Compression between Hybrid Annuity Mode & Engineering, Procurement & Construction: A Review

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Abstract:
India has the second largest road network in the world. This comprises National Highways, Expressways, State Highways, Major District Roads, Other District Roads and Village Roads. Road Transport is a critical infrastructure for the economic development of a country. It impacts the pace, structure, and pattern of development. Historically, investments in the transport sector have been made by the Government. However, to encourage private sector participation, the Ministry has laid down comprehensive policy guidelines for private sector participation in the development of National Highways. Currently, Ministry of Road Transportation & Highway executes national highway projects under EPC, HAM, BOT (TOLL), BOT (NUT) contract mode. Ministry of Road Transportation & Highway (MoRTH) has emphasized on EPC and HAM mode of contracts since their inception. This review identifies feasibility of EPC and HAM mode of contracts on various projects, considering their suitability. The review also identifies possibilities of dispute in both modes of contract, variations, claims, change of scope, extension of time and issues related to price escalation.

Keywords: Annuity, Built Operate Transfer (BOT), Engineering Procurement and Construction (EPC), Hybrid Annuity Mode (HAM), MoRTH.

I. INTRODUCTION

In India time and cost overrun on infrastructure project are very common. EPC was introduced in 2014. Engineering, Procurement and Construction (EPC)/Turnkey Contract is mature in developed countries, like America and European countries. But to India, it is a relatively new thing. The wide use of EPC Contract will meet a lot of problems. Currently 1420 projects with total length of 41025 km having project cost of ₹3.63 lakh Crore in total is under execution by Ministry of Road Transportation & Highway. In EPC model, the project cost is completely borne by the government. Higher reliance on EPC would mean increased financial burden on the exchequer. On the other hand, unfortunately the road development fails to meet the growing up needs due to limited budget allocation. This has made the government of India realize the importance of involvement of private sector in the road development. Subsequently HAM was introduced in 2016 by Government of India. Currently, 116 HAM projects, measuring 6,388 km and involving an investment of ₹1.39 lakh crore are at different stages of completion. Banks have around ₹ 62,000 crore exposures to such projects. The amalgamation of the Built Operate Transfer (BOT) Annuity and Engineering Procurement and Construction (EPC) model has resulted into the present HAM model

II. LITERATURE REVIEW

The review papers containing the work done by various authors and the outcomes of various research papers. Paper published in various national and international journals, Ph.D. Thesis, reports and books have been studied. This paper enhances knowledge to understanding the subject and provide extensive background to carry out work ahead in proper flow. Following are the literature reviews based on Application of EPC & HAM Contracts in National & International projects: (Jan Píchaa*, 2015), Engineering, procurement & 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. 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. 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. Nowadays, some contractors refuse to enter into EPC contracts in certain jurisdictions, since a number of contractors suffered from heavy losses in the past. A qualitative approach was applied in order to analyze the critical points of contracts based upon reviews of related case studies from the power sector and supplementary interviews with business professionals. This research study identifies the key clauses and pitfalls causing the majority of disputes in EPC contracts and provides the description of these conditions in order to increase their common understanding. In addition to that, the key factors of successful project completion under the EPC contract scheme were defined. It was also found that the EPC contracting scheme could work very well for power projects, 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.

(HANSEN, 2015), This research is mainly based on literature reviews, case studies and interviews. Meanwhile, this research also finds that there are at least 15 (fifteen), 5 (five), and 6 (six) strategies that can be implemented by the contractor, the employer, and both parties, respectively. Since EPC project is very complex by its nature, a good knowledge management and innovation implementation will improve its effectiveness.
Research focusses on performance liquidated damages (PLD) in EPC projects; EPC contractual aspects; possible claims and variation orders in EPC projects; and possible disputes and disputes settlement of EPC projects are also important to give description on how to deal with EPC projects for all players in the industry.

(Jamadar, 2017), Here the author talks about the structure of model EPC understanding fuses best global practices and encapsulates an empowering authoritative system for development of venture in most effective, temperate, and aggressive condition. The loan specialists will have necessities at both pre- and post-contact phases of venture. Both, pre- and post- contract project process must be bankable if lender support is to be secured. The greatest part of financing is finished by the money lenders and remains to make lesser returns than value speculators. Thus, lenders are hazard contradict and use solid dealing position to relieve chance and augment the likelihood of obligations overhauling even in venture challenges.

