

Project Management Practice And Risk Perception In Construction Companies

Prakash Mutgi¹, Udayashankar D. Hakari²

* Principal, J.J.M. College of Engineering, JAYSINGPUR- 416 101 (Maharashtra)

* Asst. Professor, (Formerly: Manager(Technical), Karnataka State Financial Corporation, Bangalore)
S.D.M College of Engineering & Technology, DHARWAD- 580 002 (Karnataka)

ABSTRACT: The construction industry in India has gained a focused attention over the past five years and with the growing economy, it is poised for a bright future and tremendous growth prospects. The construction project management and the perception, analysis and management of risk are the two areas, which need emphasis and comprehensive approach by the participants of the industry. This paper puts forth an attempt made in this direction, to bring out the importance of less attended aspects of the project management, risk analysis and risk management processes, as applied to the construction industry. Analysis of the results of a brief survey made in this regard has been included, which provides a feed back about the current practices of project and risk managements in some of the construction companies

1. CONSTRUCTION INDUSTRY AND SIGNIFICANCE OF PROJECT MANAGEMENT

1.1 Introduction

The growing Indian economy has demanded the conducive environment for its continuity and sustenance, which in turn initiated the need for the creation of world class infrastructure for India and as a result the construction industry has gained the focused attention. Presently it occupies the position as the second largest sector of the country, just after the agriculture. The proposed annual construction spend in India is presently estimated to be around 475 billion \$, which spells the importance of the construction industry as a market. The industry has accelerated the process of economical growth in the country, with a contribution of 6 % to 9 % of growth in the gross domestic product. The economic activities in the construction sector have created around 6 times increase in the incomes for the investors and about 8 times increase in the potentiality of the employment generation.

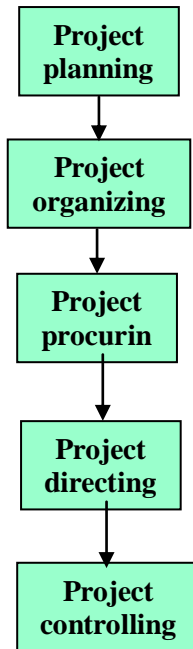
1.2 Project management – an emerging need and necessity

Amidst such an encouraging scenario, the industry is faced with many challenges with regards to construction materials, construction methodologies, financial resources, human resources, fluctuating real estate market, economic turmoil in the global front etc., amongst which the challenges with regards to the lack of perception and analysis of risks involved in the projects, appear to be quite significant and need to be addressed scrupulously and efficiently. In view of the massive growth in the size of the projects, huge increase in the quantum of different resources required, and all the other complexities associated, the project management is gaining vital importance in successfully accomplishing a project within the stipulated budget and time period.. There exists a vast scope for improving performance through knowledge of project management in the construction industry, where men, materials, machinery, money and management work together to build a facility.

2. PROJECT MANAGEMENT AS TOOL OF APPLICATION IN CONSTRUCTION INDUSTRY

2.1 Process of project management – A scientific over view:

In its broad perception, the project management may be viewed as the art and science of mobilizing and managing the people, materials, equipment and money to complete the assigned project on time within budgeted costs and meeting the specified technical performance standards. In accomplishing this the construction project management will need to perform the basic managerial functions with certain modifications to account for the special characteristics of construction projects; which can be outlined as below:



(a) **Project planning:** It involves deciding the objectives, collection and analysis of information, selection and scheduling of optimum course of action, establishment of policies, procedures, methods, systems, standards, budgets for achieving project objectives

(b) **Project organizing:** Dividing the work in to component activities, designing of job structures, defining performance targets and responsibilities, allocation of resources, delegation of authority, establishment of organizational hierarchy to secure coordination etc. are accomplished by this function.

