



# **CONTRACT SELECTION STRATEGY IN CONSTRUCTION PROJECTS**

**Bhushankumar Gaikwad<sup>1</sup>, Mr. Ghanasham Sarode<sup>2</sup>**

<sup>1</sup>*Department of Civil Engineering, Dr. D. Y. Patil Institute of Technology, (India)*

<sup>2</sup>*Department of Civil Engineering, Dr. D. Y. Patil Institute of Technology, (India)*

## **ABSTRACT**

*There are many numbers of projects taking place around the world and contracts are signed for each project comprising of major firms in action. The client parties shall quote their title objective in the contract and expect the contractor to abide by their agreement for mutual benefits. This shows the importance of contract strategy. This research is aimed at exploring the different types of contract strategy in construction industry to determine their time of application. A comparison of Traditional method of contracting with the modern form of contracting will be executed as a part of research. The research will be carried out with the help of several journal articles and books by major contract and project management. My intention is to first enlighten the importance of contract strategy to the readers by reviewing different authors view on role of various project participants and project management in contracts. The second part of this research explores the different types of contracts and case studies are conducted based on them which reflect the different trends of contract options considered over a period of time. It is considered that the findings will be of interest to project managers for larger and complex engineering and construction projects in any country.*

**Keyword – Construction Contract, Contract strategy, Procurement systems, Project performance**

## **I. INTRODUCTION**

The recent development around us shows us that the world is fast growing. For these developments to take place it requires more than just one field in operation. For instance, in a construction process there are so many groups of entrepreneurs involved like suppliers, buyers and builders. The relationships among these parties are maintained by forming contract. A contract is a legal agreement made between two or more parties for a delivery of certain services in return for money or any other value. In past, promises were made in place of contract where in several disputes arose; due to which the legal entities are made in modern times. The study taken into consideration here belongs to the construction industry sector however there may also be certain sections relating to other industrial sectors. This shall be due to the fact that the latest trend in carrying out any project entails integration of various engineering sectors. In a civil engineering construction contracts the Contractor obligates to carry out works of construction and other ancillary obligations. Majority of the civil engineering works are performed under the contract which requires the Contractor to finish the work and the Client to pay for it. The main functions of a contract are:

- 1) To specify the work to be done,
- 2) The amount to be paid,

- 3) To assign responsibility to the concerned parties to finish the work and
- 4) Decide who takes charge for the unexpected events if they occur.

Based on these, there are different types of contracts used in the construction industry; this research is focused to explore them.

## II. AIM & OBJECTIVES

### 2.1 Aim

The aim of the research would be to investigate different types of contract strategy in construction industry and factors that are considered for the use of appropriate ones for the given project situations.

### 2.2 Objectives

1. To examine the concept of Contract strategy
2. To investigate the different contract strategies used in construction industries
3. To examine the implications of contractual variations in construction industries.

## III. LITERATURE REVIEW

### 3.1 Introduction

The importance of contract strategies reviewed in this chapter. We discuss about the contract strategy and their effective application in construction field with the help of different comments. This literature review highlights the role Project Management can play in execution of contracts

### 3.2 Definitions of Contract Strategy

A contract is a key component of a procurement system and it is an essential element required between two parties collaborating for a work. A contract impresses upon the parties the solemnity of the occasion. It requires the parties to seriously consider the effects of performance and non-performance upon themselves. [1]Veld & Peeters (1989), Contract is “an agreement between two parties, whereby one party commits itself to deliver goods, software or services to a second party within a certain delivery time and for an agreed price”. He defines ‘The Client’ as “The party ordering goods” and ‘Contractor’ as “The party delivering goods”.

[2]Cooke & Williams (2004), For enforcing a better strategy one must fully understand what the contract strategy is, for no one can effectively plan and control a construction project without fully understanding the cultures and methodologies of the industry carrying out the work. There is a lot clearer statement when compared to the above one stated by However there is a definition provided by [3]Procurement Guide: Procurement and contract strategies (2003) in Procurement and contract strategies achieving excellence in construction procurement guide. The definition states that “The contract strategy determines the level of integration of design, construction and on-going maintenance for a given project and should support the main project objectives in terms of risk allocation, delivery, and incentivisation and so on”. I feel this is by far the best definition available about the contract strategy. This version of the definition proves to be more descriptive, the organization structure provided in the book explains well about the strategy adopted and its significance with the level of integration of design and construction for a given project. Accessing a good definition for a contract strategy is necessary since it would help in developing and implementing a highly effective procurement



strategy and plan for an organization which would reduce overall cost of purchasing along with a better supply chain management.

