

COMPERATIVE ANALYSIS OF THREE MAJOR TYPE OF CONTRACTS WITH CASE STUDY

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Abstract - The thirteenth FYP shows large interest in investments in infrastructure sector by India, so there is need for different types of contract that will satisfy the purpose. Engineering, procurement and construction (EPC) contracts are on the way to become the most usual form of contracting applied by the private sector to undertake construction works on large scale infrastructure projects like roads, telecommunication, petroleum, real estate etc. In every project, it is necessary to have good contract management in place; otherwise it can have negative consequences for all parties involved – the client, contractor, lenders, government, etc. Here the contractor carry’s out the designs of project, procure materials and equipment’s required as per the specifications and delivers the project in agreed duration of time. If contract management is not implemented and controlled properly, it may have a negative impact on the project as a whole. Such failures may include a delayed schedule, cost overruns, quality, safety and more.

It was also found that the EPC contracting scheme could work very well, especially in the cases where the contractor is in a good position to understand all legal aspects of the contract, including the allocation of risks.

A comparative study between PPP, Item Rate and Lump-Sum mode of contract will enable to know the feasible mode of contract in India. It lists certain advantages, disadvantages and their need in contract.

Key Words: Contracts, EPC Contract, Lump-Sum Contract, Item Rate Contract, Contract Comparison.

1. INTRODUCTION

Construction industry is rapidly growing and therefore requires various models of contracting. For mega infrastructure projects a flexible and effective method is needed. Engineering Procurement Construction (EPC) contract is a popular type of contract for infrastructure and power projects. EPC contractors carryout designs, procure the material and equipment’s as per the specifications and deliver the project in stipulated time.

Following factors are considered to measure the execution of project. Time, Cost, Quality, Cost-overrun, Time- overrun, Unit cost of building, Rate of construction, Client satisfaction

EPC contracts will continue to be the predominant form of construction contract and will be used on large scale infrastructure projects in most jurisdiction. EPC contracts vary on the basis of the assignment of responsibility and related penalties.

2. LITERATURE REVIEW:-

According to Ashwini Wadedwer, Shreedhar Patil (December 2015). The PPPs are good projects which deliver value for money when they are toll financed. The design and construction risk to private partners. The EPC contract plays vital role in infrastructure development.

Due to investment of private partners in PPP, risk is more to private sector, mainly to the lenders or financiers which goes into bad loans and delay in project completion. Because of these risk factors nowadays there is low interest from the investors in PPP. Therefore government is moving towards the EPC mode as it has fixed time limit with fixed cost.

3. OBJECTIVE:-

1. To determine most suitable type of contract for construction of flyover/road.
2. To compare three different types of contracts of same organization.
3. To identify factors causing loss or profit of project.

4. METHODOLOGY:-

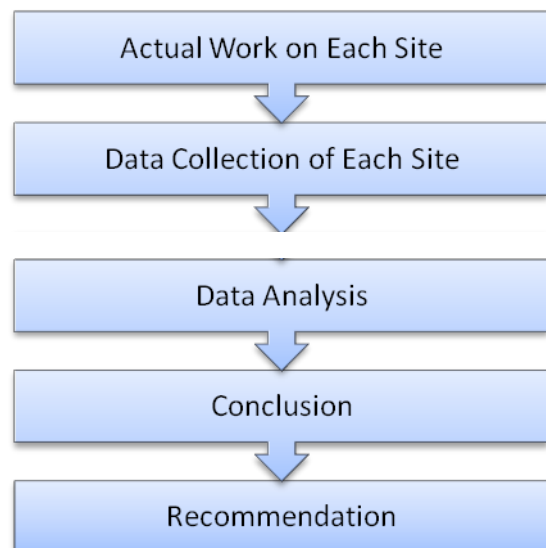


Fig-1 Methodology Flow Chart

5. CASE STUDY'S:-

Case study 1:-

- Department:- Maharashtra State Road Development Corporation Limited Mumbai.
- Name of Work:- Construction of elevated structure, ROB and service roads of NH-4 from Km 24.500 to Km 25.570 in the state of Maharashtra under EPC mode.
- Type of Contract:- Engineering, Procurement and Construction (EPC) Contract
- Length in Km:- 1.07 Km
- Completion Period:- 18 Months
- Estimated Tender Cost:- Rs. 46.1246 Crore

