



RESOURCE UTILIZATION IN CONSTRUCTION PROJECTS AND ITS IMPACTS OF HIGH RANKED VARIABLE DURING TIME OVER RUN: A REVIEW

M. Harsha Vardhana Balaji¹, Dr. Pulidindhi Venugopal²

¹Assistant Professor, Department of Civil Engineering,
Knowledge Institute of Technology, Salem.

²HOD & Professor, Department of Technology Management,
SMEC- VIT University, Vellore.

Abstract

Now a day's Construction Industries facing many challenges especially time over run and uneconomic projects. This time over run is due to improper resource management, the effective resource utilization for the recent decades were less than 60%, improper resource utilization impacts on various costs, Profit margins, quality of the projects, on time completion etc. In every construction projects construction stakeholder's contractors, owners, consultants along with project managing, execution and design team holds their own level of impact on progress of the projects. This paper aimed to review the current resource utilization techniques and to locate the major attributes which governs the project on time completion and to highlight on areas which needs attention for effective resource management. Effective resource management makes the resource to be in live and makes it utilization effective.

Key words: Resource optimization, Material Management, Delay in constructional projects, Stakeholders delay

I. INTRODUCTION:

Most of the construction industries focus on profits and time, in recent days 20% of construction industries were practicing effective resource management system along with proper planning and scheduling. 5-10% of construction industries were aware of it but they are not adopting during practice on consideration of the uncertainties. Remaining 60% of construction

companies execute unplanned system only with their past experience or simply by directions for top level management. This improper execution without planning and scheduling contains high risk factors, uncertainties and construction contractors were in lack of knowledge about its impacts with time.

Major resource involved in a construction were

- Material,
- Machinery or Equipments, □ Human resource
- Construction stakeholders etc .

Majority of construction industries were in lack of organization culture and system, they simply concentrate on execution by supplying manpower and material, even the work to be done were planned on the previous week and also even a day before the execution, they often face uncertainties, delay and dispute during execution.

II. DELAY IN CONSTRUCTION PROJECTS:

Each project contains certain duration these duration handling differs with company culture and also based on their resource availability. Construction stakeholders frames a culture and the follow them continuously or with little deviation. In the present decades 70 % of the projects experience time over run [1].

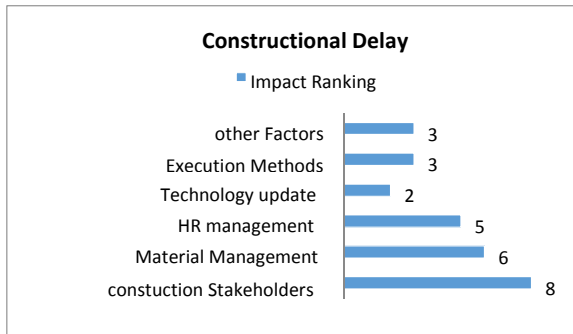


Fig- 1

This time over run consists of various attributes responsible for it and major attributes which consist of greater impact of delay of the projects were Fig – 1 construction Stakeholders dispute, material management, Human resource management, choice of technology, adopting methodology and other environmental aspects etc.

Constructional delays were Excusable and compensable these are delay which are caused due to uncertainties formed due to environment or climatic and they are non predictable, Non excusable and Non compensable were delays occurred due to stakeholders dispute. Compensable delay were recovered by increasing resource according to time and they can be managed by over time execution of the project, were the non compensable delay are non recoverable those delay can be modified in to other form. Critical delays cause high impact in project such as loss of profit margin and time over run, Non critical delay were acceptable and they can be adjusted alteration.

III. CONSTRUCTION STAKEHOLDERS

In construction delay stakeholder's contractors, consultants and owner's related factors ranks first which cause higher impact in execution of the project [1].Stakeholders holds higher responsibility during the early stage execution of the project.

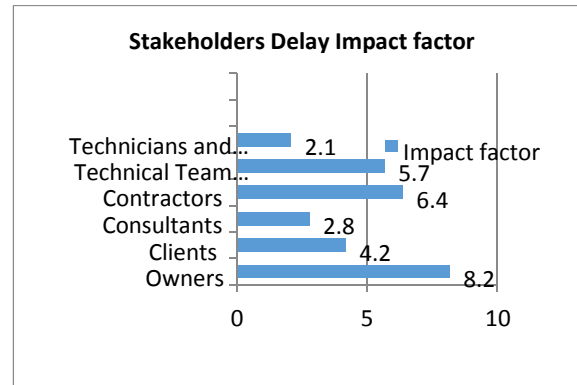


Fig-2

Majority of the construction projects experience uncertainties in at its beginning stage, as per the present scenario in India Fig-2 shows the Stakeholders impact factors in execution stage and also 63% of the projects face uncertainty [2] this is due to the lack of early phase attention and also industrial culture. Construction Stakeholders even after the awareness on technology they are not adopting innovative system and they controls the organization to be conservative [2].In stakeholders arbitration analysis out of 52 disputes 38 disputes were directly concern with stakeholders [3] these stakeholders lack in maintenance of healthy inter relationship and improper decision making.