### 3.3 Importance of Contract Strategy

[4]Bower (2003) has stated his view on the importance of contract strategy as “Contract strategy has a major impact on the timescale and ultimate cost of the project”. He further emphasizes the negative effects on the project outcomes over an inappropriate selection of a contract strategy for a project. Bower (2003) says that when a wrong contract strategy is selected it may cause over budget of project and delay in completion time.

[5]Perry (1985) in his study outlines the key decisions for contract strategy:

- a) The project characteristics
- b) Organizational structure for design and construction
- c) Types of contracts
- d) Tendering process including conditions of contract, contract selection and tender analysis.

[6]Rashid, R.A. et al., 2007, Project procurement has been described as an organized methods or process and procedure for clients to obtain or acquire construction products. Apart from the traditional approach, there are now other “fast-tracking” or innovative procurement systems used by the construction industry worldwide. The different procurement systems differ from each other in term of allocation of responsibilities, activities sequencing, process and procedure and organizational approach in project delivery. These differences have invariably affected the project performance. Cost, time and quality are the three most important parameters of project performance; different procurement method will have different effect on the cost, time and quality of the project. Carefully consider all factors when selecting the most appropriate procurement approach for a construction project.

[7]Smith, J., Merna, T. & Jobling, 2006, A client has the ultimate responsibility for project management; they must define the parameters of the project, provide finance, make the key decisions and give approval and guidance. The appropriate procurement or contract strategy will only become apparent as the evaluation progresses from initial appraisal to full analysis, including consideration of potential areas for dispute because of known and unknown risks. In terms of entering into a contractual relationship, the client must ensure that the most appropriate risk sharing strategy is chosen and reflected by the organizational structure and payment mechanism adopted.

Smith (1995), Outlines some main topics to be taken into consideration for setting up a contracting strategy.

They are:

- a) Project objectives
- b) Organization system for design and implementation
- c) Risk allocation
- d) Terms of payment
- e) The conditions of contract and
- f) Tendering procedure



[8]Dr. Emad Elbeltagi, 2006, at the early stage of a project and once a project manager is selected; the main issue that faces the owner is to decide on the contract strategy that best suits the project objectives. The development of the contract strategy comprises a complete assessment of the choices available for the management of design and construction to maximize the likelihood of achieving project objectives.

We reiterate the importance of the contract strategy and its process which is carried out in order to reach the required end products. [9]Aboushiwa & Bower (2000), A contract strategy should be established at an early stage to meet the cost, programme and quality objectives of a particular project. He urges the introduction of contract strategy as early as possible into the project for its betterment. I support this point by saying that the contract strategy is the most important aspect of a project because it forms the foundation on which everything else is built. Therefore earlier the contract strategy is decided and the works are planned the better will be the project outcomes.

However, [10]Venters (2005), Expresses his view that nevertheless its importance, it won't be the sole dependent for the success of the project. He argues "Successful project must also require a solid work scope commitment of a project team and a realistic budget to support a successful project." We not fully satisfied with Venters (2005) comments as he feels the contract strategy is the foundation for everything in a project. When an inappropriate strategy is chosen then the whole project may fail and no solid work scope no project team and no budget can be of any use.

### 3.4 THE ISSUES

Governments' capacity to invest in public infrastructure is ultimately constrained by finite funding resources and the need to responsibly manage the balance between competing budget priorities. Investing in the right mix of infrastructure assets and managing them well throughout their lifecycle is important in enabling governments to meet current and future service delivery demands and maximize value-for-money from the funding available. A comprehensive procurement strategy that demonstrates careful consideration and analysis of all available options will enable project owners to identify the delivery model and procurement method most suitable for the project in question. By using an appropriate delivery model and procurement method, project owners can expect to attain improved value-for-money outcomes as risks will be most effectively managed and the incidence of contractual disputes, cost and time overruns is likely to be reduced.

## IV. RESEARCH STRATEGY

### 4.1 Introduction

#### 4.1.1 Concept of contract strategy

Contract strategy means selecting organizational and contractual policies required for the execution of a specific project. The development of the contract strategy comprises a complete assessment of the choices available for the management of design and construction to maximize the likelihood of achieving project objectives.