Case Study 2:-

- Department:- Public Works Department (PWD)
- Name of Work:- Construction of Flyover From College of Engineering Pune to Patil Estate, Pune (Balance Work)
- Type of Contract:- Item Rate Contract
- Length in Km:- 0.80 Km
- Completion Period:- 15 Months
- Estimated Tender Cost:- Rs.21.83 Crore

Case Study 3:-

- Department:- Pune Municipal Corporation
- Name of Work:- Construction of ROB between S. No. 89 & 71 at Mundhawa Over Pune Solapur Railway line on 24.0 Mtr. HCMTR.
- Type of Contract:- "C" Form (Lump – sum Contract)
- Completion Period:- 24 Months
- Estimated Tender Cost:- Rs. 25.87 Crores

6. ADVANTAGES AND DISADVANTAGES OF CONTRACTS:-

1. EPC Contract:- EPC contract carryout designs of project, procure equipment's and materials required as per the specifications and deliver the project within the specified period of time.

I. Types of EPC contract:

- a. Single document.
- b. Privately negotiated.
- c. Tendered out.
- d. Issued under nomination basis.
- e. Multiple documents.
- f. Single document.
- g. Lumpsum price.
- h. Fixed price.

II. Suitability:-

For mega infrastructure projects a flexible and effective method is needed. Engineering Procurement Construction (EPC) contract is a popular type of contract for infrastructure and power projects. EPC contractors carryout designs, procure the material and equipment's as per the specifications and deliver the project in stipulated time.

III. Advantages:-

- a. Reduced total time during the contractual process by having just one process.
- b. A seemingly "lower cost" when integrating "all" the elements under one provider.
- c. The main advantage of this service is the peace of mind the owner gets when it hands over full responsibility of the project to "only one contractor", it is much easier for the owner to manage and communicate with one provider, which means "one neck to choke".
- d. EPC minimizes the owner's risks.
- e. EPC for mega projects is more flexible and efficient delivery method.

IV. Disadvantages:-

- a. A higher cost is assumed due to the higher risk that comes with total responsibility, there is less information to prepare proposals and therefore bidders assume more risks.
- b. There is a greater disparity when comparing offers, both economically, because each provider has different criteria for assessing the risk.
- c. Usually designs are oversized due to lack of information available at the time when the offer is being prepared.

2. Item Rate Contract:- It is also called a schedule contract, in this contract, the contractor undertakes the execution of work on an item rate basis. The amount to be received by the contractor, depends upon the quantities of various items of work actually executed. The payment to the contractor is made on the basis of detailed measurements of different items of work actually done by him.

I. Suitability:-

The item rate contract is most commonly used for all types of engineering works financed by public or government bodies. This type of contract is suitable for works which can be split into various items and quantities under each item can be estimated with accuracy.

II. Advantages:-

- a. There is no need for detailed drawings at the time of allotting contract as in the case of lump sum contract. The

detailed drawings can be prepared after the contract is awarded.

b. Changes in drawings and quantities of individual items can be made as per requirement within agreed limits.

c. The payment to the contractor is made on the actual work done by his at the agreed rates.

III. Disadvantages:-

a. The total cost of work can only be known upon completion. As such, the owner may incur financial difficulty if the final cost increases substantially.

b. Additional staff is required to take detailed measurements of work done for releasing payments to the contractor.

3. Lump-Sum Contract:- In this type of contract, the contractor offers to do the whole work as shown in drawings and described by specifications, for a total stipulated sum of money. There are no individual rates quoted, thus it becomes difficult to make adjustments in the contract value if any changes are to be made in the work later on. The schedule of different items of work is not provided and the contractor has to complete the work as per drawings and specifications for the agreed lump sum amount.