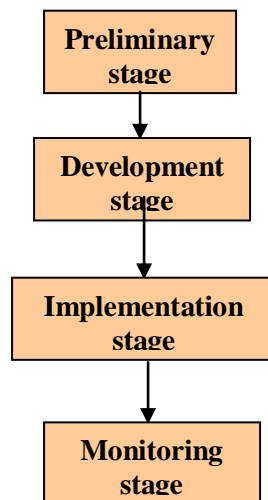
(c) **Project procuring: Preparation** of resource procurement schedule deciding on the appropriate sources of procurement, budgeting the resources, prevention of wastage during resource holding at site, supplying the resource of required quality and quantity to the project construction site form the main features of this function.

(d) **Project directing** : It comprises of providing effective leadership, motivating the behavior of participants, communicating instructions and orders.

(e) **Project controlling** : This function is carried out by specifying the factors to be controlled, evolving the methods of measuring control factors, identifying the deviations, applying corrective measures to put the plan on scheduled path

2.2 Project management in reality:

The practical treatment to the scientific approach is purported to yield the realistic views of the project management which may appear to be a typically modified semi scientific approach. From the practical point of view, the construction project management may be predominantly be considered to involve four distinct stages as below:



Each of these stages of a project can be typically elaborated in the following manner:

(I) The preliminary stage of the project: This is the elementary and conceptual stage of the project comprising mainly of following exercises :

(a) Project identification and selection: This is the first and most important step in commencing any new venture. Identifying and exploiting the right business opportunity becomes the key to success of the organization. The construction projects may be broadly grouped into : *building construction projects, infrastructure projects, industrial construction projects and special purpose projects.*

The building construction projects include residential/commercial complexes, education and recreational facilities, hospitals and hotels, warehouses etc..Since any corporate body or construction company invariably aims at earning profits by making their investments on such projects, while identifying such projects the factors such as the economy of the region, class and category of the potential customers, future growth trends and prospects, existing market etc. should form the major concern for any builder or real estate developer or for any housing or infrastructure company, *The infrastructure projects* are aimed at improving the infrastructure for the growth of economy. While identifying such projects, the construction companies will have to examine the vital aspects such as their financial sustenance, investment capabilities, resource mobilization abilities, quality ensuring methodologies and political maneuvering skills. The profits being huge; owing to large capital involved; the profit concern should become secondary in such projects. In identifying and undertaking *the industrial projects*, thrust should be given for the self assessment by the companies with regards to their own capabilities of maintaining high standards of quality, technical competence, past experience in similar projects. Here also, the profit concern takes secondary position. The identification of *special purposes projects* is comparatively more risk prone and needs thorough examination of all the aspects of the projects mentioned above

(b) Project location selection : The main factors that influence the selection of the sites for construction projects are the connectivity i.e. availability of transmission facilities like roads, rail, air port and water ways etc. , availability of the distribution lines of electricity, availability of construction material sources.

(c) Project feasibility studies : These studies help in general, in evaluating the project potential i.e. its merits and weaknesses before it is taken up for implementation. The feasibility studies should be undertaken in respect of the following :

Technical feasibility studies should mainly cover construction methodology, scope of work, wastage disposal arrangement , construction cost justifications and time estimates. *Financial feasibility studies* should comprise of estimation of project cost, means of finance, sales forecast, projections of profitability, pay back period, cash flow projections, break even analysis and projections of balance sheet. *Market feasibility studies* should include demand survey, demand forecast, prospective customers, consumption patterns, existing players, level of competition, salability potential etc.*Legal feasibility studies* must provide an insight to the legal aspects of the project, legitimacy of the ownership of land / property, encroachments, possibilities of future objections if any. This is quite important study particularly in the commercial projects where the land is very precious and its value may be abnormally high, owing to the strategic location.

(II) The project development stage : This may be considered as pre-implementation stage which initiates the actions towards achieving the realities of the ideas or the plans conceptualized in the previous stage. This stage involves the below mentioned actions :

(a) Creation of basic infrastructure: The major basic infrastructures to be created are : water supply, power supply, roads, other social amenities like housing, health care, entertainment, communication, shopping, banking etc. for the project personnel at the site.