A proper contract strategy for a project involves five key decisions [8]:

- Setting the project objectives and constraints
- Selecting a proper project delivery method
- Selecting a proper contract form / type

- Contract administration practices

Selecting an appropriate contract strategy is as much important as selecting other major characteristics of project. A contract strategy is important as it impacts in the progress of the project through a right direction, when a good strategy is applied it improves the supply management in order to deliver maximum value at minimum cost, and how to develop and implement a best-practice process for the management of contracts.

The importance of contract strategy and describes it as an amalgam of activities that runs from defining the Client's:

- a) Project objectives
- b) Priorities
- c) Responsibilities
- d) Organisational structure
- e) Types of contract
- f) Conditions of contract
- g) Contractor selection
- h) Tender procedures, and
- i) Risk allocations to the selection of most appropriate contract strategy.

#### 4.1.2 Selection of Contract Type

The selection of contract type to be used for a construction project is made by the owner, acting upon the advice of his Engineer and his legal advisor. The selection must meet the owner Objectives and takes into account the constraints that might relate to the project. Consultants and contractors should be fully informed by the project objectives and constraints. The scope and the nature of the project will primarily affect the selection of type of contract.

#### 4.1.3 Project objectives

The client will have a number of overall objectives. These objectives may be of primary and /or secondary importance. Primary objectives include functional performance, time objectives, and cost objectives.

**a. Project Scope (performance):** The project scope defines the extent or the area that the contract covers. Any additions or omissions during the life of the project will increase or decrease the quantity of work involved. Likewise, any changes in design must be discussed carefully to establish whether or not they are likely to affect the scope of the project.

**b. Time:** The scope and time are closely interrelated. Decisions must often be made on the effect of increasing or decreasing scope on time. If the completion date of a project is critical, then increasing scope will call for an accelerated program. The extra cost associated with this acceleration must be quantified.

**c. Price:** The cost of a project is closely related to scope and time. The effect of the contract on price, and the various incentives and penalties that can help to keep price steady must be discussed and clearly defined.

On the other hand, **secondary objectives** could arise on a construction project and would exert a major influence over contract strategy decisions Examples of secondary objectives are:

- Allocation and payment for risk.
- Training of the client's staff.
- Transfer of technology.

- Involvement of contractor in design.
- Involvement of client in contract management.
- Choice of labour-incentive construction.
- Use of local material and resources.
- Protection of the environment.

#### 4.1.4 Project constraints

All construction projects have constraints that influence the achievement of the project objectives. These constraints should therefore, be considered when choosing an appropriate contract strategy. There are a variety of constraints and these are examples:

- Availability of funds.
- Availability of contractual incentives.
- Method of tendering.
- Project location.
- Target dates of the project.
- Possibility of design changes.
- Availability of resources.
- Seasonal working.
- Number of contractors willing or able to tender.
- Inflation.

#### 4.1.5 Project Delivery Methods

The project delivery method translates what project parties are involved in the project and how they interact with each other and called also project organizational structure. The choice of an organizational structure should be related to project objectives and constraints. It can be facilitated considering the following factors:

- Size and nature of the work packages within the project.
- Selection of the design team form in-house resources, external consultants or contractors.
- Process of supervision of construction.
- Restrictions upon using combination of organizational structures within the project.
- Expertise which the client wishes to commit to the project.

## V. DIFFERENT CONTRACT STRATEGIES USED IN CONSTRUCTION INDUSTRIES

A. The different types of procurement procedures commonly used are explained below:

### 5.1 Traditional

In the Traditional method, the Client appoints the Contractor to build to a defined scope of works for a fixed price lump sum. And the responsibility for the design and the project team is held by the Client.



Fig.2.1 Contractual procedure involved in Traditional Procurement Method [6]

### 5.2 Design and Build / Turn Key

Here the Contractor provides a completed building to an agreed cost and programme. The Contractor is responsible for design and construction. There are three types of design and build arrangements. ‘The Employer-led design’, ‘Contractor-led design’ and ‘other design and build options’. One of the merits of this type of contract is the undivided responsibility for both design and construction Wearne (1989).

However he says design and build could also be a potential threat when the Client does not clearly specify his needs, the Contractors tend to build in their own way when not specified accurately. Nevertheless when accurately specified, Masterman (1992) points out a merit in this method in the form of cost savings. This method could be the cheapest of all methods. The disadvantage is that the Client cannot exercise much of the control in the project.

