

# Role of Architects in EPC Contracts

Atul Savner  
 Student, Department of Architecture  
 School of Planning and Architecture, New Delhi

Kartik Shekhar  
 Student, Department of Architecture  
 School of Planning and Architecture, New Delhi

Rajat Raj  
 Student, Department of Architecture  
 School of Planning and Architecture, New Delhi

Sanika Paliwal  
 Student, Department of Architecture  
 School of Planning and Architecture, New Delhi

**Abstract:-** The goal of this research is to see if the way EPC contracts function is beneficial to the architectural profession, and if so, how it may be improved. According to our research based on a qualitative approach that includes case studies from the public sector and further interviews with experts in the area, the architect's position in an EPC contract is not critical and is in line with other project stakeholders. EPC contractors also have the capacity to control the project's workflow, therefore architects may be forced to make compromises in terms of design, remuneration, and so on.

**Keywords:-** EPC Contract, Project management consultant, Architect, Contractor.

## I. INTRODUCTION

### A. Study Background

Using an "Engineering, Procurement, and Construction" EPC contract arrangement, the contractor is the one in charge of all the activities ranging from design, procurement, construction, and commissioning, until the project is handed over to the end-user or owner. Engineering and construction contractors are responsible for developing the detailed engineering designs, procuring all materials and equipment needed, and building a functioning asset or facility for their clients. In the industry, companies providing EPC services are commonly referred to as EPC contractors. (Sharma and Student, 2020)

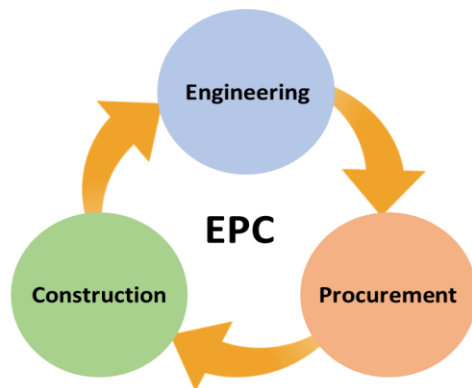


Fig 1: EPC process diagram  
 Source: Author

### B. Problem Statement

In the past few decades, contract types have changed from item rate packages to lump-sum, fixed-price, and fixed-time contracts. Slowly but surely, the onus of projects has shifted from the developer/owner to the contractor. There is a visible shift from owner-managed projects to EPC Contracts and the risk of time and cost overrun has been transferred to the contractor, along with the responsibility of designing and procurement of material and construction. This form of the contract even protects the owner/developer from currency and interest rate/fluctuations.

### C. Research Question

1. What is the role of an architect involved in an EPC contract? What are the ways in which an EPC contract affects the architect's scope of work?

### D. Objectives

1. To understand EPC contracts.
2. To understand the high/Fewer risk factors associated with EPC contracts in implementation in public sector building construction projects.
3. To analyze the role of architects in EPC contract projects.
4. To analyze the challenges faced by architects.

### E. Research Framework

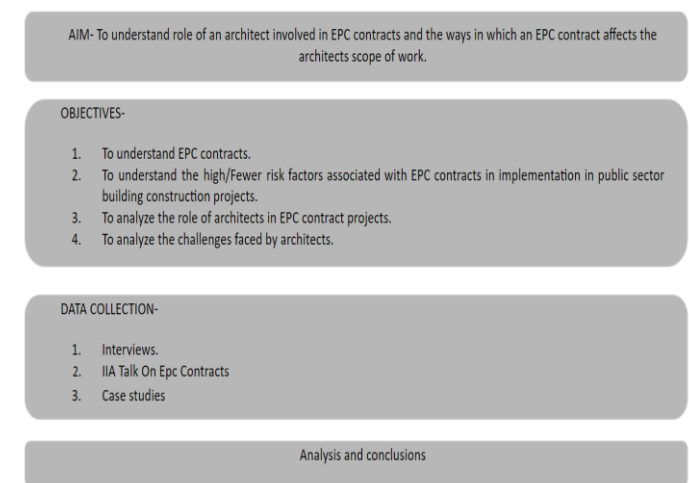


Fig 2: Research Framework  
 Source: Author

**II. LITERATURE REVIEW**

*A. About EPC*

The term EPC stands for Engineering-Procurement-Construction, a widely used project delivery method in construction. It has much in common with design-build, including single-source responsibility for design and construction, fixed-price contracts, and the broad assumption by the contractor of the risks of cost, schedule, and performance. Time, Cost, and Quality are the key clauses in any construction contract. This is also true for EPC contracts. The EPC contract, however, tends to deal with issues that are more sophisticated than those associated with other types of construction contracts. This is because, as mentioned above, an EPC contract is designed to satisfy the lenders' requirements for bankability. (Sharma and Student, 2020)

*C. Typical Epc Models*

*B. Features of EPC Contracts*

- **A single point of responsibility** - The contractor is responsible for the design, engineering, purchasing, construction, commissioning, and testing of the entire project.
- **A fixed contract price** - The contractor bears both the risk of cost overruns and the benefit of any cost savings.
- **A fixed completion date** - As part of EPC contracts, completion dates are typically either fixed dates or fixed periods after contract commencement.
- **Performance guarantees**
- **Caps on liability.**
- **Security Performance specification** (“What Is An EPC Contract?” n.d.)