(b) Decision on the use of appropriate construction methods: The cost component depends upon the nature of the project and the extent to which equipment is employed. In a mechanized building project, the equipment cost can vary from 6 % to 10 % of the project costs, whereas in the highway construction project, it may touch as much as 45 %. Aspects such as nature and volume of work, time available for the project completion are to be considered in the selection of the appropriate construction method.

(c) Interaction with the consultants: The continuous interaction with the engineering and management consultants would facilitate the speedier decision making with regards to the various aspects of the projects such as: development of structural, electrical, mechanical and other specialist systems and designs, scrutiny of

designs and drawings from the construction point of view, estimations, cost budgeting, processing and awarding sub-contracts, etc..

(d) Works programming and scheduling: Scheduling of the work program of a construction project helps in many ways. A bar-chart type of work schedule provides a simplified version of work plan which can be understood by all concerned with planning, co-ordination, execution and control of the project. The work schedule shows the planned sequence of activities; date wise and thus verification of dead lines imposed for the completion of the project and achievement of stages is accomplished. It enables the forecasting of requirement of resources and also indicates the pattern of resource consumption at different stages.

(e) Resource planning : Finance, manpower, material, plant & equipment are the prime resources required for a project and by means of resource planning, the project manager can realize as to when and in what quantity these resources are to be inducted into the project as the time progresses.

The financial planning should be made to have timely arrangement for all the capital requirements of the project, long term as well as short term. Due care needs to be exercised in the planning to ensure that the interest element is maintained at the barest minimum and also that the realization of advances, dues from clients is concentrated in right time. *The project manpower planning* should primarily focus on determining the size of the project work force and scheduling the manpower recruitment/induction to match the task requirements. *The construction material planning* in the project environment should cover the various functions such as material purchasing, inventory control, store keeping and warehousing, materials transportation and handling at site. A properly planned, economically procured and efficiently managed *plant and equipment system* would be of great usefulness in improving productivity, quality, safety and also in meeting the demands of urgency.

(III) The project implementation stage: The main aim of this stage is completing the project in time within specified costs and qualities. This calls for the efficient management of men, materials, plant and equipment and above all the financial management at the micro level.

(a) Effective personnel management : The effective management of men involved in the construction industry primarily deals with the selection and placement of right type of men on the job at the right time, providing them job satisfaction and keeping them adequately motivated of course always in tune with the company's needs.

(b) Effective material management: The construction materials constitute the major component of the project cost. Depending upon the type of the project, it may vary from 45 % to 65 % of the contract cost. Proper material management can therefore contribute substantially to the successful implementation of the project.

(c) Effective equipment management : The capital investment on the purchase and/or rentals/lease and operation of the plant and equipment being generally high, it has to be managed so as to ensure the minimum operating, maintenance and repair costs , maximum productivity and return on the investment made.

(d) Effective financial management: The finance being the most important resource, its efficient management is a basic necessity for an effective overall management and control of the project for better end results and successful project completion. Once a project is approved, adequate funds must be made available to meet its requirements as per the schedule of implementation. It is always highly desirable if the funds are provided even before the final anticipated approval to initiate advance actions. Adhoc, intermittent, part allocation with undue rigidities can impair the maneuverability of the project team. A comfortable liquidity position of the firm, in general, enhances its ability to implement the project expeditiously and economically.

(IV) The project monitoring stage: The project monitoring facilitates in observance of the deviations from the implementation plan if any, analyzing the emerging problems subsequent to the implementation of the project and taking corrective actions for resorting such issues. It may be considered to comprise essentially of :

(a) Project control methodology: In a construction project, the typical parameters that should be controlled are: *Time progress control* which should aim at the timely execution of work as per the project time schedule. *Resource productivity control* which should provide for the effective utilization of resources of men, material and equipment. *Resource mobilization control* by which, the timely availability of resources at the site as per the plan can be ensured. *Direct cost control* which facilitate economizing the operations by creating cost consciousness. *Budgeted cost control* should aim at evaluating project cost status and its variations from the budget, analyzing causes for variations and initiating the cost reduction measures. Depending upon the nature of the project, these controlling parameters may be altered or increased suitably to adopt and incorporate an appropriate project control method matching the project.