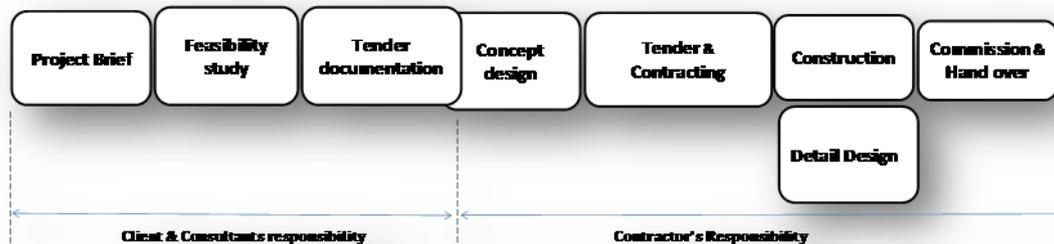


Fig.2.2 Contractual procedure involved in Design and Built Procurement Method [6]

### 5.3 Two Stage Tendering

As the name suggests there are two stages involved in this method, the first being the appointment of the Contractor based on the tender and the second stage involves the Contractor working with a project team for preparing designs and cost estimates for each and every process of PLC. The Client then enters into a contract on a fixed price basis after having a close look and proposing changes at the various design strategies involved.

### 5.4 Public Private Partnerships / Private Finance Initiative

This procedure is mainly used for public sector infrastructure projects where private sector capacity and public resources are utilized. In this method, the contract is given to a consortium for the building and operating. The capital is derived from the taxes paid by the public for usage of property. The asset may or may not be returned back at the end of the contract. It should be noted that the tendering process shall be expensive and requires

negotiation rather than competitive tendering. When compared to other procurement methods the time from inception of the project to attaining a start on site is substantially longer.

Some general merits and demerits

Advantages:

- a) Potential for high returns
- b) Continuity of work
- c) More control over the program

Dis-Advantages:

- a) Very high bidding costs
- b) High level of resource required
- c) Complex and demanding
- d) Tough contract terms

### 5.5 Management Contracting

#### a. Management Contracting

This is a fast track strategy where certain elements of construction process starts even before the completion of the design. The management Contractor is given charge of whole of the project including the design and build ability in return of a fee. Here the management Contractor assigns work packages to the individual sub-Contractors

#### b. Construction Management

This is the same as the Management Contracting except that here the work packages and the individual sub-Contractors are assigned by the Client.

In this method there are maximum overlap between design and construction. [2]Cooke & Williams (2004) see's this feature as a potential benefit. Other advantages of the management contracts cited by [11]Wearne (1989) are that the Contractor's project team is enriched with the contracting and construction expertise, the service of which could be hired or fired. As per Cooke & Williams (2004) the disadvantage these methods possess is the risk carrying threat for the Client; this threat mainly applies to the construction management arrangement.

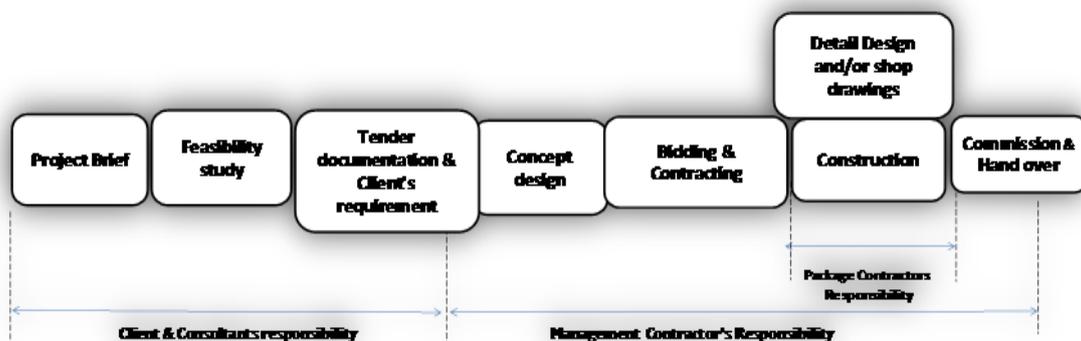


Fig.2.5 Contractual procedure involved in Management Contracting Procurement Method Source[6]

**5.6 Cost – Reimbursable and Target- Cost Contracts**

**a. Cost-Reimbursable contract**

It is a type of contract where the Contractor is paid on the basis of actual costs of ‘time and materials’ plus agreed amount to cover profits and overheads.

