

# A Review Paper on Quantify the Different Constraints for Delays in Infrastructure Construction Project Work and Recommending Corrective Measures for Same

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**Abstract** - The aim and scope of this project is to identify the constraints in infrastructure construction project working environment. If constraints are better understood at the outset, it is believed that better performance can be assured. Identifying and removing constraints from bottleneck activities help to reduce uncertainties in infrastructure construction processes and increases the transparency of project management. This study was carried out based on literature review and a questionnaire survey. The data for this study will be gathering through a detailed questionnaire survey. The questionnaire form is forwarded to various construction industries through email and in personal. The objectives of the study is to successfully reduce the constraints which will help to decrease the unnecessary wastage and loss of both money and time because of inadequate planning.

**Key Words:** Constraints, Bottleneck activities, Quantify, Workflow, Relative Important Index.

## 1. INTRODUCTION

Constraints becomes an important factors which focuses on the weakest rings in the chain. Constraints are defined as anything that limits a system from attaining higher performance towards its goal. Identifying and removing constraints from bottleneck activities help to reduce uncertainties in construction processes and increases the transparency of project management. Needs and constraints in a multi-party working situation bring complications in project management. Needs are diversified when the client is a large organization such as a public client or a corporate client. However, constraints in construction projects limit their achievement of high performance that we are unaware of the existence of the constraints, or, we tend to put more emphasis on the project goals. The construction working environment involves multi-party participation. Needs and constraints in a multi-party working situation bring complications in project management. These can further develop into conflicts and disputes, which bring cost consequences, direct and indirect, to clients and contractors. The project team members have to meet client's needs on one hand and to overcome constraints on the other hand.

With the limited literature for the constraints in the construction working environment, it is important to identify the potential constraints in the construction project, which will help to decrease the unnecessary wastage and loss of both money and time because of inadequate planning. Controlling the constraints is thus a pre-condition for high performance of the project. Constraints is based on the idea that every system has at least one bottleneck which can be defined as any kind of situation that impedes the system to reach high performance level in terms of its purposes. A constraint is defined as anything that limits an organization or entity from moving toward or achieving its goal. Constraints logic forms major portions of the organization's philosophy of continuous improvement. It is applied to identify what factors limit an organization from achieving its goals, developing a solution to the problem, and getting the individuals in the process to invent the requisite changes for themselves. It has been realized that reducing and eliminating critical constraints through better means of look ahead planning are the keys to achieving reliable workflow and, consequently, increased productivity. Constraint modeling is an indispensable step in construction planning. Reliable planning depends on effective identification, formulation, and satisfaction of key constraints in production processes. Constraint management helps to optimize production plans, resolve resource conflicts, and increase the availability of resource and information prerequisites. Reducing uncertainties in the workflow requires new methodologies and tools that can deal with other types of constraints rather than only the process constraints. Infrastructure Construction projects are facing a greater number of uncertainties and more severe risks, which could cause much bigger losses than in the past. Construction projects are subject to numerous constraints of various types, including contractual due dates, resource limitations, and safety, financial, and managerial constraints. Construction projects are characterized by their complexity, uniqueness, and the fact that there are various types of constraints imposed by stakeholders. If constraints are better understood at the outset, it is believed that better performance can be assured.

## 2. LITERATURE REVIEW

### **Title - Key Constraints Analysis with Integrated Production Scheduler. Author – Chua D. K. H.**

Identifying and removing constraints from bottleneck activities help to reduce uncertainties in construction processes and increases the transparency of project management. The present means of look-ahead planning do poorly in resolving hidden constraints in the supply chain and information flow. Accordingly, work plans are vulnerable to the uncertainties that result in flow variation. It has been realized that reducing and eliminating critical constraints through better means of look-ahead planning are the keys to achieving reliable workflow and, consequently, increased productivity. Constraint modeling is an indispensable step in construction planning. Reliable planning depends on effective identification, formulation, and satisfaction of key constraints in production processes. Constraint management helps to optimize production plans, resolve resource conflicts, and increase the availability of resource and information prerequisites. Most existing project planning tools are usually based on the critical path method CPM, which, typically, only one type of constraints i.e., the PROCESS constraints concerning precedence relationships of activities, is modeled. The CPM does not provide the means to deal with many hidden constraints regarding resource supply and information acquisition. Without identifying these hidden constraints explicitly, it is hard to control and reduce the workflow uncertainties that result in process variability. Making reliable work plans is important in achieving high productivity and continuous workflow. Existing CPM-based planning tools lack the ability to manage the hidden constraints in the supply chain and information flow with respect to resource and information availabilities. As a result, the quality of production is vulnerable to many uncertainties that are difficult to eliminate or reduce. A new tool, Integrated Production Scheduler, is introduced to ameliorate the reliability of construction look-ahead plans by modeling the resource and information constraints in addition to the process constraints for construction processes.