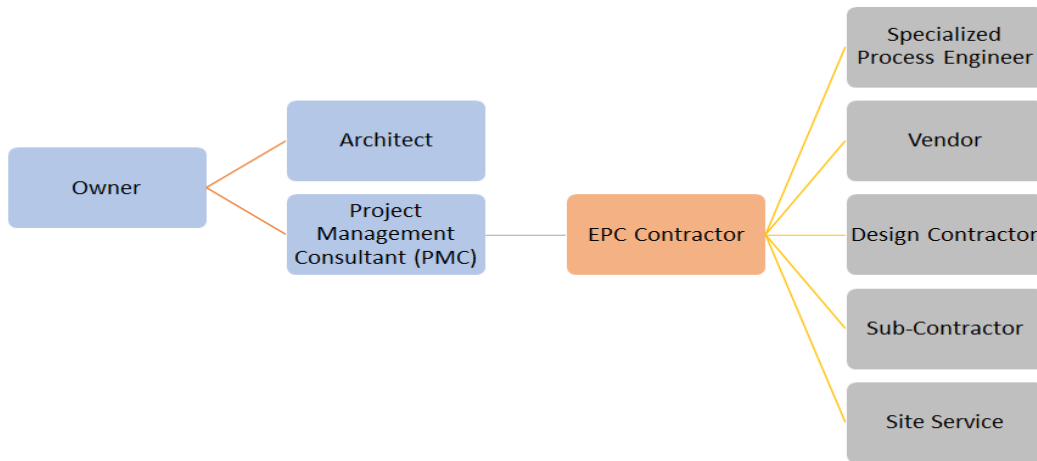


Fig 3: Typical EPC model Arrangement (1)  
Source: Author

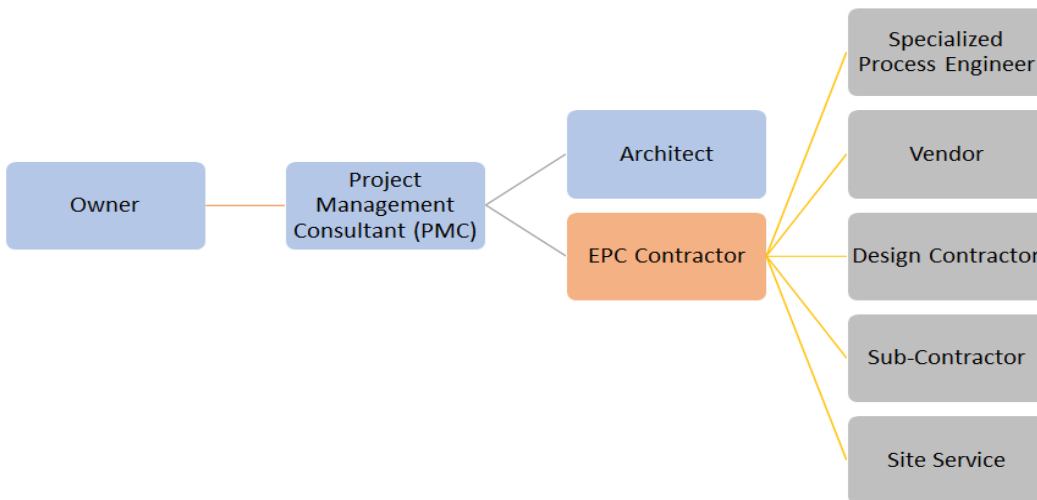


Fig 4: Typical EPC model Arrangement (2)  
Source: Author

D. Modes of EPC Contract

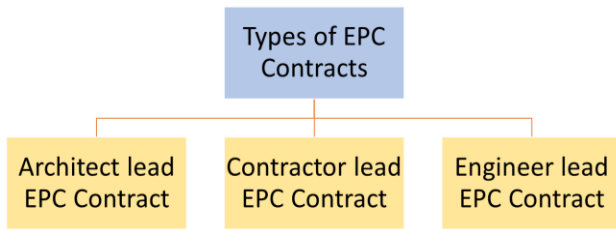


Fig 5: Types of EPC Contracts  
Source: Author

E. Role Of Architect

The role of the architects in the whole process can be different in different projects. The architect comes into the picture when the client wants a certain project to be done. The second phase starts when the tender floats and the EPC contractor is hired, the Contractor can have the in-house architectural team detail the design, or the contractor can hire some other architectural team to conduct the process.