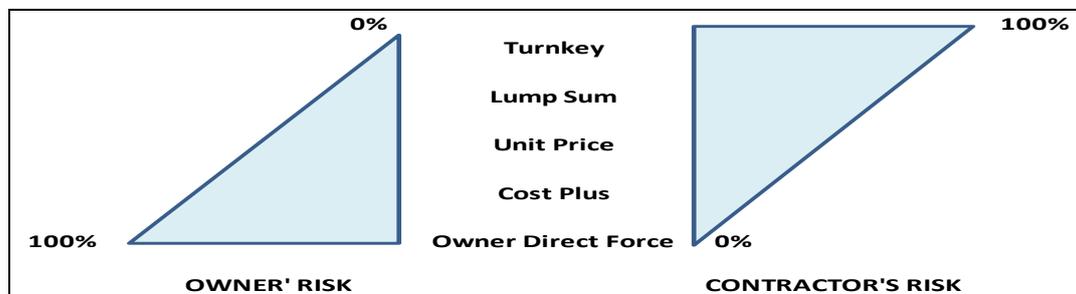
**a. Target-cost contracts**

These are the type of contracts where the Contractor is paid based upon its established costs. To make sure that costs are not allowed to exceed a target, the cost is fixed at the outset. The target is adjusted to take care of any changes and other price risks allocated to the Employer under the initial terms of the contract. There are also incentives provided to all parties involved such that costs and time are controlled.

The advantages of the cost-reimbursable contracts can be seen well as Masterman (1992)[12] reclaims that when there is insufficient definition of work in tender, during high inflation, when the project is extremely complex and unquantifiable amount of risks involved. This method may prove to be effective at those times. He also shares his views on the drawbacks involved with this method by stating the lack of contractual commitment by the Contractor to the final cost and absence of financial incentive to be used.

**5.7 Framework Agreements**

This is a form of a contractual agreement which allow suppliers to be brought together with the relevant expertise and experience resulting in savings to both the parties where a number of projects are involved.[2] Cooke & Williams (2004) explain the main difference between other contracts is that with framework contract there will be no ‘main Contractor’. These agreements also cover different forms of procurement including Design and Build, Traditional, etc.



**Fig.2.0 Level of Risk Associated with Various Contracts**

**VI. TERMS OF PAYMENT**

While planning a contract the promoter must consider the type of payment that shall motivate the Contractor and fulfil the objectives of the Client. The payment by price is preferred by most of the promoters since it carries less risk on promoter and more on the Contractor when compared to the actual cost. The different terms of payment shall be discussed below.

**6.1 Lump sum payment**

In the lump sum contract the payment is settled at the end when all the works are complete. Here the payment is of a single type and to a single Contractor who is responsible for both design and construction as mentioned in



the signing of contract. [11]Wearne (1989) says that this method proves advantageous to the Client since the Contractor gets to take the risks of actual costs being greater than the contract prices. The potential disadvantage is that it costs extra time and money to the Client if needs to make any changes from the agreed plan.

Lump sum contract is a quite simple one provided only a single payment is due for completion of performance. This method is usual in employing contracts for the design and supply of mechanical, electrical and process plant.

## 6.2 Milestone and planned progress payment systems

The payment in this type is based on the milestones achieved by the Contractor i.e., the stages of the project finished. [11]Wearne (1989) explains the advantages and limitations of this method. The promoter gains in this by providing incentive to the Contractor for proceeding with his work and also Contractor benefits by getting paid sooner. The demerit in this method shall be the lack in clarity and resulting disputes when the milestones are not defined properly at the start.

## 6.3 Bill of Quantities (BOQ)

In the bill of quantities the work agreed to be done under the contract are listed as each item along with the quantity of material needed and quality specified for the work. The Contractor is usually paid according to the quantities of items completed each month. One of the advantages of this method is that it induces performance. It can be effective because the Contractor is paid as soon as possible after incurring costs and the Client gains in by reducing the total cost of the construction. The disadvantage is that this method is more complex and expensive for all parties when compared to the basic lump sum contract.

## 6.4 Schedule of Rates

This method is similar to the BOQ in listing the work to be performed, however the rates are more related to the total quantity of work done rather than the amounts expected. The basis of payment is considered to be a more flexible form of bill of quantities. [11]Wearne (1989) says that this method can be useful when the work type is certain but the quantity of work is not clear enough. The risk for the Client is that sometimes it causes very uneconomic use of resources. Schedule of rates are used in civil engineering for preparatory and site exploration work, contracts for design, demolition, repairs and maintenance.