(Hong Ke, 2015), here the author talks about the EPC contract model in China is still relatively new, currently only been used in the chemical, electrical and other small industries, its wide application faces many problems. The general contractor, the risk management bear the brunt. Under the EPC contract model, the general contractor in improved profits, contracts powers strengthened, while exposure also increases. From the contractor's point of view, undertake EPC contracting international engineering projects, both opportunities and risks, if the contractor can use reasonable technical means to control and manage risk, will be able to win at the same time profits, continue to develop and grow their own. Risk Management of EPC Project is still in its infancy, so the research on risk management contractor under the EPC contract conditions and will help Chinese construction enterprises in the international market and increase their international business development business development level.

(Nikhil Kumarl, 2019), Here the author concludes from the two models that both have some pros and cons related to them but compared to BOT model, HAM turns out to be a better alternative for the highway construction project. Here, the risk allocation is minimum and financial burden is also shared to a great extent to both public and private and moreover such HAM projects have better future. Since after the launch of so many HAM projects are under construction and many more would come up in near future. The government is taking every possible step to ensure HAM becomes the priority for the highway construction and development across the country. The main reason which has made HAM so popular is its ability to handle risk regarding financial management. In this aspect government is liable to pay only 40% of the overall cost in five installments and the rest 60% is the burden of the private party.

(Mojahedhi, 2018), here the author describes that the critical factors for better performance in EPC projects of different general contractors can be directly compared in project management terms. This study has focused on the project triangle (cost, time, and scope) since these factors are more tangible for project’s stakeholders for the purpose of assessing project success. However, factors such as safety, sustainability, and satisfaction can also be discussed as project success measures.

(R. Akbiyikli), authors in this paper attempted to enlighten the innovated public-private partnership type of procurement approaches for infrastructure projects. It is explained that there are several factors, relating to public sector cash constraints and the underlying principles of these innovated procurement approaches, which might cause governments to consider the introduction of these deals. The principal roles of the private sector in these approaches are to provide additional capital, to provide alternative management skills, to provide value added to the end user and the public at large and to provide better identification of needs and optimal use of resources. These output-based innovated procurement routes by no means be a panacea for a cost cutting or failing government. It must be remembered that these schemes are complex to design, implement and manage and should be considered if it can be demonstrated that they will achieve additional value compared with other approaches.

(Patwardhan, 2016), In India, road projects are awarded via one of the three models; Build-Operate-Transfer (BOT)-Annuity, BOT-Toll, and EPC (engineering, procurement and construction) contract. After the BOT model of Public Private Partnership (PPP), an advanced version of the Model Concession Agreement (MCA), presently called as Hybrid Annuity Model (HAM) is paving way for road projects. The hybrid model is supposed to be a win-win situation for the government and developers. The government is expected to fund up to 40 percent of the project cost while the remaining 60 per cent to be funded by the private player, and thus easing the financial burden on the exchequer as well. This comes as a welcome step in the situation of dismal performance of highway construction projects awarded under MCA. This paper summarizes the key changes and features which are brought under the new arrangement and provides a comparison with that models.

MAJOR FINDINGS FROM LITERATURE REVIEW

From the literature review, following are the conclusions.
• EPC project is very complex by its nature, a good knowledge management and innovation implementation will improve its effectiveness.
• Attention required for liquidated damages contractual aspects, possible claims and variation & possible disputes and disputes settlement of EPC projects
• Much attention required by the contractor in pre-bid stage regarding probable risk associated with the projects, thereby required vigilant PMC & Design Team.
• The financing strategy is the biggest strength of HAM model. It reduces the problem related to failure of project due to financial viability.
• Limitations in HAM model are change of scope, this clause may lead the project to cost and time overrun.

III. ENGINEERING PROCUREMENT & CONSTRUCTION (EPC)

EPC Stands for, Engineering Procurement and Construction. General Definition of Contract: An agreement between 2 or more parties to perform a service, provide a product or commit to an act and is enforceable by law. Indian Contract Act defines Contract as “An agreement enforceable by law”. An Agreement is defined as “Every promise and set of promises forming the consideration for each other”. Consideration essentially means “something in return”. Model EPC agreement is based on the Silver book of the FIDIC i.e.,
condition of contracts for EPC/Turnkey projects. EPC is a particular form of contracting arrangement where the EPC Contractor is made responsible for all the activities from design, procurement, construction, commissioning, and handover to the client/authority at an agreed price at a fixed date. Performance standards of the product is also hallmark of EPC Contract. EPC Contract incentivizes innovation and best practices. Contractor’s ability to manage risk (probability that, despite careful project costing and planning, unforeseen events will occur during the implementation of a project which will affect the final cost and completion time scale) in design, procurement and construction phase is critical for success of contract. 5 years & 10 years maintenance including structures with the contractor for flexible & rigid pavement respectively. No maintenance charge is provided for flexible pavement in 1st year, whereas 0.5% of BPC is paid for each 2nd, 3rd & 4th year and 1% of BPC on the 5th year for flexible pavement. Maintenance charge of 0.25% of BPC is paid for each 1st, 2nd, 3rd year, 0.5% of BPC is paid for each 4th, 5th, 6th & 7th year, and 0.5% of BPC is paid for each 8th, 9th & 10th year for rigid pavement.