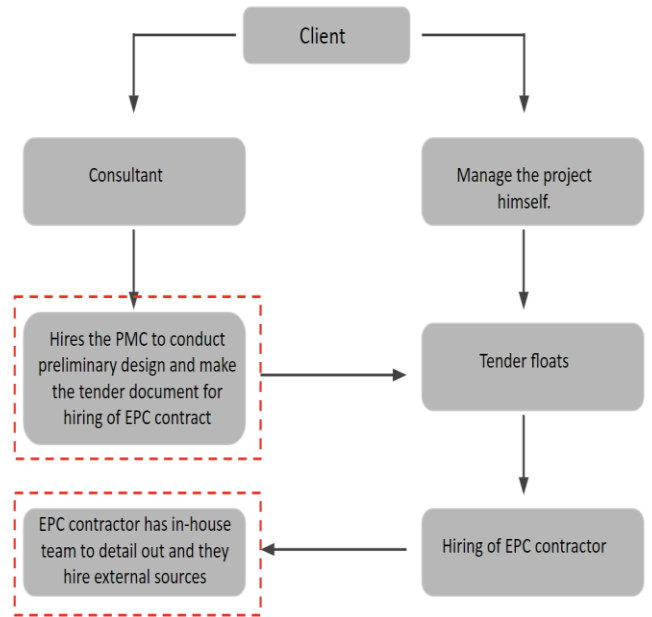


Fig 6: Process of EPC Contract  
Source: Author

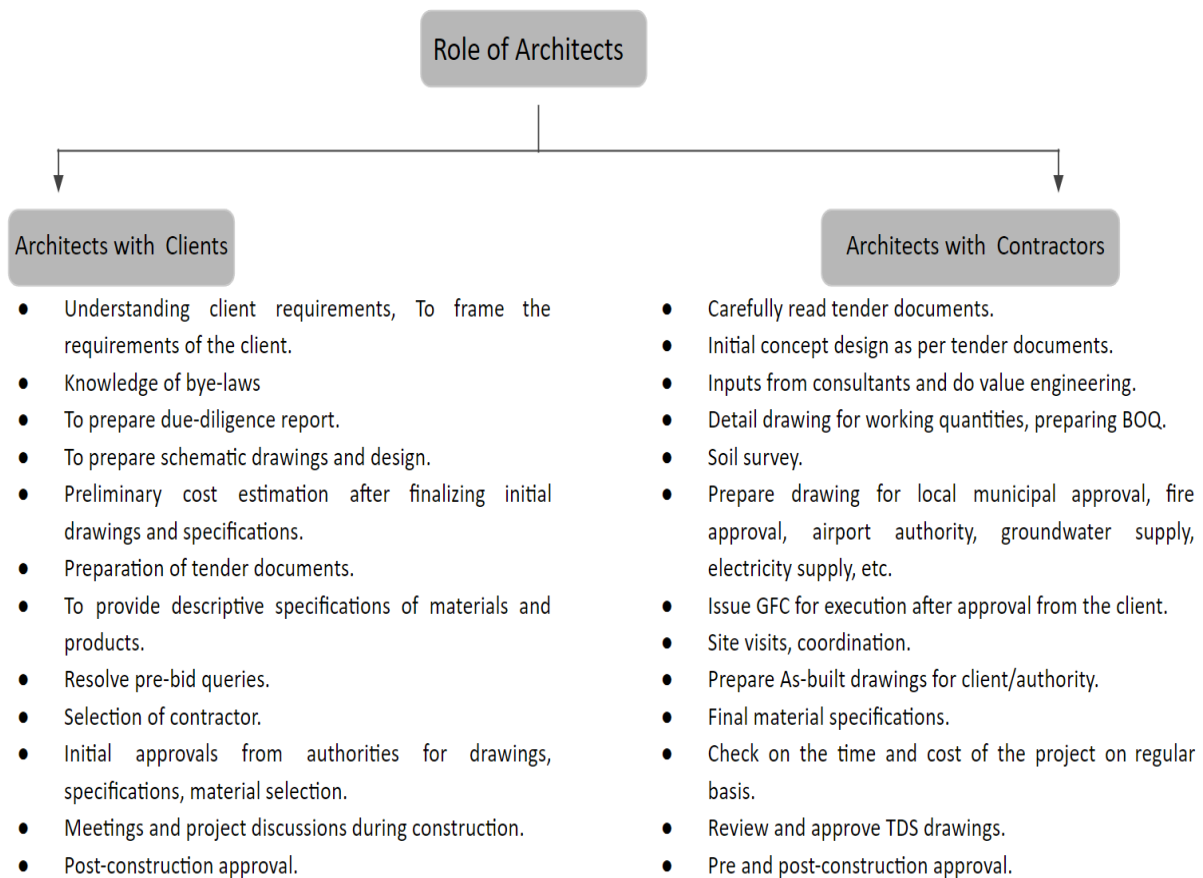


Fig 7: Stages in which architect is involved in EPC Contract  
Source: Author

### III. DATA COLLECTION

#### A. A Talk On Epc Contracts By Prof. Manoj Mathur, Prof Charanjit Singh Shah, Ar. Navneet Kumar And Er. Iftikhar Drabu

On February 26, 2021, Northern Chapter, The Indian Institute of Architects organized a deliberation among its esteemed members to enable a better understanding of EPC contracts and their impact on the profession of Architectural practice where Prof. Manoj Mathur, Hon. Jt. Secretary, Northern Chapter was the moderator. The speakers were Er. Iftikhar A Drabu (Consulting Engineer), Ar. Navneet Kumar (Former ADG, CPWD) and Prof. Charanjit Shah (Practicing Architect). Through the talk, they tried to answer 3-4 questions such as

1. What is an EPC contract?
2. How is an architect engaged in such a contract?
3. Advantages and disadvantages of such a procurement system, stakeholders' perspective.
4. Its ramifications on the profession of architecture and the quality of the built environment.

There are 6 stakeholders- Owner, Client, Architect, Project manager, Consultants, and Contractor. The architect is present at two-stage, one before the tender is floated that is to prepare the preliminary drawings, and the second is when the contractor hires one to complete the drawings for construction. He may or may not follow the earlier design but provided some very basic fundamental things that cannot be changed like the plinth area, total area, certain quantities of items remaining fixed.

In EPC mode, because of the involvement of two architects, the beauty and appropriateness of the design are lost somewhere. So this model perhaps needs to be revisited because even the bidding is more of a financial bid as to which contractor can do it at less cost compromising the quality and the design of the project. The changes in the EPC model that can be done to make it more helpful for architects are-

1. The mechanism for the appointment of an architectural consultant and engineering consultant.
2. Value of what the architects do.
3. And lastly, what do the architects deliver (IIA Northern Chapter, 2021)