## 6.5 Cost-reimbursable payment

This method is different from all other cost based terms of payment. In the simplest form of a Cost-reimbursable contract the Employer reimburses the Contractor's costs of work on a project, plus usually a fixed sum or percentage for financing, overheads and profit. [11]Wearne (1989) feels this type of contract is used for design studies, development, some repair, demolition and emergency work. The advantage of this method is that the work is started as the changes are defined and the Contractor won't incur any prices avoiding the disputes. On the other hand the Client has to deal with the demerit that Contractor may not be responsible for the economic use of his resources and cost control.

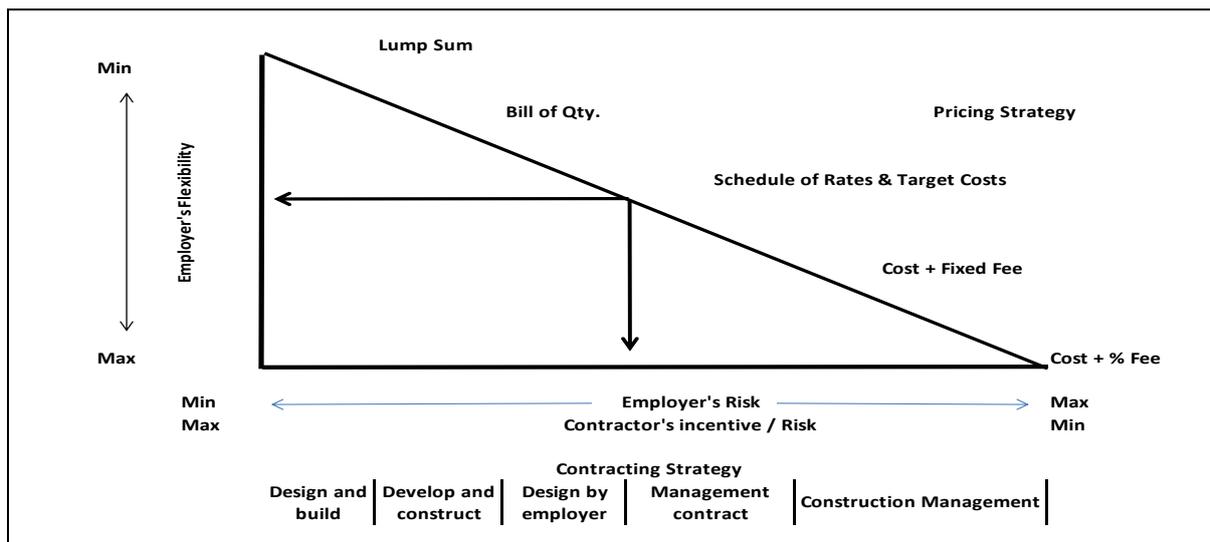
**6.6 Target incentive contracts**

This is the development of the Cost-reimbursable method where the Client and the Contractor agree prior to the initiation of the work regarding the cost for an uncertain scope of work. It is agreed that the Contractor shall share his savings in cost related to the target but when the target is exceeded the Contractor may be reimbursed less. [11]Wearne (1989) lists the advantage as both the parties shall get incentive to limit costs and Contractor benefits by his cost being reimbursed. Problems shall arise if the target is not precise or changed.

**6.7 Liquidated damages terms**

In most of the engineering contracts certain terms are agreed under which the Contractor is liable to pay liquidated damages to the Client for a breach of contract for instance if the promoter delays the completion of work than the agreed time. The main intention of introducing liquidated damages is to induce Contractors to perform their contractual obligations. Wearne (1989) feels advantage of this agreed terms are that the results are more predictable and quicker.

The typical allocations of total risk between the two main parties, the employer and the contractor, on the commonly encountered contracting and pricing strategies may be illustrated in fig.3 as follows:



**Fig.3.0 Typical allocations of total risk between the two main parties the commonly encountered contracting and pricing strategies**

**VII. THE IMPLICATIONS OF CONTRACTUAL VARIATIONS IN CONSTRUCTION INDUSTRIES.**

A **variation** (sometimes referred to as a variation instruction, variation order or change order) is an alteration to the scope of works in a construction contract in the form of an addition, substitution or omission from the original scope of works.

