

Study of Pros and Cons of Subcontracting System Adopted in Executing Indian Construction Projects

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Abstract- Even though construction industry is known as an unorganized sector, a typical system is followed during the execution of the construction projects. In today's Indian construction project scenario most of the construction works are sublet by the main contractor to the subcontractors specialized in the specific activities of the construction. During construction many issues arise between the contractor and the subcontractor due to unclear terms and conditions or poor understanding of the roles and responsibilities agreed upon. In this paper some of the issues related to subcontracting are discussed and appropriate measures to be taken during the execution of the projects are recommended for better project performance.

Keywords- Contracts; Project Execution; Project Performance; Multi-work Packaging

I. INTRODUCTION

The Indian construction industry plays a vital role in the overall economic development of the country. Indian construction industry employed 33 million people and it is expected to generate additional employment for 47 million by 2022 [1]. Due to fluctuation of construction project workload, there is high level of subcontracting in the construction industry. In most of the building projects 80 to 90 % of the work is performed by the subcontractors [2]. Subcontractors are specialized construction agencies appointed by the main contractor of the construction project to provide labor, materials and equipment or subcontractors may be hired or appointed to complete specific work package of the construction project. This is also known as multi-work packaging. The increase in subcontracting can be attributed to the increased complexity of construction projects, the shortage of experienced workers, temptation to increase profit and risk reduction [3]. One of the reasons of subcontracting work is that the average prime/main contractor is not able to have skilled work force on their roll required to complete the construction project. Also it is not possible for companies to own, operate, control and maintain specialized equipment and plants as these generally have limited usage on a typical project [4].

In the Indian construction projects subcontracting practices are extensively in use. Many issues arising due to subcontracting systems are not acknowledged and addressed in view of completion of construction projects. Also very little research has been conducted in India to examine issues related to subcontracting practices. As subcontracting has become a standard procedure in contemporary construction, it is highly questionable that much productivity improvement can be achieved if this vital factor continues to be either ignored or mishandled in the study framework [2]. The objective of this research was to study present subcontracting practices in construction industry in India, study the issues arising between main contractors and subcontractors which are affecting project performance and finally, recommendations are proposed in this paper to reduce these identified issues. This information will be useful for both main contractor as well as subcontractor to improve their performance on construction projects.

II. LITERATURE REVIEW

Subcontracting is an important feature of various projects contracting system in Indian construction industry. Subcontracting is an economical way of procuring specialized works for modern state-of-art buildings but it may also give rise to various kinds of problems. Such problems may originate from the characteristics of the specialized works and from subcontracting as a procurement method [5]. A comprehensive literature review was done in order to prepare an initial list of issues or interface problems which may originate during execution. Following section of paper highlights issues or interface problems which have been identified from literature study.

Abdulmohsen Al Hammad concluded that delay in contract progress, lack of construction quality, errors and delay in shop drawings and/or approval of sample materials were ranked highest as interface problems, whilst legal disputes, scheduling conflicts amongst sub contractors, geological problems and weather conditions were ranked lowest [6]. Hinze and Tracy based upon their research found that subcontractors appear to be decided disadvantage when entering agreements with general contractors. Bid shopping appears to be continuing practice in the construction industry, with little recourse for subcontractors. Sub contractors are often contractually required to assume all the obligations as stipulated in the contract between owner and general contractor, but are not afforded the opportunity to examine it. Payment problems continue for subcontractors as being a part of doing business [2]. Othman concluded that strain in relationships and interface problems between main contractors and subcontractors may develop due to poor communication, lack of information on site, poor supervision, master and slave syndrome and lack of management systems. Inevitably, this will lead to poor overall management of the projects, poor quality products, late project delivery and create dissatisfaction between main contractor and subcontractor as well as clients [7].

David Arditi and Ranon Chotibhongs confirmed that timelines of payments by general contractors, the process of selecting subcontractors, subcontractors bonding, construction insurance, safety issues on the construction site, partnering arrangements with various parties and productivity issues involved in subcontracting practices. In addition to these issues, they concluded that (i) the practice of retainage withheld by general contractors seems to be acceptable to many contractors unless its magnitude is large relative to the size of the firm; (ii) post award bid shopping by general contractors is sometimes justified, particularly in cases where the scope of subcontract work is modified; and (iii) current bonding and insurance practices are adequate unless the additional transferred risks are excessive [8]. Dr K W Andy NG & D F Andrew Price studied causes leading to poor site coordination in building projects. They have identified 18 site coordination problems and 16 essential causes to problems from literature and advice from experienced industrial practitioners. The causes were grouped into three categories, i.e. staffing related causes, technical related causes and management system related causes. The result of the survey established that the most important causes were mainly associated with management system especially communication rather than staffing or technical related factors [9]. Adnan Enshassi et al concluded that assigning part of works to new subcontractors without informing the original subcontractors, contractors financial problems, delay in contract progress payments, non adherence to conditions of the contract, non adherence of the subcontractor to time schedule and lack of construction quality work were the most important causes of interface problems, while involvement in several projects with the contractor at same time, weather conditions and geological problems on site were considered as trivial causes of potential interface problems between main contractors and sub contractors [10].