#### B. Case Studies

##### ➤ CASE STUDY - 1

**Project:** Inter-State Bus Terminal, Commercial Complex, and Multilevel Car Parking

**Location:** Katra, Jammu & Kashmir

**Client:** (K.D.A) Katra Development Authority

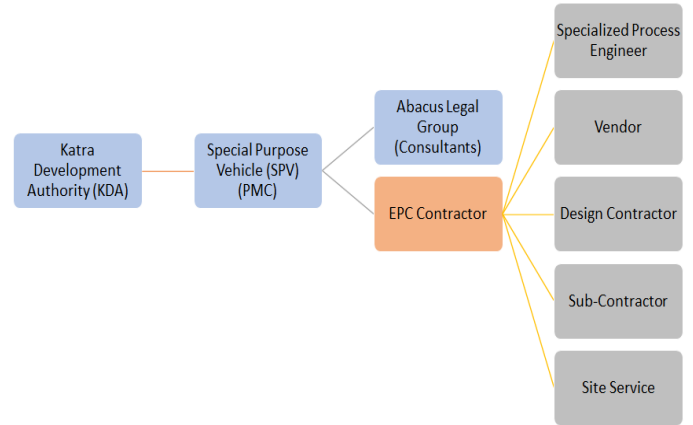


Fig 8:Stakeholders in Inter-State Bus Terminal, Commercial Complex  
Source: Author

**Scope of the Project:** Interstate Bus Terminal (ISBT) Katra, Jammu Kashmir, a commercial complex, and multi-level auto parking are all part of the project's scope. Under the supervision of the contractor, the architect is responsible for preparing detailed architectural drawings, a projection execution plan, and a BOQ (bill of quantities) that must be developed and approved by the CPWD after evaluation to ensure that it meets the applicable specifications. An architect is involved in Construction and Commissioning related activities, reviewing and coordinating with the contractor. At each design stage of this project, the Architect must examine and obtain clearance from the Katra Development Authority. The Bidder must stress the necessity for pre-engineered structures and procure them based on load estimates approved by KDA, with the designs being proofed.

**Liabilities and Responsibilities of an Architect:** The architect must detail everything to the point where nothing is overlooked. As a result, the odds of design inaccuracy are reduced. In an EPC contract, where all consultants and architects are involved on a continuous basis, it's more of a team effort. In the EPC approach, the contractor is in charge of the entire design team. Because the EPC contract begins with the design phase, the architect's function becomes critical; additionally, because the contract is binding until the project's completion, architects are constantly involved. The architect is one of many project team members who pays attention to the Contractor and is compensated based on his performance. Architects should also guarantee that the contractor follows the regulations and plans set out by the architect.

The State Government has established a Special Purpose Vehicle (SPV) led by the Administrative Secretary, Housing & Urban Development Department, to carry out the Inter-State Bus Terminal (ISBT) Project in Katra.

➤ **CASE STUDY - 2**

**Project** - Indian Institute of Management, Nagpur

**Site area** - 132 acres

**Architect** - Rajender Kumar and Associates

**EPC** - Ahluwalia contracts

**PMC**- Engineers India Limited (EIL)

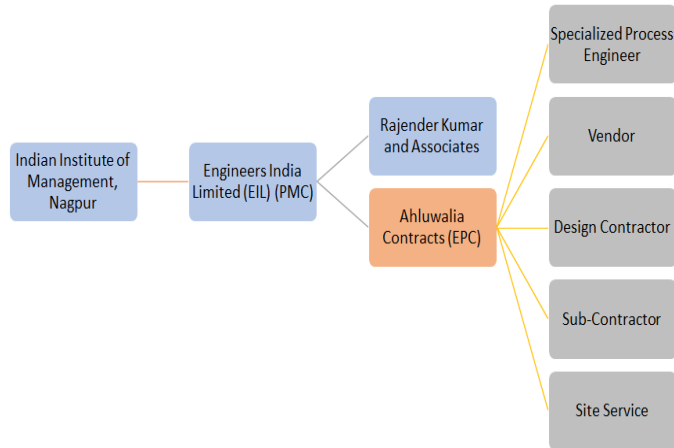


Fig 9: Stakeholders in Indian Institute of Management, Nagpur  
Source: Author

• *Scope of the Project:*

This is an institutional campus with a site area of 132 acres. Academy buildings, classrooms, multipurpose hall, dining, and other external development areas including spill out, oat, sports area, amenities, etc. The client is IIM Nagpur, they are handling the external agencies and looking into amenities. External consultants and various agencies were also hired by the contractors. Because the contractor company is unable to hire all of the consultants required, they enlist the assistance of outside consultants. The architect must consider the client's delivery, the contract's deadline, and the contract's specifications.

• *Project Details*

IIM Nagpur is an institutional campus where the client was IIM Nagpur and they hired Engineers India Limited (EIL) as their PMC (project management consultant). PMC then hired Rajender Kumar Associate to do the preliminary design of the complex according to their requirements. They were hired not only for the early design but also to create the tender document for the selection of the EPC Contractor and also to look after the execution of the project. Ahluwalia contracts won the bid for the project to further detail the design including procurement of the resources and the construction of the complete project. The Ahluwalia contracts had their own in-house architectural team to conduct the detailed design. The project is expected to take two years to complete, however because of the covid epidemic, construction has been halted, providing the contractors a six-month extension due to the pandemic.

