

# EPC Contracts - Case Study



# What is an EPC Contract?

- EPC : Engineering, Procurement, Construction
- Delivery of a completed project from design to completion
- Contractor is responsible for :
  - detailed engineering design of the project
  - procure all the equipment and materials necessary
  - then construct to deliver a functioning facility or asset to their clients



# NEED FOR EPC CONTRACTS IN CPWD

Conventional item-rate contracts are prone to time & cost overrun

Considerable time is lost in processing of: Variation in quantity of items which are quite frequent, Introduction of Non Schedule items, Variation in contract price

Measurements recording and preparation of Bills is laborious and time consuming (particularly in buildings construction contracts)

**IMPROVED & MODERNISED Project Execution Capabilities is required for Faster execution**



# Important aspects of EPC Contracts

<b>Scope of work</b>	<ul style="list-style-type: none"><li>• Project scope needs to be specified very carefully and should be exhaustive.</li><li>• Success of the whole contract depends on this</li><li>• Ambiguity or uncertainty in the clauses might lead to conflicts and confusion in the future.</li></ul>
Technical Parameters	<ul style="list-style-type: none"><li>• Based on output/ functional specifications.</li><li>• Only core requirements of Design, Construction and Operation that have a bearing on the Functional parameters, Quality and Safety of the project are to be specified</li><li>• Framework focuses on the 'WHAT' rather than the 'HOW' in relation to the works to be delivered by the Contractor.</li></ul>
Contract Price	<ul style="list-style-type: none"><li>• Lump Sum / Area Basis</li><li>• Subject to adjustment on account of changes in the relevant price index ,changes in law or changes in the scope of the project (Contractor not expected to bear manage the risks arising out of such changes)</li></ul>



# OBJECTIVES OF EPC CONTRACT

- **Implementation of project to specified standards with a fair degree of certainty relating to time & cost while transferring the construction risk to contractor.**
- **Responsibility for Investigations, Design and Construction lies with the contractor for a lump sum price determined through competitive bidding.**
- **Awarding contract for a lump sum price ensures predictability and financial discipline, both for the Contractor and the Authority**



# OBJECTIVES OF EPC CONTRACTS

- ▶ **Engagement of professionally managed agencies.**
- ▶ **To enable a transparent, fair and competitive roll-out of projects**
- ▶ **Enough room for the Contractor to innovate and add value.**
- ▶ **Project risks such as Commercial and Technical risks relating to Design and Construction have been assigned to the Contractor.**



# Salient Features of an EPC Agreement

Redevelopment of GPRA Colony at Mohammadpur by CPWD



# Scope of Work of Contractor includes:

- ▶ Architectural design and Structural design as per the general parameters and proposed drawings given in the NIT
- ▶ Planning, designing and execution of all internal services such as Internal sanitary, Water supply, Drainage system etc. complete for the buildings planned including all its fittings, fixtures, testing etc. and External services like Water supply, Rain water harvesting systems, Sewerage, STP, Drainage system, Roads, Paths and all connected sub-structure and superstructure
- ▶ Obtaining Mandatory Approvals from local bodies/ authorities required for commencing the work such as:

•Environment Clearance	•Airport Authority
•Fire Clearance	•Tree cutting
•Delhi Urban Arts Commission	•ASI
•DMRC	



- ▶ Execution of work & services and handing over the assets after making the campus habitable in all respect.
- ▶ The scope is inclusive of Topographic survey, Subsoil investigation , Traffic impact Assessment and all ancillary works
- ▶ Design of all Civil, Electrical & mechanical and Horticulture services, their integration, installation and commissioning
- ▶ Development of area, Boundary Wall, Gates, Internal roads, Street lighting, Parks, Cycle track and other amenities etc required



# Scope of Work of CPWD

- ▶ Overall Monitoring and Control of the project
- ▶ Day to day interaction with contractor to meet the time schedule and quality requirements– TPQA also appointed
- ▶ Assessment of monthly progress reports
- ▶ Review of all Designs and other Documents w.r.t their conformity to CPWD standards & specifications
- ▶ Co-ordination in getting Approvals required to start the work



# CONTROLS

# Architectural Control

- ▶ Work to be done as per specified area norms and specifications as laid down for GPRA Quarters in the agreement.
- ▶ To satisfy Local Body Building Bylaws, NBC-2016 requirements and all Statutory Bodies
- ▶ Approvals to be taken by Contractor but statutory fees reimbursed by CPWD



# Quality Control

- ▶ NCCBM engaged for TPQA by Engineer-in-charge to have a control on quality and methodology of execution.