III. METHODOLOGY AND ANALYSIS

In this study, questionnaire approach was considered to understand issues between main contractor and subcontractors. This section of paper explains how questionnaire was developed and methods used to record and analyze the collected information. Based upon literature study, a questionnaire was developed with closed questions for both contractors and subcontractors. Questionnaire was divided into two sections. Section one contains general information about the main contractor and subcontractor. Section two was about factors leading to issues between main contractor and subcontractor. Initial factor list was finalized on the basis of research of Adnan Enshassi et al. [10]. Several previous studies were also taken into consideration for finalizing initial factor list like work by Hinze and Tracy, Abdulmohsen Al Hammad, Othman, David Arditì and Ranon Chotibhongs, Huang et al, and Hsieh T [2, 6, 7, 8, 11 & 12]. The selected factors were categorized in two categories. The questionnaire was further modified by taking feedback from pilot survey. For this purpose eight questionnaires were used to collect responses of subcontractors (2), main contractors (3) and consultants (3) and they were asked to review questionnaire and verify the validity of questions and its relevance to objectives of study. All the comments were taken in consideration and finally the questionnaire was modified and re-constructed.

In this research, convenience sampling was used and questionnaires were sent to different main contractors and subcontractors. All the respondents were qualified and experienced in the Indian construction industry. Fig 1 shows the percentage of subcontractor according to specialty of subcontractor.

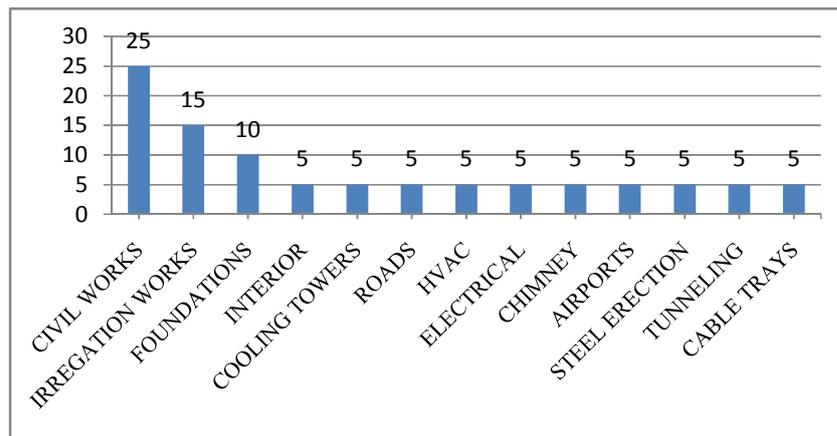


Figure 1. Specialization of the Subcontractors Vs Percentage

Respondents were asked to rate impact of factors causing issues on project performance with a scale of 1 to 5 and give probability of occurrence of factors causing issues. Then risk response was calculated and based upon the risk response top ten prioritized factors leading to issues caused by main contractors and subcontractors are listed below:

3.1. Factors Causing Issues by Contractor

- Assigning part of the works to new subcontractor, without informing the original subcontractor
- Main contractor's financial problems
- Delay in contract progress payments
- Delay by the main contractor in not providing the necessary materials to the subcontractor
- Delay of the works (behind the time schedule)

- Delays in payment to subcontractors
- Shortage of skilled labor with the main contractor
- Providing low-quality materials that results in low-quality workmanship
- Shortage of skilled labor with the subcontractor
- Non-adherence to the conditions of the contract

3.2. Factors Causing Issues by Subcontractor

- Lack of construction quality work
- Non- adherence to the conditions of the contract
- Selection of subcontractor
- Variations in design/plans/schedule
- Frequent equipment breakdown
- Slow mobilization of equipment
- Shortage of skilled labor with the subcontractor
- Neglecting the safety measures
- Low labor productivity
- Lack of proper relationship with the subcontractor

Recommendations for the same are given in the next section of paper.