➤ **CASE STUDY - 3**

**Project:** Redevelopment of India Trade Promotion Organisation (ITPO) Complex

**Location:** Pragati Maidan, New Delhi

**Client:** NBCC (India) Limited

**Total Campus Area:** 49.98 Hectares

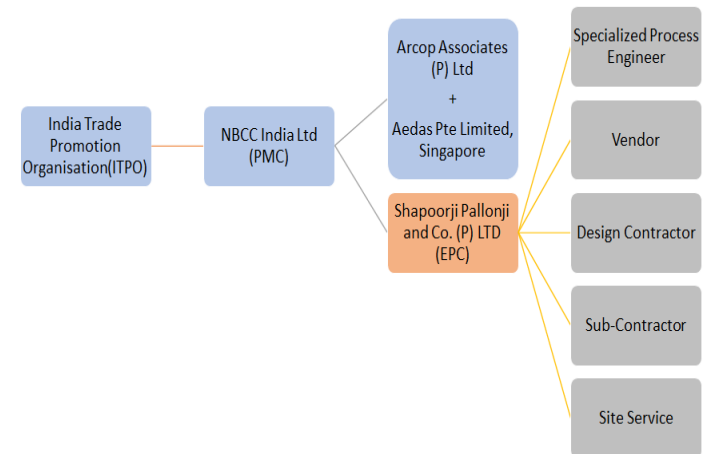


Fig 10: Stakeholders in Redevelopment of India Trade Promotion Organisation (ITPO) Complex  
Source: Author

• *Scope of the Project:*

ITPO has recommended that the project be redeveloped in two phases, Phase I and Phase II. In Phase I, the project concept calls for the creation of exhibition space and a Convention Center facility, as well as an Admin Block and a Basement for Car Parking, and in Phase II, the expansion of display space and supporting infrastructures.

The next development will be divided into two phases. Phase II will be undertaken at a later date and is not included in the Project's scope at this time.

**NBCC India Ltd** has been appointed as the **Project Management Consultant** for the Project. NBCC in turn has appointed the following:

1. **Arcop Associates (P) Ltd** is in consortium with **Aedas Pte Limited, Singapore** to provide Architectural and Engineering Services for the Project.
2. Joint Venture of **Shapoorji Pallonji and Co. (P) Ltd & Shapoorji Pallonji Qatar WLL (JV)** as Engineering, Procurement & Construction (EPC) contractor including Operation and maintenance of the Project.

• *About the NBCC:*

National Buildings Construction Corporation Limited, formerly known as NBCC (India) Limited, is a blue-chip, Navratna Government of India enterprise under the Ministry of Urban Development.

In the area of Project Management & Consultancy, the Company has been certified with ISO 9001:2008 by the Bureau of Indian Standards. Presently, the Company operates in three major segments, i.e.

- (i) Project Management Consultancy (PMC),
- (ii) Real Estate Development
- (iii) EPC Contracting,

**About the Shapoorji Pallonji:** Shapoorji Pallonji is a diversified business house, delivering complex and challenging projects for over 150 years. The company operates in 6 major business areas with 16 group companies and a strong employee base of over 60,000 people from across 40+ nationalities. With an impressive track record of excellence in all segments of construction, the company is a technology-driven, resource-rich company with high standards of Health, Safety, and Environment practices. The company pursues perfection in engineering and construction, achieved through path-breaking technologies, innovative systems, and processes that have helped it deliver complex projects and solutions on time, with the best quality, and within budget. (“PIM\_IECC\_2018.pdf,” n.d.)

➤ **CASE STUDY - 4**

**Project -** National Disaster Response force Academy, Nagpur

**Site area -** 62 Hectares (153 acres)

**Architect -** Gian P Mathur and Associates Private Limited

**PMC -** IRCON International Limited

**EPC -** Kalyan Toll Infrastructure LTD

**Client -** National Disaster Management Authority (NDMA)

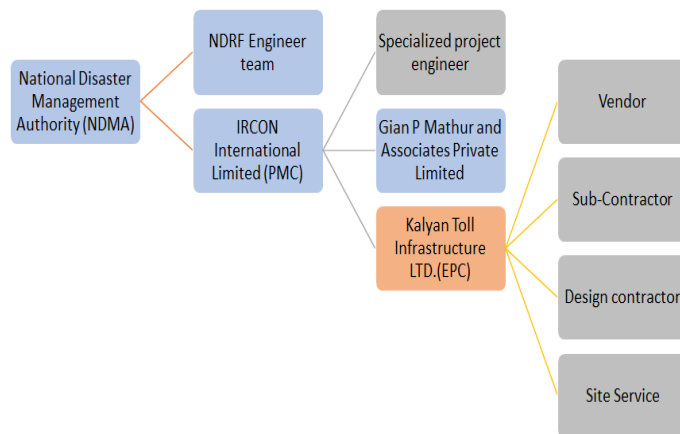


Fig 11: Stakeholders in National Disaster Response force Academy, Nagpur  
Source: Author

The National Disaster Response Force (NDRF) is a specialized force established under the 2005 Disaster Management Act for the purpose of responding to threatening disaster situations and disasters. It falls under the apex disaster management agency in India, the national disaster management authority (NDMA).

NDRF (National Disaster Response Force) has entrusted IRCON International Limited as the Project Management Consultant for the construction of the National Disaster Response Force Academy on 153 acres of land, which will serve as a training academy for all the South East Asian countries.

• *Scope of the project*

The NDRF Academy will host simulated infrastructure, which will have a village and town set up to simulate flooding conditions and to ensure synergy in providing training to fire service, civil defense, and the NDRF personnel for rescue operations in a dedicated manner, and to train people and security force for biological and chemical warfare.

**About IRCON International Limited:** IRCON International Limited has floated a tender for the Construction of Infrastructure of the National Disaster Response Force Academy at Nagpur, Maharashtra.

**About the Gian P Mathur and Associates Private Limited:** Gian P. Mathur & Associates Pvt. Ltd. (GPM – Architects & Planners) provides services across architecture, engineering, and project management. The scope of work of this architecture firm included developing a brief for the NDRF Project like developing vision and objective, design Parameters, and Project requirements. The Academy is designed to provide training to NDRF, SDRF, Fire Departments, Police, PSUs, and other companies who require such training, by creating a Real-Time Visual of disaster, which will help them act more accurately.