# Structural Design

- ▶ IIT Delhi appointed for Vetting of all structural drawings given by Contractor.



# Table of Milestones- Control of Progress

Sl. No.	Description of Mile stone	Time allowed in days (From date of start)	Amount to be withheld in case of Non-achievement of mile stone
1.	Submission and approval of architectural, structural & MEP drawings i/c approval of local bodies/authorities. Dismantling of all existing structure and removal of C&D waste to clear the site for new construction	180	In the event of not achieving the necessary progress as assessed from the running payment, 1% (of amount quoted in Part-A of financial bid) will be withheld for failure of each milestone subject to Maximum 5% of amount quoted in Part-A of financial bid for slippages of Milestones.
2.	Completion of Civil works of basement.	360	
3.	Completion of Superstructure work of all Residential Towers.	660	
4.	Completion of residential units fit with all civil, electrical & mechanical services. Work of E&M services completed in Basements.	870	
5.	All civil, electrical & mechanical and horticulture work completed in all aspects in Residential & non-residential buildings with services, clearances from local body/ completion certificates etc. required to declare buildings and campus authorized for occupation.	960	

# Stage based payments

- ▶ Simple and rational method for estimating interim payments to the Contractor
- ▶ Ensures that payments are made for all works conforming to the Agreement and commensurate with the stages of completion of works.
- ▶ Each item of the project has been further sub-divided into stages, and payment will be made for each completed stage of work.



# PROPOSED ELEVATION - MOHAMMADPUR



# Payment Breakup Schedule for Designing & Approvals

S.No.	Activity	Break up of total % payable	% of total payable
A.	Investigation, planning, Designing and obtaining approvals for works under Item no 2,3&4 - (4% of total quoted rates against item No 2,3 & 4).		0.8%
	a) On approval of inception report & detailed survey and architectural drawings ready for submission for approval of local bodies-20%		
	i. On submission of inception report, survey report and soil testing report.	0.3%	
	ii. On preparation of submission drawing	0.5%	
	b) On approval of structure design by Engineer-in-charge 20%		0.80%
	c) On approval of local body, EIA & TIA clearance, final Architectural drawing showing electrical and sanitary layout plan and details structural design and interior structural design and interior design/decoration-30%		1.2%
	i. After all approvals obtained from local body/ authorities.	0.4%	
	ii. After obtaining EIA clearance.	0.4%	
	iii. After submission of all working drawings on pro rate basis.	0.4%	

# Payment Breakup Schedule for Designing & Approvals

S.No.	Activity	Break up of total % payable	% of total payable
	d) On completion of construction-30%		1.2%
	i. On completion of all sub-structure works.	0.2%	
	ii. On completion of 50% super structure works.	0.2%	
	iii. On completion of 100% super structure works.	0.2%	
	iv. On completion of 50% of total value of work (Bid amount).	0.2%	
	v. On completion of 95% of total value of work (Bid amount).	0.2%	
	vi. On declaring complete by competent authority.	0.2%	

# Payment Breakup Schedule for Basements

S.No.	Activity	Break up of total % payable	% of total payable
B.	Completion of Basement for Parking as per Item No.2.1 – (96% of Quoted Rates)		–
	a) Excavation @ Sqm.		2.0%
	b) Footing / Raft @ Sqm.		20.0%
	c) Completion of lower/Intermediate Basement		
	i) Completion of Retaining wall/column/Lift well @ Sqm. on pro rate basis.		8.0%
	i. Retaining walls – 20% of total length	2.0%	
	ii. Retaining walls – 50% of total length	2.0%	
	iii. Retaining walls – 75% of total length	2.0%	
	iv. Retaining walls– 90% of total length and 100% of columns and lifts well	2.0%	
	ii) Roof Slab @ Sqm.		13.0%
	iii) Completion of Partition walls with AAC Blocks, lift area, walk ways, ramps, staircases and stone cladding on lift walls/ lobby @ Sqm.		4.0%
	i. On completion of partition walls	0.5%	
	ii. On completion of ramps, staircases	2.5%	
	iii. On completion of walk ways, stone cladding.	5.0%	
	iv. Completion of lobby and complete finishing	0.5%	