IV. DISCUSSION

This part of the paper shows the analysis of the result which was done to rank all the initially identified factors leading to issues between main contractor and subcontractor. According to the view point of subcontractors assigning part of the work to new subcontractor without informing original subcontractor was ranked in the first position by subcontractors. The obtained results agree with Huang et al. who emphasized that communication problem might lead to interface problems between main contractors and subcontractors [11]. Moore et al emphasized that poor cooperation, limited trust and ineffective communication lead to an adversarial relationship between main contractor and subcontractor [13]. This clearly shows that it is a critical factor in this group and it may result in conflict of responsibilities and authorities on sites. Main contractor's financial problem and delay in contract progress payments was ranked in second and third positions respectively. These two factors will lead to issues or interface problems between main contractor and subcontractor since it will impose financial difficulties on subcontractor and make him unable to pay for workers and suppliers, which lead to time and cost overrun for the project. The obtained result agree with Hinze and Tracy, Al Hammad, , Othman, and Fah [2, 6, 7 & 14].

According to the view point of main contractors', lack of construction quality work was ranked first. Non adherence to the conditions of contract was ranked in second position. The obtained results agree with Al Hammad, Othman, Huang et al. and Fah [2, 7, 11 & 14]. A variation in design/plans/schedule was ranked fourth. Huang et al. (2008) emphasized that lack of proper planning and scheduling lead to interface problems between main contractors and subcontractors. Fah and Joseph & Proctor emphasized that delay, behind the time schedule leads to interface problems between main contractors and subcontractors [14 & 15]. Othman emphasized that poor management causes interface problems between main contractors and subcontractors. Frequent equipment breakdown and slow mobilization of equipment were ranked fifth and sixth respectively [7]. Hsieh concluded that subcontractors have critical influence on site productivity and they bear responsibility for much of the productivity on the construction sites, particularly in areas such as labor relations, supervision, material delivery, prefabrication, standardization, worker training, quality control, equipment maintenance and utilization. Neglecting the safety

measures was ranked eighth [12]. Hinze and Wilson stated that, this is an important factor leading to interface problems caused by subcontractor group. The importance of this factor is due to the fact that lack of safety measures usually leads to time and cost overrun, legal obligations. Lack of proper relationship with the subcontractor was ranked as tenth [16]. The obtained results agree with Currie, Sweeney & Hafer and Shash [17 & 18].

V. CONCLUSION AND RECOMMENDATIONS

Subcontracting on construction projects is a common practice in construction industry of India. Subcontracting practice may cause some interface problems between main contractor and subcontractor which will create and impact on time, cost and quality of construction projects. Therefore, attention should be given to such interface problems to avoid impact. The findings of this study highlight ten major issues according to the view point of main contractors and sub contractors. It is hoped that the above highlighted interface problems are addressed properly so that the relationship between main contractors and subcontractors will improve which will avoid the impact on time, cost and quality of construction projects. Main contractors should give special attention to the following factors;

- Main contractors are recommended to discuss progress of work with subcontractors. If main contractors are not happy with the performance of subcontractors they must issue warnings to subcontractors before assigning part of the work to new subcontractor. Also in such cases main contractors should inform about such change to original subcontractors well in advance.
- Construction work often require huge amount of money and take considerable time to complete. Hence project participants require regular payments to maintain their cash flow to continue with their work. Any irregularities in such interim payments could result in productivity which may cause delay in project. It will also have effect on whole construction supply chain because with financial problems to main contractors, they may not able to pay their material supplier, subcontractors etc. Hence main contractors are recommended to take the work considering their financial situation so that during execution they should not face problem of financial crisis. Main contractors are recommended to pay their subcontractors timely.
- Main contractors must provide good quality raw materials to their subcontractors in required quantity to ensure completion of work within given time.
- Main contractors are recommended to adhere with clearly written contract document to avoid disputes with their subcontractors.
- Main contractors should supervise their subcontractors performance regularly, seek evidence to work done, check whether work done by subcontractor is as per agreed plan or not and whether sub contractor have met all contractual obligation.
- Main contractors are recommended to use required resources like men, materials during execution of work.

Sub contractors should give special attention to the following factors;

- Sub contractors are recommended to do their work with respect to terms and conditions which are given in contract document.
- Sub contractors should use good quality raw materials and adhere to quality standards on site to do quality work.
- Sub contractors are recommended to use good quality construction equipment on site in required quantity and experienced labor to ensure completion of quality work in given time.

- Sub contractors are recommended to use all safety measures on site to use create good safety culture on construction site.
- Sub contractors should carry out project specific planning for execution of work. Management and operational staff members of sub contractors should attend all planning meeting to understand all designs, drawings, plans and schedules. There should be clear interfacing documentation between main contractors and subcontractors regarding changes in designs, drawings, plans, schedules and management systems.

Sub contractors are recommended to keep long term relationship with few main contractors which will allow for better performance in construction project sites.

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