(b) Project management information system (PMIS) : The PMIS should aim at collecting economically, the right data, in the right form, through right means, at the right time, in the right place; and communicating the extracted information (feedback) to the right person on time, for making decisions. A suitably designed and effectively implemented PMIS can improve managerial efficiency and effectiveness in the monitoring of construction projects.

The success of a project has a direct bearing on the level of understanding of each of these four stages and on the efficiency with which each of the stage is maneuvered.

3. Construction Industry Survey And Analysis Of Results

Based on the practical approach of the project management enlightened in the pre-para [2] , a survey has been made to find out the project management practices that are followed by some of the leading construction companies of Hubli city. The results of the survey and the analysis of results is summarized vide Table – 1 . Based on the scores of the companies, the ranking is given and the financial results (in terms of turnover and net profit) pertaining to the past 3 years and also the the %age growth in business and in profits are compared against their ranking. It is observed that, the companies which have been assigned top and fair ranking by virtue of their sufficient adherence to the project management practices outlined in the pre-paras, have succeeded in achieving consistent growth in business as well as profits vide Table – 2.

4. ANALYSIS AND MANAGEMENT OF RISK IN CONSTRUCTION INDUSTRY

4.1 Significance of risk analysis and management in construction projects : Construction projects are always subjected to fast changing environments. The stability of the project environment is affected by numerous internal factors viz. quality considerations, commercial dealings, internal safety and security of resources, accidents, errors in estimation, design alterations, labour strikes, material wastages, equipment breakdowns, contractor disputes, corruption etc., and by various external factors such as unstable political, economic and financial conditions, natural disasters like fires and floods and man made hazards like burglary and fraud. This results in the instability of the project environment thereby causing uncertainty. The uncertainties generate the element of risk into the project.

4.2 Risk : Risk in a construction project signifies situations wherein a project is likely to deviate from or fail to meet the dead line and cost targets. In terms of project management, the most serious effects of risk can be: *failure to keep the project within the estimated cost, failure to complete the project within the stipulated time and failure to achieve the required quality and operational requirements.*

4.3 Risk analysis: The risk analysis helps in estimating potential impacts of risk and in making decisions regarding which risks to retain and which risks to transfer to other parties. The risk analysis in the context of construction projects consists of the process of dealing with risks and uncertainties in a structured manner by : (a)Identifying risks, (b)Quantifying risks (c) Categorizing risks and (d) Controlling risks.

(a)Risk identification: Most of the risks can be identified by breaking down the project into manageable level of details. The breakdown enables the estimator to recognize the nature of each risk eg. investment risk, operational risk, sales or income risk etc.. Once the risk is established, it can be suitably priced and a method can be developed or a strategy can be adopted to handle and cope with it.

(b)Risk quantification: The identified type of risk is further split in to risk elements and that risk is quantified by estimating the probability of its occurrence(normally 50 % probability is considered) and multiplying it with the cost of risk consequences of each risk element .

(c) Risk categorization: Depending on the nature of environment, the risks can be broadly divided into two categories:

- Manageable risks which include risks arising from changes in the internal environment of the project
- Non- manageable risks which result from an unstable environment of the project.

The monetary value of the manageable risks should be included in the ‘project contingency’ while the amount assessed for unmanageable risks is usually to be provided as ‘project reserve’. The risk cost equals the sum of contingency and the project reserve. Thus the contingency and the project reserve are considered to represent the amount earmarked to overcome the risks.

(d) Risk control : . Though no particular solutions can be used to minimize risks, the following remedial measures may be practiced in controlling them:

- Adjustment of plans, scope of work and estimates to counter risk implications
- Evolution of alternative plans to manage foreseeable risks.
- Keeping all concerned informed about the possible risk.

At the project site the project planners can deal and handle the uncertainties and the task of risk analysis. But in case of complex high-tech projects, it is advisable to make use of the services of specialist risk consultants.