Almost all construction projects vary from the original design, scope and definition. Whether small or large, construction projects will inevitably depart from the original tender design, specifications and drawings prepared by the design team.



This can be because of technological advancement, statutory changes or enforcement, change in conditions, geological anomalies, non-availability of specified materials, or simply because of the continued development of the design after the contract has been awarded. In large civil engineering projects variations can be very significant, whereas on small building contracts they may be relatively minor.

### Variations may include:

1. Alterations to the design.
2. Alterations to quantities.
3. Alterations to quality.
4. Alterations to working conditions.
5. Alterations to the sequence of work.

### A. Source of conflict

Conflict can arise when work is not mentioned in the bills of quantities, drawings or specifications. In common law this silence does not mean the contractor has an automatic right to claim for extra payment. The client is not bound to pay for things that a reasonable contractor must have understood were to be done but which happen to be omitted from the bills of quantities. Where there are items that, whilst they are not expressly mentioned, are nonetheless required in order to complete the works, then the contractor should have included them in their price.

### B. Extension of time

Many construction contracts allow the construction period to be extended where there are delays that are not the contractor's fault. This is described as an extension of time (EOT). Variations may (but do not necessarily) constitute relevant events that can merit an extension of time and so adjustment of the completion date.

## VIII. DATA COLLECTION

### 8.1 CASE STUDY – Construction of an Industrial Building (Tathawade Pune)

#### A. Site Visit Data-

1. Name of the Site: Sai Industrial Apartment
2. Description: Building
3. Site Area- 5000 Sq.ft
4. Address: Tathawade Pune. 411033, MH, INDIA.
5. Society Name: Sai Apartment
6. Contact Person: Sanjay Shelar
7. Tel No: +91 9579670950
8. Designation- Authorize Person

#### B. Description:-

- a. Designed define in contract document- R.C.C framed work Building Six Storeyed.
- b. Ten bays long by six bays wide, six storeys high with identical floor slabs.
- c. Contractor planned the job , designed the formwork

#### C. Cause of Variation:-

- a. To permit the installation of additional heavy machine on 3<sup>rd</sup> floor design of the structure was altered.

- b. Floor slab was strengthened; section of supporting columns was increased.

## XI. EXERCISE

In projects changes may cause either benefits or drawbacks. One of the major drawbacks is the cost overruns. The major cost due to change is by the cost of rework or revision of work. Rework is the unnecessary effect of re-doing a process or activity that was incorrectly implemented in the first place and can be created by defects or variations. The effects due to the changes can be grouped as direct effects and indirect effects.

### A. Direct effects

1. Demolition of work already done
2. Rework
3. Specification change
4. Time lost in stopping and restarting current tasks in order to make the variation
5. Revisions to project reports and documents
6. Reorganize schedule and work methods to make up lost time

### B. Indirect effects

1. Loss of productivity due to reprogramming; loss of rhythm, unbalanced gangs and acceleration.
2. Change in cash flow, financial costs, loss of earnings
3. Increased risk of co-ordination failures and errors
4. Loss of float, therefore increased sensitivity to further delays
5. The major sources from which the Contractor may try to recover the additional costs are:

- **Materials**

For any building work the construction materials are bought beforehand. When the building plan changes the work as planned gets halted and therefore the materials bought do not serve their purpose at that time. These materials need to be either stored or used for other purpose. For the variation new construction materials have to be bought. With the inflation, the rates of the materials change. Certain materials can't be save for use at another time they are nothing but waste. For the extra reinforcement work needed additional quantity of steel will be required. These buying will affect the cash flow as well as the tender quoted at the beginning.

- **Formwork**

The change in formwork increases the cost of total construction. Reinforcements are required for a formwork construction; hence for a specified plan the reinforcement materials are brought in advance. When the plan changes and a higher quality of formwork are required, the materials currently available do not match the quantity required. Materials of a higher specification are required which incur additional costs and time. Due to this the time and price quoted in the tender for the formwork are not followed as planned ultimately causing chaos.

- **Delay**

The delay caused in the project due to variation affects the entire characteristics of the project. The work planned, the materials purchased and the equipment borrowed all are wasted due to the delay. For instance, a tower crane is rented for the work with the money already had been paid. In this situation when the project is delayed the tower crane could not be utilized for the real purpose it was brought and with the work unfinished

the crane needs to be rented again. Along with this the overheads from the administrator point of view would also be affected.