IV. MATERIAL MANAGEMENT

Material management always related with time and cost, proper Management of materials makes the project economical along with prevention of time over run. Material management is cyclic process with common procedures such as purchase, procurement, inventory control, stock management, stock retrieval and record maintenance. As Fig-3 represent the stages in material management and the stages on material delay requires higher degree of material analysis presently ABC analysis and FIFO analysis makes the material highly utilized.

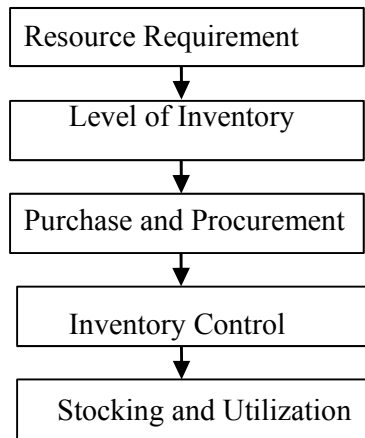


Fig – 3

Most of the material management decisions were handled by owners and high degree authority in construction industry. 60% of money concern with material management system in every project [4]. Material management, managing stock produce higher impact on delay of construction projects [5]. It is provided that 30% of the projects delay due to improper administration and 5% due to uncertainties of materials [6]. Material management conserves resource i.e. material wastage and provide better quality in final product. Stock analysis in material plays vital role in which, stocking of class A material without utilization over a long period of time results in block of cash flow in construction projects, cash flow block fund and delay in projects.

V. EQUIPMENT MANAGEMENT

Constructional equipments were mostly hired and the effective utilization of equipments remains a challenging task to the execution team because ideal construction cause low productivity and decreases profits, on the other case owned equipments lack of maintenance and even construction industries use the poor quality equipment for their profitability these result in constructional delay and quality. As a process of cost cutting construction industries utilize the low productivity equipments. 70 % of delay in execution by equipment is due to operators, they operated equipment without training in it 20% of construction accidents were due to in effective handling of equipments. Equipment should be selected based on

- Organization Specific
- Scope and Nature of the Project
- Environmental and Climatic factors

Organization specific equipments were selection of equipment on consideration with organization culture and their functional methods

Scope and nature of projects defines the need of equipment utilization of miss matched equipment results in uncertainty in project. Environmental and climatic consideration supports the equipment usage and improves progress

VI. HUMAN RESOURCE MANAGEMENT

Human resource management is application of right person in right time for the right job. Construction industries were lack of human resource like skilled labour. Labour execute their projects only by the direction and instruction of their head without any training or unknowing the purpose of it, cause countable effects in quality wastage of resource. 40% of the projects face depicts of skilled manpower [7] application of unskilled Human resource leads to uncertainties more critical and even it leads to rework. 7- 10 % of material waste was due to unskilled labour utilization of the projects [7] continuous migration of Human resource in an organization depicts the growth of the organization and delay in projects Labour migration were mainly due to delay in the pay or lack of expected pay, in effective team working, natural calamities, lack of motivation and appraisal etc .

Human resource which need to noted were

- Engineers (Planning and Design team),
- Technicians (Execution First level),
- Supporting Staff,
- Skilled Workers, □ Unskilled
- Semi skilled workers.

First layer of execution team were mostly aware of the execution methods and its output were as next layer lack of technical explanation they receives only execution direction without the technical knowledge. The layer of skilled workers, unskilled and semiskilled needs technical demonstration or education and also skill development program before execution.

VII. EXECUTION METHODS

Construction organization lack in update of technology and they always restricts of application of new strategies. Execution techniques remain same for different project [2] Also even developed organization fails to analyse past records from execution. Poor adoption and

methods produce low productivity, quality, wastage, and lead time [8]. In recent trends resource constrained scheduling and time constrained technologies were available which conserve resource drastically. Delay in execution methods were Internal and External, Internal delays were due to constructional stakeholders such as client, contractors, Designers, consultant and sub contractors were as external delay were environmental and also slow processing

VIII. TECHNOLOGY UPDATE

To overcome time overrun stakeholder increase resources quantity and execute the project without considering the quality of the projects these techniques we adopted widely considering quality of the projects. Fast racking is one of the technique adopted in maximum projects and it requires close observation and analysis of past records [10] Adoption of technology without proper skills proceeds to high uncertainty and constructional delay. This technology adoption can be leaded by experienced technical execution team along with project management consideration, its needs micro level observation and past records.

