

# Identification of Constraints and Their Impact on Construction Project

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**Abstract** - The construction industry is progressive nature because of increasing vulnerabilities in development innovation, Budget and advancement forms. Construction projects especially building projects are becoming unquestionable increasingly intricate and troublesome these days. The construction project group can face extraordinary deviations. The aim of this study is to identify the constraints and preparing for questionnaire survey. The major constraints are identified using R.I.I. method which has the highest impact on construction activities. It is a method that is applied to rank the constraints that outcomes in decreased project performance and cause delay in construction projects execution. 1 to 5 is the rating contingents upon the premise of their effect on the project performance. Higher the value of RII, more important is that the factor impact on project progress. Then the impact caused by the constraints in schedule is developed by MSP (Microsoft Project software).

**Key Words:** Constraints, Relative Importance Index [R.I.I.]MSP (Microsoft Project software)

## 1. INTRODUCTION

Project stream is every time restricted by construction constraints. These constraints will in time overrun, cost overrun due to delays in the work procedure and low quality because of surge of work to complete the task in time. The requirements must be reduced so as to make the task effective one. Time and cost are the two principle factors in the construction industry to state an undertaking is effective or not. It is necessary to finish an effective venture on schedule and within the financial plan.

Each development task will have somewhere around one requirement. "Constraints are characterized as something that confines the moment of an organization or element towards or fulfillment of its targets". Constraint designates entity-progression relationship.

Microsoft project is the software advanced by Microsoft in application to plan and schedule different exercises associated with the venture. The steps used in scheduling of the project activities are as follows.

Activities: After describing the scope and creating the work breakdown structure which is concerned with deliverable to recognize which work has to be approved to create the deliverable, the next stage is to further breakdown the work package. In described activities, work package will decompose as activities.

## 1.1 OBJECTIVES

The main objectives of this study are as follows

1. To prepare B+G+3 project Scheduling of the activities using MSP.
2. To identify the major constraints using R.I.I. method which have the highest impact on construction activities.
3. To obtain the total duration of project execution after considering the impact of the identified constraints and obtain the delay caused.

## 1.2 LITERATURE REVIEW

Constraints are the common problem in every construction industry. Identification of constraints and its removal is must to achieve success of the project.

X .Regina Mary, V. Rathinakumar<sup>[1]</sup> This study has investigated various aspects which help to reduce constraints. Constraints will alter the undertaking achievement. Constraints are diminished by using expanding venture assets including labour resources appropriate interconnecting the undertaking activities and schedule is prepared using M.S.Project. To reduce the constraints, actual prepared scheduled is compared with modified schedule. Resource management also necessary in every development venture since task execution will depend upon resources/assets. Successful construction project will be completed within the scheduled time.

Desalegn Disasa Daba and Dr. Jayeshkumar Pitroda<sup>[2]</sup> The main target of this study was to identify the defer factors in construction projects. In any construction industry project life cycle (PLC) delay is greatest basic issue. When actual duration of the project is more than the scheduled time duration of the project, it is called time delay of the project. The consequence of the delay will have many undesirable effects on project such as claims and conflicts between project stakeholders, loss of performance and labours productivity.

## 2. RESEARCH METHODOLOGY

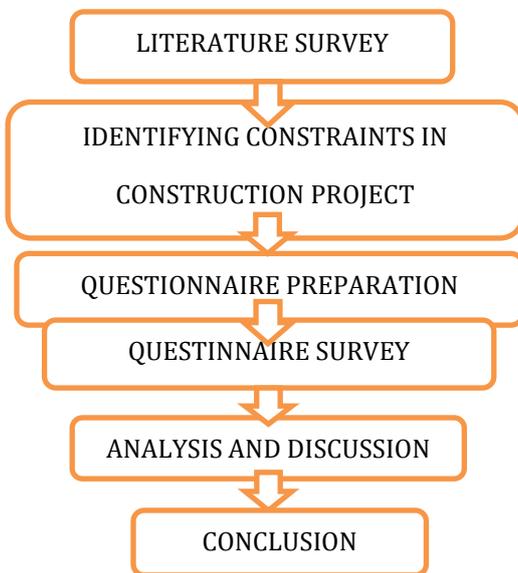
The delay in construction projects is one of the most important construction issue which needs to be addressed. There are various constraints which are responsible for causing delays in construction. This study is an attempt to identify such constraints. In this work a construction project

which is planned is scheduled for 327 days is considered. The methodology obtained is described in this chapter