# Payment Breakup Schedule for Basements

S.No.	Activity	Break up of total % payable	% of total payable
	d) Completion of upper most Basement		
	i) Completion of Retaining wall/column/Lift well @ Sqm. on pro rate basis		8%
	i. Retaining walls – 20% of total length	2.0%	
	ii. Retaining walls – 50% of total length	2.0%	
	iii. Retaining walls – 75% of total length	2.0%	
	iv. Retaining walls– 90% of total length and 100% of columns and lifts well	2.0%	
	ii) Roof Slab @ Sqm.		13.0%
	iii) Completion of Partition walls with AAC Blocks, lift area, walk ways, ramps, staircases and stone cladding on lift walls/ lobby @ Sqm.		4%
	i. On completion of partition walls	0.5%	
	ii. On completion of ramps, staircases	2.5%	
	iii. On completion of walk ways, stone cladding.	5.0%	
	iv. Completion of lobby and complete finishing	0.5%	
	e) Internal finish and painting work (@.50% per floor)		1.0%
	f) Internal Flooring i/c skirting (1.0% @per floor)		

# Payment Breakup Schedule for Basements

S.No.	Activity	Break up of total % payable	% of total payable
	g) Water proofing treatment of walls and terrace @3.00% per floor on pro rate basis		6%
	i. Waterproofing of base and walls on pro rate basis	3.0%	
	ii. Waterproofing of terrace and Mumty etc. on pro rate basis	3.0%	
	h) Internal Electrical installations		1.0%
	i) Lift Nos.		1.0%
	j) Complete Fire Fighting System		3.0%
	k) Ventilation System @ Sqm.		7.0%
	i. On installation	5.0%	
	ii. On commissioning	2.0%	
	l) After Completion of Super Structure		3.0%

# Payment Breakup Schedule for Stilt

S.No.	Activity	Break up of total % payable	% of total payable
C.	On completion of Stilt portion above Basement Complete as per Item No. 2.2 – (96% of Quoted Rates)		
	a) Completion of stilt Floor		
	i) Column/Shear Wall @ Sqm.		25.0%
	ii) Slab @ Sqm.		35.0%
	iii) Partition walls, entrance lobby, Lift Lobby and flooring etc. @ Sqm.		10%
	1. Completion of Partition walls on pro rate basis	2.0%	
	2. Completion of Flooring on pro rate basis	2.0%	
	3. Completion of entrance lobby and lift lobby on pro rate basis	6.0%	
	b) Internal Finishing and painting @ Sqm.		3%
	1. Surface finishing with synthetic mortar	1.5%	
	2. Painting work	1.5%	
	c) External Finishing @ Sqm.		3.0%
	d) Internal Electric Installation @ Sqm.		2.0%
	e) Lift @ Nos.		5.0%
	f) Fire Fighting System @ Nos.		2.0%
	g) Fire Alarm System		1.0%
	h) Sprinkler System		5.0%
	i) After Completion of Super Structure		5.0%

# Payment Breakup Schedule for Super Structure

S.No.	Activity	Break up of total % payable	% of total payable
D.	On completion of Super structure complete in all respect as per scope of work under Item No. 2.3 – (96% of Quoted Rates)		
	a) On completion of civil structural work @ Sqm		25.0%
	b) On completion of		
	i) AAC Block/Partition walls @ Sqm		3.0%
	ii) Internal finish and painting @ Sqm		3.0%
	iii) False ceiling in toilets @ Sqm		1.0%
	iv) Flooring and skirting @ Sqm		10.0%
	v) External finish and painting @ Sqm		6.0%
	vi) Finishing of doors and windows including, Wood work of wardrobe all fittings and paintings etc @ Sqm.		8.0%
	vii) OH tanks, installation of water supply lines, drain pipes, china ware and sanitary fittings including testing etc. Complete toilet works @ Sqm.		13.0%
	1. Water supply lines	4%	
	2. OH Tank	4%	
	3. Fixing of Sanitary Fitting & China Wares	3%	
	4. Testing of all system	2%	
	viii) Wood work of OH storage and under platform storage including sink etc. Completion kitchen work @ Sqm.		7.0%
	c) On completion of Electrical installation @		
	i) Electrical Installation @Sqm		8.0%
	ii) Installation of lifts @ Nos.		4.0%
	iii) Fire Fighting System @ Nos.		3.0%
	d) On declaring complete by competent authority		5.0%