I. Suitability:-

A lump sum contract is more suitable for works for which contractors have prior construction experience. This experience enables the contractors to submit a more realistic bid. This type of contract is not suitable for difficult foundations, excavations of uncertain character, and projects susceptible to unpredictable hazards and variations.

II. Advantages:-

- a. The owner can decide whether to start or shelve the project knowing the total lump sum price quoted by different contractors.
- b. The contractor can earn more profit by in depth planning and effective management site.
- c. Since the contractor has accepted a fixed price for the construction, the owner is not liable for any over expenditure. This is the most important benefit.
- d. It is much simpler to get construction loan with a Lump sum contract as it provides a high degree of certainty as far as cost is concerned.
- e. It is much easier to supervise and manage Lump sum contracts.

III. Disadvantages:-

- a. Quantifying changes is a big challenge. Such contracts demand documentation and record keeping of change orders at all stages that further requires more paperwork.
- b. Lump sum contracts pose greater risk to contractor.
- c. The overall construction completion could take longer than other contractual alternatives.
- d. Since the contract is based on fixed price, the contractor may start using sub-standard means and methods and products. In such a case, the owner should specify building materials well in advance.
- e. Lump-sum contracts usually end up with higher fixed price to cover unforeseen circumstances. Owners are responsible for unpredicted conditions which are beyond the control of either party.

7. DATA ANALYSIS:-

Site	Dehu Road	COEP	Mundhawa
Type of Contract	EPC Contract	Item Rate Contract	Lump-Sum Contract
Cost	Project amount and scope of work is fixed. Extra claim can be done but not easily applicable, as the scope is defined	Project amount is given by the client. Extra claim can be done as per work executed.	In this case the project amount is fixed and extra claim can be as per the work executed
Feasibility	Work can be started when the land is acquired more than 90%.	Work can be started even if minimum land is acquired i.e. 25%.	Work can be started when more than 50% of land is available to the contractor.
Time Overrun	Easily time extension is not available as the scope and the amount of the project is fixed.	Time beyond the scope of work is available and can get the time extension depending on the work.	Time is defined but time extension can get according to valid reasons.
Cost Overrun	In this type of project cost is	Causes of cost overrun:	Causes of cost overrun:

	<p>according to tender only. But due if some extra work is carried out i.e. utility shifting, escalation additional amount can be obtained from the client.</p>	<p>i) Basic Cost ii) Escalation due to delay iii) Extra Items iv) Claims</p>	<p>i) Tender Cost ii) Escalation iii) Extra Items iv) Claims</p>
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8. SOME MAJOR EPC COMPANIES IN INDIA:-

Segment	EPC Company
Construction residential/commercial	<ol style="list-style-type: none"> 1. Larsen and Tourbo Ltd. 2. Shapoorji Pallonji and Co. Ltd. 3. B.G. Shirke Construction Technology Pvt. Ltd. 4. Man Infra Construction Ltd. 5. Supreme Infrastructure India Ltd.
Infrastructure/general contracting	<ol style="list-style-type: none"> 1. Hindustan Construction Co. Ltd. 2. Gammon India 3. Simplex Infrastructure Ltd. 4. Gayatri Projects Ltd. 5. Nagarjuna Construction Ltd.

9. CONCLUSIONS:-

- a. In EPC contract single contractor is appointed by the owner for all kinds of construction works. The major difference between lump sum and EPC is that, in EPC the contractor has the responsibility of design and construction.
- b. Where as in lump sum contract the design and drawings are prepared by the technical team of the owner.
- c. The EPC contractor hands over a working facility that's ready to go. A design-build contract closes out similarly to design-bid-build contracts, with the owner and its construction manager or designer taking an active role in punching out the facility.
- d. Design-build contracts tend to take either a traditional design-bid-build approach to unknowns like hidden site conditions, or to share that risk between the owner and the design-builder. In contrast, it's not uncommon for EPC contracts to shift these risks entirely to the EPC contractor.
- e. Understanding the differences between these two seemingly quite similar design processes is a key step when assessing which delivery system is right for your project.