- Identification of constraints and preparation of questionnaires.
- Conducting questionnaire survey, analysing it using R.I.I. method and identifying the governing constraints using R.I.I. method.
- Identifying the impact caused by the constraints in schedule developed using MSP.
- Identifying the constraints which can be resolved by proper planning and engineering knowledge.

### 2.1. QUESTIONNAIRE SURVEY

A flow chart illustrates the methodology improved for this study



**Fig-1:** Flow chart of methodology of questionnaire survey

**Step 1:** Questionnaire survey is a method of gathering maximum people data. This survey brings multiplicity of practices and can be done in multiplicity of ways. Questionnaire survey can be accompanied to gather information by means of a printed questionnaire and mail. The current circumstance of construction project has been considered in this work. The core objective of this is to improve certain tools and techniques that can be exploited to accomplish the project within scheduled time, within estimated cost and with appropriate quality.

**Step 2:** The first step incorporates the fundamental learning of the subject documents required for the analysis is gathered through literature review. The review was coordinated through several references. Several issues contributing diminished undertaking execution in construction industry are recorded down based on review.

**Step 3:** These factors were expanded under 8 distinct classifications which are as per the following:

1. Land/property
2. Planning/drawing
3. Government work
4. Finance
5. Labours
6. Material execution
7. Others

**Step 4:** The second step incorporates questionnaire survey preparation dependent on the above depicted aspect.

**Step 5:** The questionnaire was distributed to different project stakeholders such as engineer, contractor, Clients by mail and in person and valuable feedbacks are gathered.

**Step 6:** The application of Relative Importance Index is used in this method. It is a method that is applied to rank the constraints that outcomes in decreased project performance and cause delay in construction projects execution.

**Step 7:** The R.I.I. rank is achieved by means of following equation.

$$R.I.I. = \frac{5(n_5) + 4(n_4) + 3(n_3) + 2(n_2) + 1(n_1)}{5(n_5+n_4+n_3+n_2+n_1)}$$

Where,

1 to 5 is the rating contingents upon the premise of their effect on the project performance

1= NIL. 2=LOW. 3= MODERATE. 4= HIGH. 5= VERY HIGH  $n_x$  is the number of respondents

### 2.2. SCHEDULING OF ACTIVITIES USING MSP

**Step 1:** Schedule planning involves activities which will the project scheduling such as documentation, procedures, Stakeholders and resources.

**Step 2:** This step involves different activities required to complete the project it is also called as work break own structure.

**Step 3:** After work break down structure relations between the activities are determined. This logical sequence of activities helps to obtain work efficiency.

**Step 4:** Estimating the resources required to complete each and every activity such as labours, materials, equipment's and tools.

**Step 5:** Estimating the duration required to complete each and every activities.

**Step 6:** This involves development of most efficient project schedule by entering the start and finish date for each and every activity. It also includes identification of critical tasks which will directly effects on project completion time using critical path method.