# Payment Breakup Schedule for Community Hall & Shopping Complex

S.No.	Activity	Break up of total % payable	% of total payable
E.	Community Centre & Convenient Shopping Centre as per Item No. 3- (96% of Quoted Rates)		
	a) On Completion up to plinth @ Sqm.		20%
	b) On Completion of civil structural work @ Sqm.		25%
	c) On Completion of		
	i) Partition Work @ Sqm.		1.0%
	ii) Internal Finish and painting@ Sqm.		2.0%
	iii) False ceiling in toilets @ Sqm.		1.0%
	iv) Flooring and skirting/dado @ Sqm.		5.0%
	v) External Finish and painting@ Sqm.		3.0%
	vi) Finishing of Doors and Windows including all fittings and painting etc. @ Sqm.		6.0%
	vii) OH tanks, installation of water supply lines, drain pipes, china ware and sanitary fittings including testing etc. Complete toilet works @ sqm		5.0%
	1. Water supply lines		
	2. OH Tank	1%	
	3. Fixing of Sanitary Fitting & China Wares	1%	
	4. Testing of all system	2%	
		1%	
	viii) Finishing of community hall including kitchen and other allied works@ Sqm		8.0%
	d) On Completion of Electrical works @sqm		
	i) Electrical Installation including Split ACs in community hall @ prorata basis		8.0%
	ii) Installation of Lifts @ Nos.		4.0%
	iii) Fire Fighting System @ Nos.		3.0%
	e) On declaring complete by competent authority		5%

# Payment Breakup Schedule for Infrastructure Development

S.No.	Activity	Break up of total % payable	% of total payable
F.	Infrastructure Development as per Item No.4 – (96% of Quoted Rates)		
	1. Boundary Wall, Guard Room		15.0%
	i) RCC work @per metre on prorata basis	4%	
	ii) Plastering and painting @per metre on prorata basis	1%	
	iii) MS grill fixing and painting @per metre on prorata basis	6%	
	iv) Guard Rooms, finishing and painting complete	4%	
	2. Completion of Sewerage system and part thereof on prorata basis		11.0%
	3. Completion of water supply system/grid and part thereof on prorata basis		10%
	4. Completion of Drainage SW and part thereof on prorata basis		5.0%
	5. Completion of Service Ducts for Electrical and Non-Electrical wiring, Water supply etc. and part thereof on prorata basis		6.0%
	6. Completion of Paving for surface parking & underground water reservoir and part thereof on prorata basis		18.0%
	7. Completion of Road & signage and part thereof on prorata basis		5.0%
	8. All Electrical Works including Sub-Station, D.G Set, Boom barrier, CCTV etc. complete as per scope of work/requirement		11.0%
	9. Completion of land Scaping & other horticulture work such as grassing, tree plantation etc. complete and part thereof on prorata basis		2.0%
	10. Road marking, painting of curb stone, berm cleaning, connection of entry points with external road network complete in all respect.		3.0%
	11.On declaring complete by competent authority		10.0%

## PAYMENT – SCHEDULE FOR MAINTENANCE & HOUSEKEEPING WORK

S.No.	Activity	Break up of total % payable	% of total payable
1.	a) First year (from 1st day to 365 <sup>th</sup> day) after completion of the project	-	
	After every three months @ 22%	88%	
	b) Second year (from 366 <sup>th</sup> day to 730 <sup>th</sup> day) after completion of the project	-	
	After every three months @ 22%	88%	
2	After 730 days on handing over the assets and maintenance works 24% of Total Amount quoted under Item No 1 (a) & (b)	24%	

# PROPOSED LAYOUT PLAN - MOHAMMADPUR





**Soft De-construction - retrieving useful material**  
Material retrieved- Brick, doors, Reinforcement etc



# MODIFICATIONS IN CLAUSES APPLICABLE ON GCC 2014

## Existing Clause:

(Standard CPWD Contract Form GCC 2014, CPWD Form- 8 modified & Corrected up-to last date of submission of bid)

## Modified Clause:

To be applicable in this contract

### Clause-9:

#### Payment of Final Bill

Add the following at the end of Clause 9: The bill in relation to the work completed by the Agency against Part A of the Schedule of Quantities shall be provisionally finalized as per the aforesaid provisions. The final bill relating to the entire work under the agreement shall be prepared after the completion of both the original construction as well as the maintenance and housekeeping work covered by the agreement in accordance with the aforesaid provisions."

### Clause-12:

#### Deviations/Variations Extent and Pricing

Sub-clause 12.2: Only Sub-clause 12.2 A relating to deviation, extra items and pricing for project and original works are applicable. Remaining portions of this sub-clause relating to substituted items and deviated quantities are not applicable.