**About Kalyan Toll Infrastructure LTD:** Kalyan Toll Infrastructure Limited is a construction company with 25 years of experience based in Madhya Pradesh. It is appointed as the EPC based on the tender floated by IRCON International Limited for the construction of infrastructure of the National Disaster Response Force Academy at Nagpur, Maharashtra. (“Home | NDRF - National Disaster Response Force,” n.d.)

**IV. ANALYSIS**

*A. Interview Analysis*

Information was gathered through talks with architects, EPC contractors, and project managers in order to gain a thorough perspective of the nature of projects involving EPC contracts.

	<b>What is the role of an architect in projects involving EPC contracts?</b>	<b>What are the challenges faced by architects when involved in projects involving EPC contracts?</b>
Niyati Gupta (Faculty member at SPA Delhi)	Depends on the mode of the EPC contract, although some basic fundamentals are the same such as preparation of drawings, etc. Teamwork is important.	The scope of work for architects is very limited and the flexibility is somewhat taken away.
Ar. Sandal Kapoor (Experienced real estate professional and visiting faculty at SPA-New Delhi.)	Architects are involved in two stages preparing drawings, GFC, coordinating with other consultants.	The architect should be experienced as there is the very limited scope of misconduct or any kind of other mishappening.
Ar. Rahul Kumar (Principal architect at RKA)	Architects are involved in two phases on in preliminary designing and the other from the contractor side who details the project further	The scope and the time allotted to the preliminary Architect is very small and on paper the preliminary architect is hired for a very short period but his involvement is there till the project is delivered.
Ar. Ravindra Singh Verma (Experienced real estate professional and visiting faculty at SPA-New Delhi.)	The scale of EPC can vary from a very small level, therefore the stakeholders are very different in different projects but the motive remains the same, single-point accountability.	The project might have the potential of mediocrity in the terms of design just because of the ease of construction as well as the procurement of the required material within the client's requirements.
Sunil Saxena (Senior Vice-President and Regional Head of Kolkata-Ahluwalia Contracts)	All stakeholders are equal in EPC contracts. An architect is an agency that keeps coordinating with other consultants and has to keep a track of the project throughout with various other responsibilities.	They have to go through the specification thoroughly, with timely site visits, discussions.

According to the analysis above, the architect's position in an EPC contract is not critical and is comparable to that of any other stakeholder. Consultants are also interdependent. As a result, accurate BOQ, coordination with consultants, and timely project completion, as well as quality assessments, become challenging aspects of EPC contracts.

#### *B. IIA Talk On Epc Contracts Analysis*

- The architect is present at two-stage, one before the tender is floated that is to prepare the preliminary drawings, and the second is when the contractor hires one to complete the drawings for construction.
- In EPC mode, because of the involvement of two architects, the beauty and appropriateness of the design are lost

somewhere. EPC mode is more mechanical and industrial rather than design and construction.

- The purpose of EPC mode as in why it came was for finance and time. So this model perhaps needs to be revisited because even the bidding is more of a financial bid as to which contractor can do it at less cost compromising the quality and the design of the project.
- The changes in the EPC model that can be done to make it more helpful for architects are-
  1. The mechanism for the appointment of an architectural consultant and engineering consultant.
  2. Value of what the architects do.
  3. And lastly, what do the architects deliver

C. Case Study Analysis

➤ CASE STUDY - 1

**Project:** Inter-State Bus Terminal, Commercial Complex, and Multilevel Car Parking, Katra, Jammu & Kashmir

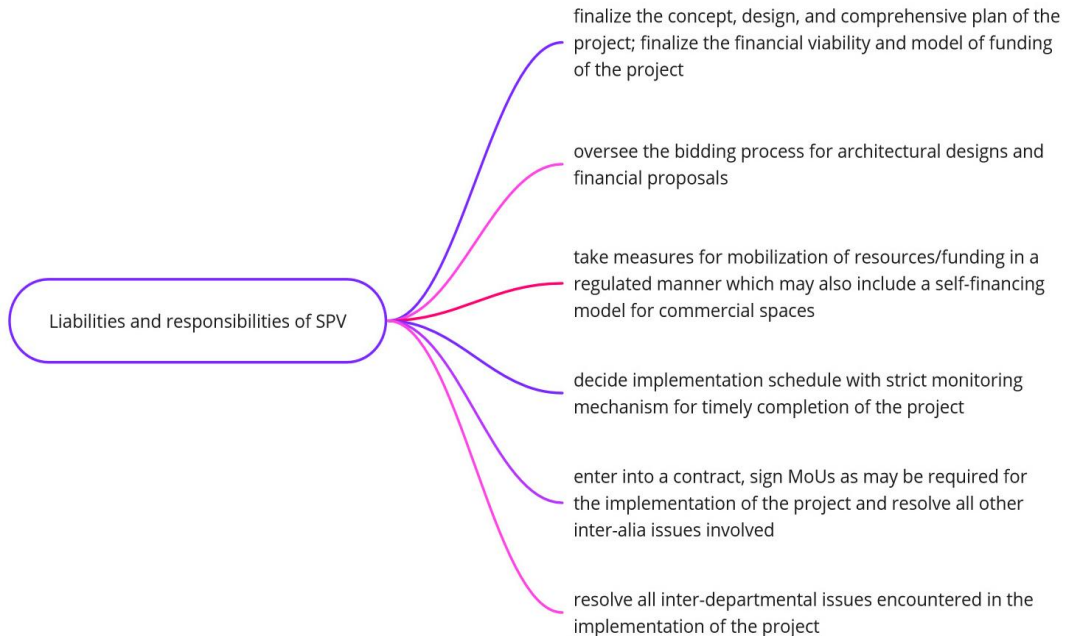


Fig 12: Responsibility of Architect (SPV)