Also construction contractors prefers usage on high manpower than equipments this is mainly and they consider as cost cutting but these method may produce profits but the quality of the projects remains affected. Technological updates in a construction industry conserves much time and improves the accuracy in project, improved accuracy results in great progress and the constructional contractors highly benefited.

IX. OTHER FACTORS AFFECTING CONSTRUCTION DELAY

Considerable amount of hidden factors or uncertain factors will also cause time over run in projects. Environmental factors are the factor which cannot be judges creates higher impact on execution [3]. Technical errors such as errors in Drawing, Designing, improper planning and designing were also cause countable time delay in project execution [3]. Dispute and Arbitration common variables which were experienced in handling of projects, these disputes needs to be addressed soon or it lead to delay in projects even ending of project.

Financial management especially delay in payment is one of important variable which needs

higher attention. These factors are uncertainties which differs from each projects and they can be noticed only on execution without early production, these variable has its own impacts on delay and they can be only handled by proper decision management and it require perfect timely action to prevent its impact. Most of the project quoted in short duration for availing but while execution they suffer a lot due to uncertainty.

Construction accidents were one of the challenging factors in construction industries and they also cause its own impact on execution of project and they are compensative delay which need proper guidance and safety measures from the owners to avoid it.

X. CONCLUSION AND RECOMMENDATIONS

Constructions industries have to get analysed on construction delay and their attributes involved in it, by this attributes, with the impact value attention over the handling of higher impact attributes leads optimization of resource.

Constructional industries require periodic review of projects and also technology update, Maintenance of past records improves the methodology in construction projects it steps up the organization to higher level.

Construction Stakeholders dispute among themselves makes the projects unhealthy and affects end result. Construction Stakeholders may adopt new methodology on handling complexity projects, each project have different scenario and modification of organization culture according to it ends in better results.

XI. SCOPE OF FUTURE WORK

The identified high impact factors were review for delay in end product as the same analyzing of cost and over the high impact variables results in increase of profit margins among the construction industry.

References

1. Cause of Delay in Large Construction Project, Sadi A. Assaj, Sadiq Al Hejji, 2006, International Journal of project Management 24(2006) 349-357.
2. The Importance of the early phase: The case of construction and Building projects, Bjorn Johs.Kolltveit, Kjell Gronhaug, ELSEVIER,

- International Journal of Project Management 22 (2004) 545-551.
3. Factors Influencing Decision on Delay claims in construction for Indian Scenario, 2014, Nithin Chaphalkar , K.C.Iyer Australasian Journal of Construction Economics and Building, 14[1] 32-44.
 4. Periodic – Review Inventory Model with three conceptive delivery modes and forecast updates Q.Feng, G.Gallego, etal., Journal of optimization theory and application – Journal of optimization theory Application, Vol 124 no. 1 PP 137-155, 32 2005.
 5. Performance Analysis of Inventory Management system in construction Industries in India S.Sindhu, Dr.K. Nirmalkumar, V.Krishnamoorthy, IJIRESET Volume 3, Issue 4 April 2014, ISSN : 2319-8753.
 6. Analysing Material management techniques on construction Project, Ashwin R.Pattii, Smita V.Pataskar IJEIT Volume -3, Issue 4, October 2013.
 7. Human resource Management Techniques Dealing with deflect and Retention of Skilled Labour in construction industry. Prof: Siddesh K Pai, Mr Sathya Dheeraj, Ms.Rani samayuktha Kristam, IJSRP Volume 3, Issue 9, Sep 2013 ISSN 2250-3153.
 8. Sustainable performance criteria for construction method selection in concrete ELSEVIER Automation in construction 19 october 2009 235-244.
 9. Time constrained project scheduling T.A.Guldemond. J.L.Hurink .J.J.Paulus. Schutten 14 Feb 2008 11:137-148.
 10. Dynamic Planning for Fast Tracking Building Construction Projects,Feniosky Pena – Mora and Moonseo Park, Members, ASCE,Journal of construction Engineering and Management/ November/ December 2001, 127:445-456.
 11. Human Resource Management Techniques Dealing With Deficit & Retention of Skilled Labor in Construction Industry,Prof: Siddesh K Pai*, Mr. Satya Dheeraj**, Ms. Rani Samyuktha Kristam, International Journal of Scientific and Research Publications, Volume 3, Issue 9, September 2013 1 ISSN 2250-3153
 12. Iyer, K.C., Kalidindi, N.S. and Ganesh, L.S. (2001) ‘Effects of Construction Contract clauses on occurrence of disputes in India’, Asia Pacific Building and Construction Management Journal, 6 (1), 13-24.
 13. Kumarswamy, M.M., andYogeswaran, K. (2003) ‘Substantiation and assessment of claims for extension of time’, International Journal of Project Management, 21, 27-38.
 14. Odeh, A.M., and Battaineh, H.T. (2002) ‘Causes of construction delay: traditional contracts’, International Journal of Project Management, 20, 67-73