, dream, visualize projects and functional needs on a 24 x 7 basis.

We are the owners of the Project and it is our responsibility to ensure that delays do not crop up and time and cost overrun are avoided. Every Project Engineer / Manager has therefore to think about the project for all 24 hrs. and carry the head load of Project success.