Table 1. Maintenance Obligation Of The EPC Contractor

<table>
<thead>
<tr>
<th>PERFORMANCE PARAMETER</th>
<th>DESIRABLE VALUE</th>
<th>ACCEPTABLE VALUE</th>
<th>TIME LIMIT FOR REPAIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Pavement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pothole</td>
<td>Nil</td>
<td>0.1% area subject to 10mm depth</td>
<td>24-48 hours</td>
</tr>
<tr>
<td>Cracking</td>
<td>Nil</td>
<td>&lt;5% subject to 0.5sqm for any 50m length</td>
<td>7-15 days</td>
</tr>
<tr>
<td>Rutting</td>
<td>Nil</td>
<td>&lt;5mm</td>
<td>15-30 days</td>
</tr>
<tr>
<td>Skid No.</td>
<td>60 SN</td>
<td>50 SN</td>
<td>180 days</td>
</tr>
<tr>
<td>Pavement condition Index</td>
<td>3</td>
<td>2.1</td>
<td>180 days</td>
</tr>
<tr>
<td>Structures and culverts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete</td>
<td></td>
<td>Not more than 0.50 sq.m</td>
<td>Repairs to affected concrete portion with epoxy mortar/ concrete within 15 days</td>
</tr>
<tr>
<td>Hill roads</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damage to retaining wall/ breast wall</td>
<td></td>
<td></td>
<td>7 days</td>
</tr>
<tr>
<td>Rigid Pavement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single transverse (or Diagonal) crack intersecting with one or more joints w=3.0-6.0mm</td>
<td></td>
<td>For, d&lt; D/2- Dowel bar retrofit within 15 days</td>
<td>For, d&gt; D/2- Full depth repair within 15 days.</td>
</tr>
<tr>
<td>Joint Seal Defects</td>
<td></td>
<td></td>
<td>Notable. L&gt; 25% Clean and reapply sealant in selected locations within 7 days.</td>
</tr>
<tr>
<td>Safety Related Items and other furniture items</td>
<td></td>
<td></td>
<td>Testing of each signboard using retro reflectivity measuring device in accordance with ASTM D 4956-09 biannually. In case of deficiency, replacement within 48 hours except for gantry mounted signs for which replacement has to be done within a month period.</td>
</tr>
</tbody>
</table>

IV. HYBRID ANNUITY MODE

Hybrid Annuity Mode (HAM) is amalgamation of BOT Annuity and EPC models. As per the design, the government will contribute to 40% of the project cost in the first five years through annual payments (annuity), whereas the remaining 60% is raised by developer from equity or loan as variable depending upon the value of assets created.

Under HAM, Revenue collection would be the responsibility of the Concerned Authority The developer doesn’t have right to collect revenue. Concession Period is generally granted for 15 Years whereas construction period is of 2 Years. 60% of the bid project cost adjusted for price index is paid off over the concession period in 30 biannual annuity. Interest is paid on the 60% amount @ rate of Bank Rate +3 % along with the annuity payment. O &M payments are made to the concessionaire for 15 years along with the bi-annual annuity based on the amount quoted for 1st year O&M cost during bidding stage. Concessionaire is responsible for Maintenance of the road for the entire concession period.

V. CONCLUSION

Both EPC and HAM project are aimed to omit cost & time overrun in road projects in India. Hence, they emphasis more on liquidity damages, damages due to non-performance etc. Although both the contract mode has lot of similarities, but the
In case of EPC contracts developer are more attracted considering their easy & timely repayment of their investment. In case of HAM, financial closure plays a vital role. It becomes difficult for the developer to arrange investment from financial institutions considering the fact that financial institutions observe great risk in those huge funded projects. Hence, Authority shall provide certain leverages in HAM contract to attract Developer & Investors.

VI. REFERENCES