4.4 Risk management: Risk management may be considered as a process to control the level of risk and to mitigate its effects. While the risk analysis is like drawing a map of potential hazards and outlining the damage they could cause, the risk management is taking the map and deciding the ways to avoid hazards. There are five distinct methods of risk management in a construction project .

(a) **Risk avoidance:** It is avoiding the risk associated with a specific task, activity or project; by not bidding the work at all or by placing a very high bid or by removing that risk element from the bid. This is strictly a business decision and many times proves to be a very good strategy, particularly when the construction documents are unclear, ambiguous or incomplete.

(b) **Risk transfer:** This involves shifting of the risk burden to others and is usually done by conventional insurance as a risk transfer mechanism or by hiring subcontractors.

(c) **Risk retention:** This may prove to be a good strategy only when it is impossible to transfer the risk. The risk can be retained when the estimated economic loss can be safely absorbed or when the cost of transferring the risk is almost as much as the cost of worst loss that could ever occur from the project.

(d) **Risk allocation:** It is the sharing of the risks with other parties. This method can be adopted when it is realized that the cost of execution of a project is too high and the economic risk needs to be shared with another firm/company.

(e) **Risk reduction:** This is effected by training the staff about risk perception and its management and thus strengthening the position to bear shocks.

5. RESULTS OF SURVEY AND ANALYSIS

A survey by way of direct interaction / interviews has been carried out to evaluate the percentage usage of different risk management practices by some of the leading construction companies of Hubli city so as to find out the most commonly employed method of risk management while making major decisions on the different types of risks normally encountered in their construction projects. The results of the survey and their analysis is given vide Table – 3 and the graphical representation of the result analysis is indicated vide Fig. 1 to predict the trend.

It is observed that the method of risk avoidance is practiced to the highest extent by almost all the companies while the risk retention and risk elimination practices are employed to the lowest extent. The risk transfer and risk reduction methods are moderately used in the risk management process. It is also noted that, the method of risk reduction ; which involves training the staff about risk perception; is practiced to a high extent by the companies which are categorized as companies with well established project management practices (vide Table- 2).

6. CONCLUSIONS

The project management, in the context of the construction industry, has a vital role to play in improving the efficiency and productivity of the industry. Apart from the usual project management techniques, the construction industry has a predictable requirement of a more practical treatment to the subject so that the same can be generally understood and followed even at micro level while executing the projects. The adoption of practicing the various distinct stages of the project management is not so encouraging and still a considerable amount of such inputs to the construction companies/firms is needed..

The awareness of risk analysis and risk management method offer an edge in refining the performance of the companies. There exists a lack of satisfactory level of knowledge of risk analysis and risk management methods amongst the construction companies. In most of situations, the companies reported to perceive the risks based on their past experience and most of the decisions are taken with the avoidance of risk.

References

1. Aggarwal,S.(2003),” Challenges for construction Industries in Developing Countries”, Proceedings of 6th National Conference on Construction Nov. 2003, New Delhi.
2. Al-Bahar,J.F.(1990) “Systematic risk management approach for construction projects”,Journal of construction engineering and management, vol. 17,pp 205 – 213
3. Baker,S.;Ponnaiah,D;and Smith S. (1997) “ Risk response techniques employed for major projects “,Jl. of Construction.Management. and Economics,vol.17 pp 205-213
4. Iyer K.C. and Jha K.N.”Factors affecting cost performance: evidence from Indian construction projects”,International Jl. of Project Management,vol 23, issue 4,May 2005, pages 283-295
5. Margareta Gallstedt “ Working conditions in projects : Perception of stress and initiative among project managers”,Int.Jl. of Proj.Mgmt,Vol.21, issue 6,Aug 2003, pp 449- 455
6. “Project Appraisal Manual “ Karnataka State Financial Corporation ,Bangalore, 2007
7. Raina,V.K. “Construction Management Practices : The inside story, Tata Mc Graw Hill Publishing Company Ltd.,New Delhi 1998.
8. YenYee Chang;and Evelyn May Brown “ Managing Project Risk”,Prentice Hall, Pearson Education Ltd., London 2000