### **Title - Quantification of Delay Factors Using the Relative Importance Index Method for Construction Projects in Turkey. Author – Gunduz M.**

To identify delay factors on construction projects and analyse these factors with the relative importance index method. The relative importances of these delay factors were quantified by the relative importance index method. The ranking of the factors and groups were demonstrated according to their importance level on delay. To identify the delay factors in construction projects because delays are considered to be a serious problem in the construction industry. The common results of delays are late completion of the project, increased cost, disruption of work, loss of

productivity, third-party claims, disputes, and abandonment or termination of contracts. Therefore, delays in construction projects give rise to dissatisfaction to all parties involved.

Research aimed to (1) identify the delay factors in construction projects, (2) categorize the delay factors in construction projects, (3) quantify the relative importance of delay factors and to demonstrate the ranking of the factors and groups according to their importance with respect to delays, (4) address the factors and groups contributing most to delays, and (5) make recommendations in order to minimize or control delays in construction projects.

### **Title- Identification of Constraints in infrastructure Construction Projects to Improve Performance. Author – Lau E.**

Needs and constraints in a multi-party working situation bring complications in project management. Needs are diversified when the client is a large organization such as a public client or a corporate client. However, constraints in construction projects limit their achievement of high performance. To identify the constraints in construction project working environment and apply the theory of constraints (TOC), which provides practical steps for making organizational decisions in situations in which constraints exist. If constraints are better understood at the outset, it is believed that better performance can be assured. Presently clients' needs in construction are well discussed, but constraints have yet to be understood in context. The constraints in five categories, they are:

- (1) Economic constraints,
- (2) Legal constraints,
- (3) Environmental constraints,
- (4) Technical constraints, and
- (5) Social constraints.

The impacts of these constraints to the construction project were studied. Developing awareness to managing and controlling the constraints in construction working environment for achieving high performance in the construction working environment.

### **Title – Financial related causes contributing to project delays. Author – Rahman H.**

Delay in construction projects is a common phenomenon and a costly problem. The issues of financial related delays in construction projects. It identifies the root causes and scrutinises the suitable mitigation actions of financial-related project delays. Four main factors were identified in the literature, namely late payment, poor cash flow management, insufficient financial resources and financial market instability. The result revealed that poor cash flow management is the most significant factor that leads to a project's delay followed by late payment, insufficient financial resources and financial market instability.

Contractors instable financial background, client's poor financial and business management, difficulties in obtaining loan from financiers and inflation were identified as the most significant underlying causes. The clients play the most important role in reducing the impact of financial problems towards the extent of project's delay. Several suitable mitigation actions were suggested by the respondents. The importance of having more intensive research that give emphasis on clients achieving a well managed cash flow in order to obtain a prompt payment practice in the construction industry. The greater the delay in payment due to a contractor, the greater the cash flow problems, the greater the extent of delays. The poorer the cash flow management, the greater the cash flow problems, the greater the extent of delays. The greater the shortage of financial resources, the greater the cash flow problems, the greater the extent of delays. The greater the instability of financial market, the greater the cash flow problems, the greater the extent of delays.

### 3. SCOPE

Following are the objectives of the proposed dissertation work.

- a) To study and identify the constraints in construction industry for Residential Building Scheme.
- b) To identify the major root causes of financial related problems that would lead to delays in project.
- c) To investigate the opinions of the parties upon the actions that they undertake to manage the financial problems.
- d) To analyse the causes by using quantitative techniques.
- e) To give suggestive recommendations in order to reduce the delay problems by considering case study.

### 4. Methodology

For carrying out the proposed work, following methodology will be adopted for data collecting and analysis.

- a) Collection of preliminary information through literature review.
- b) Collection of data by surveying amongst the practitioners of building construction. (Engineers, Contractors, Architects, Builders)
- c) Identifying constraints in delay of construction work.
- d) Feasibility study of constraints by using Relative Importance Index Method.
- e) To give results and conclusion from the data analysed.

### 5. CONCLUSION

All the papers reviewed above are mainly focuses on to identify the different constraints for delays in construction

projects. Identifying and removing constraints from bottleneck activities help to reduce uncertainties in construction processes and increases the transparency of project management. Construction projects are subject to numerous constraints of various types, including contractual due dates, resource limitations, and safety, financial, and managerial constraints. But the previous study has not covered the effectiveness for particular infra structure construction project. And it is necessary to quantify the different constraints for delays in infrastructure construction project work and also for this, recommending corrective measures for the same.

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