Source: Author

➤ CASE STUDY - 2

**Project -** Indian Institute of Management, Nagpur

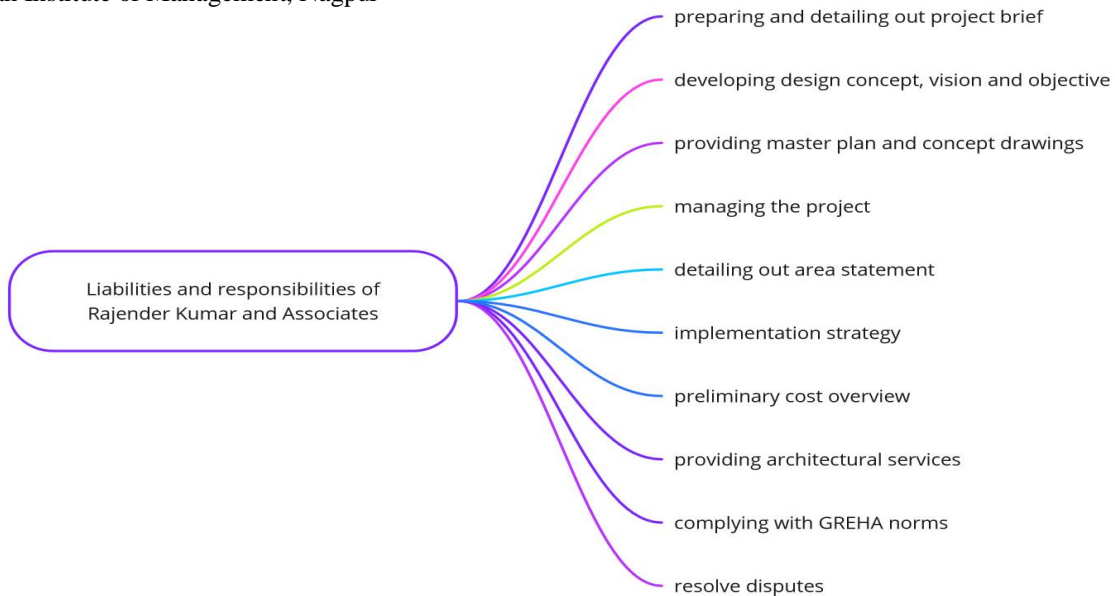


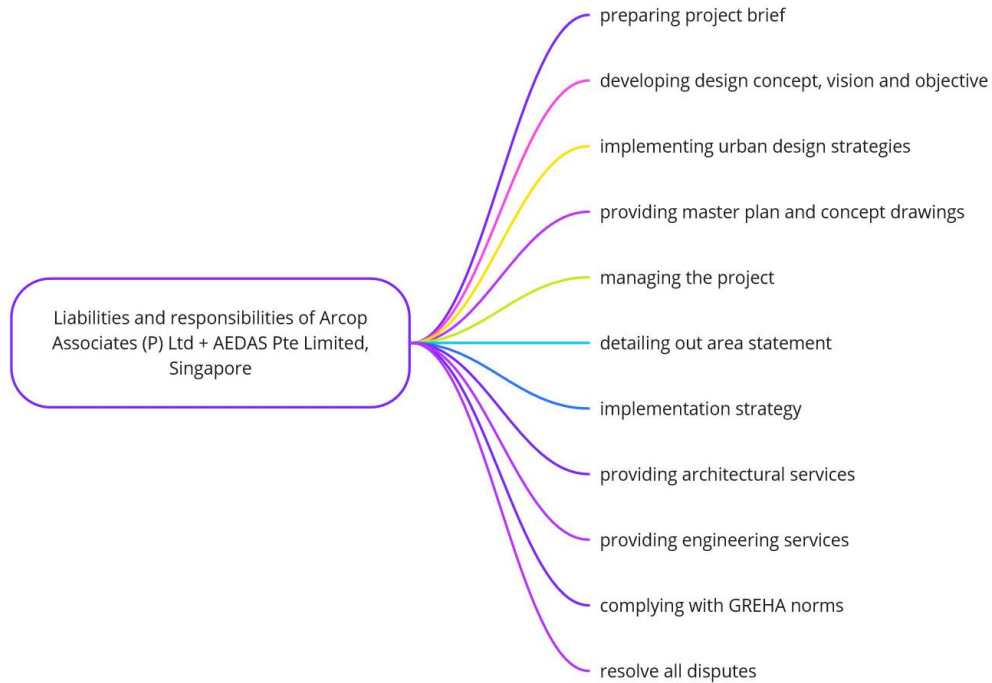
Fig 13: Responsibility of Architect (RKA)

