Research Paper

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Understanding a Construction Project- a cost Perspective

Engineering

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ABSTRACT

In order to accelerate economic and social progress to provide better living standards for their people, the developing economies are trying their best to plan and implement development plans. Today Importance of project has been realized as every such project, especially civil engineering project has involvement of a capital of higher magnitude because of this very factor, the term 'project', has received worldwide recognition as a tool for the development process. In curriculum of technical education in Indian universities much attention is given to technical side, unfortunately managerial, especially cost aspect has been found neglected. Sometimes poor understanding of project leads to delay and failure of the project .In this paper a comprehensive treatment has been given for the understanding of the project.

1.1 INTRODUCTION

In newspaper or in any news channel we come across the word "Project". We hear of cement projects, power project, housing project etc. But while the term project is common to all of them, the plants are not i.e. something is common in all the projects and some uniqueness with each project. Let us understand very nature of the project i.e. which group of activities is called project.

1.2 UNDERSTANDING OF THE PROJECT

Webster dictionary defines project as a plan or proposal for doing something or one can say a programme for doing or accomplishing an organized activity or task.

However, public, government or a business organization or an individual wishes to do something. This very something provides the basis for the initiation for the formulation of a project but the idea of the project should be technically feasible, economically viable, politically suitable and socially acceptable. Now project proposal is approved, the project commences to achieve a mission. A project is completed as soon as the mission is fulfilled. The project lives between these two cut-off points and therefore this time span is known as project life cycle. The project Management Institute USA defines project as under:

"A project is a one shot, time limited goal directed, major understanding requiring the commitment of varied skills and resources". It also describes a project as a combination of human and non-human resources pooled together in a temporary organization to achieve a specific purpose.

UNIDO (United Nations Industrial Development Organization Vienna) defines a project as "a proposal for an investment to create and / or develop certain facilities in order to increase the production of goods and / or services during a certain period of time.

For Lewis, "a project is a one time job that has defined starting and ending dates, a clearly specified objective or scope of work to be performed with a predefined budget and usually a temporary organization that is dismantled once the project is completed.

1.3 INHERENT CHARACTERISTICS OF PROJECT

The characteristics, which are common to all projects are called principal characteristics or inherent characteristics, which can be summarized as under.

(1) It has well defined starting and ending points.
(2) It uses a wide variety of resources and skills involving cost and time.
(3) It involves the coordination across organizational boundaries of groups and organizational units.
(4) It is an instrument of change and is unique in itself.
(5) Every project advances in succession i.e. what exactly will happen in any project is not always known before hand until it enters in detailed engineering phase and construction.
(6) Every project is like a big job work i.e. it is single one and made to order.
(7) It is combination of technology, equipment, machine, material and men with diverse talents. Thus it can be said it is unity in diversity.
(8) Every project needs a system of execution i.e. turnkey basis, sub-contracting or cost plus basis etc.
(9) Every project is associated with certain degree of risk and uncertainty. A poorly defined project has higher degree of risk.

1.4 CATEGORIES OF PROJECT

Projects can be classified in so many ways as under.
(1) In terms of scope National or International.
(2) Profit oriented or Non-profit oriented.
(3) In terms of production: Industrial or Non-industrial.
(4) In terms of technology: Non-Conventional R&D, High Technology, Conventional Technology, Low Level Technology.
(5) In terms of size Mega, Major, Medium and Mini.
(6) In terms of origin: Grass Root, Expansion, Modification.
(7) In terms of time Normal, Crash, Disaster.

Any project can be assessed on above criteria this can be very easily done by filling Table 1.1. Now the project can be said, defined at prima facie level.

Basis of Assesment	TITLE OF THE PROJECT	
Scope	National	International
Profit	Profit making	Non-profit making
Production	Industrial	Non-Industrial
Technology used	Non-conventional, R&D Conventional Technology	High Technology Low Conventional Technology
Size	Mega, Major	Medium, Mini
Origin	Grass root, Expansion	Modification
Time	Normal, Crash	Disaster

Table 1.1: VARIOUS CATEGORIES OF PROJECT

1.5 THE PROJECT LIFECYCLE

Every programme, project, or product passes through certain phases of development. A crystal clear picture of these phases permits managers and executives to have better control over the resources in the achievement of desired goals. The phases of project are known as life cycle phases, described as under

(1) Conceptual
(2) Definition
(3) Implementation
(3) Divestment

In conceptual phase preliminary evaluation of idea , analysis of risk,various uncertainties , the completion time, cost and gestation period are analysed. The definition phase identifies

resource requirement ,time , cost estimates and pit falls in a definite manner. In implementation phase the plans prepared in definition phase is implemented .Time cost schedule are monitored. Fund flow , cash flow and feed back are taken. If implementation of schedule is not up to mark corrective measures are taken. In divestment phase hardware or facility built with active involvement of various agencies is physically handed over for the production to a different agency that was not so involved earlier. In this phase questions come to mind what and where resources should be reassigned and how the persons involved during execution of the project be reshuffled. Various steps of disinvestments phase are as under.