- **Disruption**

The variation causes disruption to the entire programme of the project. The disruption mainly affects the Contractor's work. Initially the Contractor would have planned for a certain program for the flow of works. With the variation coming into the play, this program is affected. Disruption to the work occurs as the work has to be stopped for the new design to be made until that the materials pre ordered for the construction work continues to arrive. Later the storage of these materials becomes a concern. This causes a loss of productivity to the Contractor and additional costs to carry out the works using new rates.

- **Cash Flow**

Due to variation disruption in work takes place, this affects the works ordered to the sub-Contractors and the materials supplier because the cash had already been paid by the Contractor for the progress of the work. When the work gets stopped the payment made to the Contractor gets delayed causing a serious damage to the Contractor's cash flow. During this period his outcome exceeds his income forcing him to operate at loss.

- **Consequential Factors**

This factors deal with the various consequences the Client and Contractor need to face for delaying the project. Say if the project was initially planned to be built on summer due to the delay now the project needs to be built on winter in the presence of horrible weather. This causes extra money for delaying and sometimes reheating the materials if needed. Certain equipment need to be rented again for the work to progress. There are several consequences that need to be faced caused by the variation.

## X. GENERAL LESSONS

There are several lessons to be learned from this case study about a variation in a project. The challenges faced by the Contractor and the Client and the consequences they need to face for finishing the project. Some general lessons learned when dealing with the changes under Traditional contract are described below.

- 1) It is necessary that the Client considers all the possibilities before going for the change and if the Client decides to go for the change then he/she must be fully aware of the consequences that need to be faced. Sometimes it is much comfortable for the Contractor to make changes once the project is finished.
- 2) It is important to realize the impact of the variations not only in terms of money and material but also on all values of the various characteristics of the project which may affect the outcome, such as time. Apart from the project cost other subsidiary costs must also be taken into account.
- 3) When the Client thinks there is a major change to be made then all forms of contract must be analyzed and a contract form should be chosen which best suits the situation that is adequate to enforce the changes.

## XI. CONCLUSION

The research is carried out in order to describe the importance of procurement strategies. I have researched the Engineering contracts and contract management along with all aspects of contract strategy.

A. While examining about the procurement types, I came across the different types of procurement methods and their appropriate use.



- The Traditional method was found to be suitable for the projects where the functionality is prime objective and it is lauded for its price and cost certainty. However the Traditional method would be inefficient for the fast track projects.
- Design and Built shall be suitable for the fast track project but it cannot be employed for the complex projects.
- There is a procurement type which could tackle both the fast track as well as complex project, the Management contracting however it will prove ineffective in front of the inexperienced the Client.
- The PFI projects are a superior option for the publicly funded government aided infrastructure projects.
- Cost–Reimbursable and Target–Cost contracts are commonly employed for sudden emergency projects and for high-risk projects. It was found in this case the Contractor is supposed to reimburse his actual cost and may have the incentive of a bonus or penalty arrangement. These are collaborative arrangements and the Client must be involved, through his Project Manager, in all major decisions.

**B.** Cost, time and quality are the three most important parameters of project performance. The different procurement method will have different effect on the cost, time and quality of the project. Each project procurement system has its own peculiarity in term of the pre-tender and post tender activities and processes, division of risks between client and contractors, and the effectiveness of project monitoring and control. It is very important at the very outset of the project to carefully consider all factors when selecting the most appropriate procurement approach for a construction project.

**C.** Variations are often sources of dispute, either in valuing the variation, or agreeing whether part of the works constitute a variation at all, and can cost a lot of time and money during the course of a contract. It is important to realize the impact of the variations not only in terms of money and material but also on all values of the various characteristics of the project which may affect the outcome, such as time. Apart from the project cost other subsidiary costs must also be taken into account.

## **XII. FUTURE SCOPE**

1. To compare the Traditional contract strategy with the new engineering contract systems.
2. To study the influence of different contract types on the effectiveness of owner-contractor relationships in construction projects

## **XIII. ACKNOWLEDGMENT**

I would like to thank my guide Prof.Mr. Ghanasham Sarode, Assistant Professor, Department of Civil Engineering. He gave me a precious time from his busy schedule & his valuable guidance has been a constant encouragement. I would also like to thank Dr. R.S.Jahagirdar, Principal, Dr. Deepa A. Joshi, Head of the Department of Civil Engineering, and the faculty of Department of Civil Engineering whose constant encouragement and expert guidance was instrumental in the completion of this paper.



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