Sub-clause 12.3: Not applicable

Sub-clause 12.4: Not applicable

Sub-clause 12.5: Not applicable

Sub-clause 12.6: Applicable



**Clause 17 : Contractor Liable for Damages,defects during defect liability period**

**Defects liability period shall be 24 months after declaring the original construction work complete by the competent authority i.e. Chief Project Manager, Redevelopment Project Zone, CPWD, New Delhi.**

**Clause 25 : Settlement of Disputes & Arbitration**

Existing Clause 25 is replaced with the following clause:

Except where otherwise provided in the contract, all disputes and claims relating to the meaning of the specifications, designs, drawings and instructions here-in-before mentioned and as to the quality of workmanship or materials used in the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the work or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned here-in-after.

If the agency considers any work demanded of him to be outside the requirements of the contract, or disputes any drawings, record or decision given in writing by the Engineer-in-Charge on any matter in connection with or arising out of the contract or carrying out of the work to be unacceptable, he shall promptly within 15 days request the Chief Project Manager in writing for written instructions or decision. Thereupon, the Chief Project Manager shall give his written instructions or decision within a period of one month from the receipt of the agency's letter. If the Chief Project Manager fails to give his decision within the aforesaid period, or if any party is dissatisfied with the decision of the Chief Project Manager, then either party may within a period of 30 days from the receipt of the decision of the Chief Project Manager or from the last date prescribed above for the Chief Project Manager to give his decision if he delays or fails to give his decision, give notice to the Chief Project Manager for appointment of an arbitral tribunal on the Performa attached herewith, failing which the said decision shall be final, binding and conclusive, and not referable to adjudication by arbitration. It is a term of contract that each party invoking arbitration must exhaust the aforesaid mechanism of settlement of disputes prior to invoking arbitration.

## Clause 25 : Settlement of Disputes & Arbitration

Contd....

Except where the decision has become final, binding and conclusive in terms of sub-para (i) above, disputes shall be referred for adjudication through arbitration by an arbitral tribunal.

The arbitral tribunal shall consist of three arbitrators chosen from a panel of seven arbitrators prepared by the Chief Project Manager. The panel will comprise of engineers retired from any government service from a position not below the level of Joint Secretary to the Government of India and having experience in the field of arbitration in construction contracts.

The Chief Project Manager shall within 30 days from the receipt of a request on prescribed Performa from either party for appointment of arbitral tribunal, shall appoint two arbitrators from the panel of seven arbitrators. The two appointed arbitrators shall appoint the third arbitrator from the same panel, who shall act as the presiding arbitrator.

It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each such dispute along with the notice for appointment of arbitrator and giving reference to the rejection by the Chief Project Manager.

## **Clause 25 : Settlement of Disputes & Arbitration**

Contd...

The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 (26 of 1996) or any statutory modifications or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.

It is also a term of this contract that the arbitral tribunal shall adjudicate on only such disputes as are referred to it by the appointing authority and give separate award against each dispute and claim referred to it and, in all cases, where the total amount of the claims by any party exceeds Rs 1,00,000/- the arbitral tribunal shall give reasons for the award.

The fees of the arbitral tribunal and the manner of its payment shall be determined by the arbitral tribunal after taking into consideration the rates specified in the Fourth Schedule of the Arbitration and Conciliation Act, 1996 as amended by the Amendment Act, 2015 or as per guidelines issued by the competent authority or ruling of Delhi High Court /Supreme Court of India.

<b>Clause 27 : Lump sum Provisions in Tender</b>	<b>NOT APPLICABLE</b>
<b>Clause 30 : Employment of coal mining or controlled area labour not permissible</b>	NOT APPLICABLE
<b>Clause 31 A : Departmental water supply, if available</b>	NOT APPLICABLE
<b>Clause 32 : Alternate water arrangements</b>	NOT APPLICABLE
<b>Clause 33 : Return of Surplus materials</b>	NOT APPLICABLE
<b>Clause 34 : Hire of Plant &amp; Machinery</b>	NOT APPLICABLE
<b>Clause 35 : Condition relating to use of asphaltic materials</b>	NOT APPLICABLE



# ISSUES IN EPC CONTRACTS

- Competence among Contractors and Consultants in India is not yet fully developed for these type of Contracts in the Buildings Sector
- Minimum scope of Deviation from agreement so Tender document should define clearly what works are expressly covered under the agreement and what works are expressly excluded. Careful attention needed in formulating the agreement document
- The Agreement should be drafted with utmost precision, having clarity and delineating the scope of the work. We have used plinth area rates for bidding/ quoting. In case of Lump Sum Contracts, even more detailed drawings and specifications may be needed to prevent ambiguity.
- Extra Care needs to be taken to get the work executed as per the Agreement



# THANK YOU