1.7 THE CONSTRUCTION PROJECT

Knowledge of project management, has diverse application where-ever multiple agencies are involved. A construction project calls for a specialized skills in project management. Chinowsky and Meredith (2000) have highlighted importance of strategic management in construction project.

They have identified seven areas of strategic importance in any construction project to achieve long-term objective.

Group who is involved in construction activity covers an enormous range of activity and deals with multifarious types of people. They construct the following.

(1) Thermal and hydro power station
(2) Bridge and flyovers
(3) Road networks
(4) Lay railway track and construct metros
(5) Tunnels
(6) Dam and canal networks, docks and harbours
(7) Airports
(8) Buildings, i.e. hospitals, schools, housing blocks, flats and prisons.
(9) Factory
(10) Parks and resorts

The project listed 1 to 7 are ordinarily handled by the government. Only 8 to 10 ordinarily ventured by government as well as private agencies.

In India, government usually initiate social projects, which are for the common good, and people of the country are the main beneficiaries.

Social projects need Social Cost Benefit Analysis (SCBA). United Nation Industrial Development Organization (UNIDO) method and Mirless approach are two standard methods for SCBA.

Any construction project can be thought of as consisting of seven major elements as under:

(1) Preliminary planning.
(2) Project definition.
(3) Hiring of human resources.
(4) Project design.
(5) Procurement of material.
(6) Project implementation and completion.
(7) Project start up.

After preliminary planning and defining the project the owner searches for an experienced design engineer. It is the duty of designer / planner to design the project which will most nearly satisfy the needs of the owner at the lowest possible cost. The designer should study every major item to determine if it is possible to reduce the cost without unduly reducing the service, which the project will render. The designer should have wisdom and vision to make possible changes in design, modify the requirement of construction and modify portion of specification in such a manner that the cost of the project will be reduced without sacrificing its essential value. An engineer who practices this philosophy is rendering a real service to his client in particular and to the society in general.

Thus it seems evident that an engineer should be reasonably familiar with peculiarities of construction, construction methods and costs if he is to design a project that is to be constructed at the lowest possible cost.

Like other projects construction project also has some peculiarities in general and some unique features in particular. Few may be as under.

(1) Every construction project needs a site selection.
(2) Every project needs land acquisition.
(3) Execution of any drawing is basically a manufacturing process.
(4) Any construction results in an immobile product rather than a mobile property.
(5) Every construction uses ordinarily, locally available building material.
(6) Every construction project is capital intensive.
(7) Every construction is basically a job work as one entity.
(8) Every construction job is a unique experience.
(9) Economics of scale is highly applicable to every project
(10) Over specification or lack of insight on the part of de signer has a serious cost implication.
(11) Under specification has disastrous effect.
(12) Every construction is an irreversible action.
(13) Useful life of any construction is much higher (around 60 years) as compared to any other engineered prod uct.
(14) Application of principles of value engineering results in big saving.
(15) Every stage of construction needs optimisation.
(16) Optimised construction needs diversified knowl edge.
(17) Maximum saving can be achieved during construction pro cess.
(18) Application of learning curve results big savings in con struction.

When design and drafting part of the project is finished the next phase is procurement of material and construction.

1.8. COSTS IN CONSTRUCTION PROJECT

The cost of a project is broadly influenced by following factors
(1) Design and Specification
(2) Material
(3) Labour
(4) Equipment
(5) Overheads and Supervision
(6) Profit Earned

To optimise at design and specification level, designer should be well versed with the specific and general requirement of the facility or structure being designed. For writing specification, he should know most of the specification and quality of workmanship required for a particular job.

Designer should keep himself informed about new material, new equipment, new techniques.

Few tips from following list can be adopted to reduce the cost of construction.

(1) Designing concrete structures with repetitive section is one of the ways to save on formwork.
(2) One should avoid intricate designs.
(3) Design for use of optimal size and rental of construction equipment. .
(4) Avoid special construction requirements as far as possible.
(5) To increase productivity reduce labour requirement to minimum.
(6) Specify a quality of workmanship commensurate to quality of the project.
(7) Furnish detailed foundation information to construction engineer.
(8) Contractor should not be thrust upon responsibility for information or data for design.
(9) Encourage use of local material.
(10) Suggest various techniques for accomplishing the desired result.

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(11) Hold pre-bidding discussions with contractors to minimise change orders.
(12 Consult foreman and supervisors having judgement and experience for understanding and execution of the project.

CONCLUSION

A project starts from scratch with a definite mission, generates activities involving a variety of human and non-human resources, all directed towards fulfilment of the mission and stops once the mission is fulfilled. Today project management has received a recognition as a tool for the development process. The cost aspect of project is most critical aspect.The human resource involved in projects should always remember "Estimate is an opinion ,price is a policy cand cost is a fact.

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