Source: Author



➤ **CASE STUDY - 3**

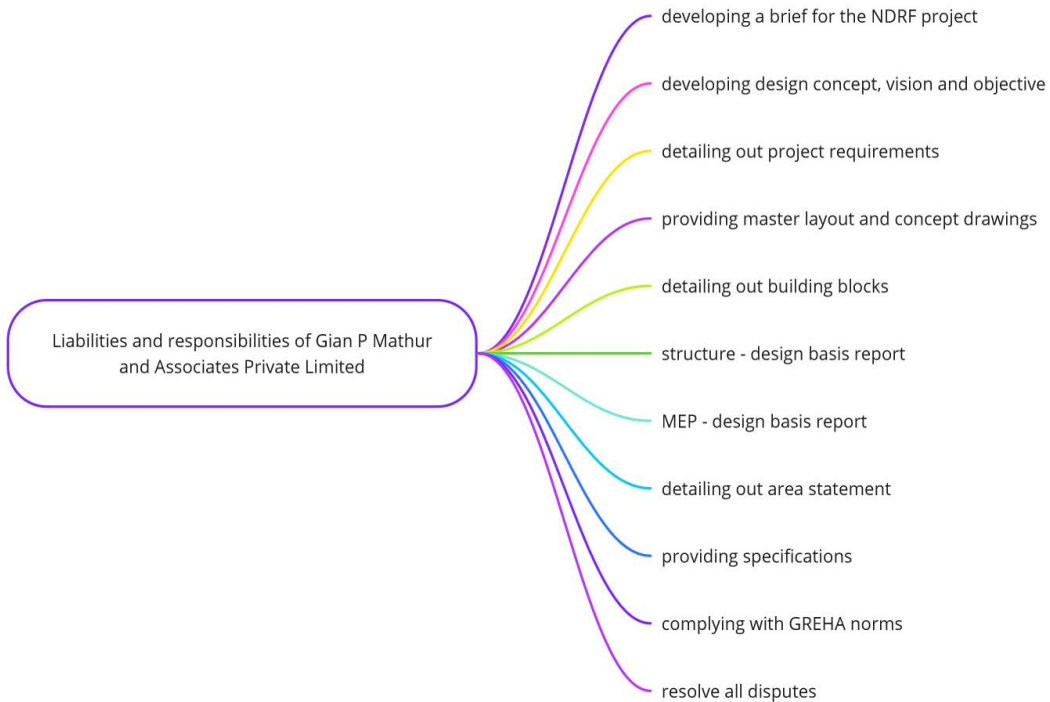
**Project:** Redevelopment of India Trade Promotion Organisation (ITPO) Complex, Pragati Maidan, New Delhi



**Fig 14: Responsibility of Architect (ARCOP+AEDAS)**  
Source: Author

➤ **CASE STUDY - 4**

**Project - National Disaster Response force Academy, Nagpur**



**Fig 15: Responsibility of Architect (GPM)**  
Source: Author

## V. CONCLUSION

In larger contracts, an architect's position in an EPC contract is important since, in addition to being involved on the contractor's side, an architect is also involved on the client's side.

### A. Importance of an architect

In an EPC contract, the modeler isn't given the best need. Other engineering ventures, which may or may not be executed through the EPC show, are treated as bosses who are included in the plan organized through acquirement and development. Because EPC contracts don't involve coordinating intelligence between the designer and the client, they are not considered EPC temporary workers.

### B. Risk Management

Since of miscommunications between different specialists, there continuously emerges dangers within the venture which costs over-budgeting or taking more time for the extended completion.

### C. Role of architect

- Both architecture and infrastructure engineering are engineering specialties. In an EPC model (engineering, procurement, and construction), an architect's role begins with the design phase.
- During the construction phase, the architect is in charge of pre-commissioning and commissioning services such as piling, concrete, structural-equipment erection, instrumentation, earthwork, MEP work, and coordination with consultants. During the procurement stage, all construction and MEP materials, as well as process equipment, are procured from around the world.
- As a result, the architect is responsible for the design, execution, construction, coordination, site supervision, commissioning, and material procurement in large-scale projects.
- The architect needs detail to a specific level in order to eliminate architectural mistakes. Consistent coordination between architects and other EPC experts is critical to the success of an EPC contract.
- BOQ preparation that is accurate, as well as thorough reading

### D. Challenges faced by an architect.

- Scope of work is very limited
- Preparing BOQs
- Limited time for design.
- Not necessary that the design was done by the architect involved with the client is being taken forward.

- Unless it is an architect-led EPC contract which is very few, an architect is not the head of the project and has to work under the supervision of the contractor.

### E. Relationship between EPC contractor and architect.

- More work will be required of the architect.
- The architect is expected to follow the EPC contractor in most EPC projects, including designing in some cases.
- Because the architect is compensated based on performance, the contractor can hire specific item rate subcontractors to complete the job, making the architect a less significant stakeholder.

### F. Challenges faced by EPC contractors.

- Miscalculations in BOQs prepared earlier by PMC resulted in extra cost.
- Specifications are not provided properly or detailed by the architect.
- On-site problems.
- Dependent on a single entity for a particular task throughout the project.
- Site Information such as soil survey etc is not done properly.

### G. Future of EPC contracts.

- Due to single-point responsibility, EPC contracts have a bright future in India.
- At a time when private actors are having difficulty acquiring funds, the government is resorting to EPC contracts to assure faster execution.
- BIM will be a key aspect of EPC in the near future to help better organize things.

## REFERENCES

- [1]. Home | NDRF - National Disaster Response Force [WWW Document], n.d. URL <http://www.ndrf.gov.in/> (accessed 2.9.22).
- [2]. IIA Northern Chapter, 2021. EPC Contracts.
- [3]. IIM Nagpur.ac.in. 2020. [online] Available at: [https://www.iimnagpur.ac.in/wp-content/uploads/2020/02/Techno-commercial-R1\\_compressed.pdf](https://www.iimnagpur.ac.in/wp-content/uploads/2020/02/Techno-commercial-R1_compressed.pdf) (accessed 2.9.22).
- [4]. KDA EPC Agreement Design, Engineering, Procurement & Construction for ISBT 9.5.2018 Etendering.pdf, n.d.
- [5]. PIM\_IECC\_2018.pdf, n.d.
- [6]. Sharma, D., Student, P., 2020. Suitability of EPC Contracts in Public Sector Building Construction Projects 8, 8.
- [7]. What Is An EPC Contract? - Government, Public Sector - Malaysia [WWW Document], n.d. URL <https://www.mondaq.com/government-contracts-procurement-ppp/1085960/what-is-an-epc-contract> (accessed 2.9.22).