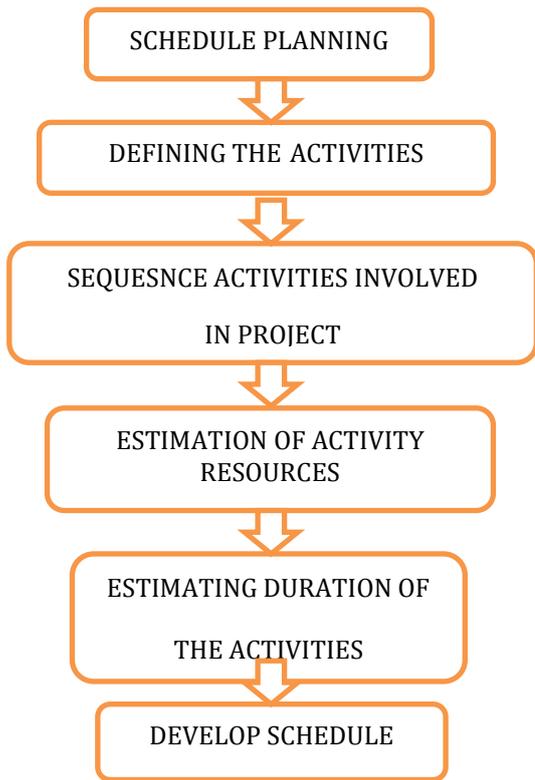


Fig-2: Flow chart indicating the process of scheduling using MSP

### 2.3 ANALYSIS AND RESULTS

This Phase includes identification of constraints based on literature review, conducting questionnaire survey, analysing constraints using R.I.I. method, identification of governing factors and rescheduling of activities using MSP.

1. Conducting questionnaire survey based on literature review is as shown in Table 1.

Table -1: Questionnaires prepared based on literature review

SI.NO	CATEGORY	FACTORS
1	LAND/PROPERTY	Delay in approval of permission drawing
		Changes in permission drawing
		Site inspection
		Demands/corruption
2	PLAN NING/ DRAWING	Delay in drawing
		Drawing errors
		Improper planning

		Change/rework due to some reasons
		Method of construction adopted
3	GOVERNMENT WORK	Availability of concerned approval authority
		Water supply and power lines connections
		Preservation of ecology
4	FINANCE	Budget limit
		Cash flow problem during construction
		Escalation of resource price
5	LABOURS	Wages
		Poor co-ordination
		Health
		Improper work schedule
		Lack of safety measures
		Shortage of labours
6	MATERIAL	procurement
		Quality
		Storage
		Wastage
		Local availability
		Transportation facility to supply
7	EXECUTION	Weather condition
		Lack of experience
		Poor resource allocation
		Lack of construction knowledge
		Lack of supervision
8	OTHER	Conflicts

2. Summary of questionnaire survey results of different categories is as shown in Table 2.

Table-2: Questionnaire survey results using R.I.I. method

SI.NO	CATEGORY	FACTORS	R.I.I.
1	LAND/PROPERTY	Delay in approval of permission drawing	0.59
		Changes in permission	0.56

		drawing	
		Site inspection	0.58
		Demands/corruption	0.68
2	PLANNING/ DRAWING	Delay in drawing	0.61
		Drawing errors	0.49
		Improper planning	0.58
		Change/rework due to some reasons	0.53
		Method of construction adopted	0.68
3	GOVERNMENT WORK	Availability of concerned approval authority	0.68
		Water supply and power lines connections	0.53
4	FINANCE	Preservation of ecology	0.52
		Budget limit	0.73
		Cash flow problem during construction	0.70
		Escalation of resource price	0.73
5	LABOURS	Wages	0.65
		Poor co-ordination	0.65
		Health	0.56
		Improper work schedule	0.57
		Lack of safety measures	0.73
		Shortage of labours	0.82
6	MATERIAL	procurement	0.61
		Quality	0.60
		Storage	0.56
		Wastage	0.59
		Local availability	0.57
		Transportation facility to supply	0.61
7	EXECUTION	Weather condition	0.82
		Lack of experience	0.77
		Poor resource allocation	0.67
		Lack of construction knowledge	0.77

		Lack of supervision	0.73
8	OTHER	Conflicts	0.72

3. Identification of governing factors which will have high level of impact on construction project from questionnaire survey results is as shown in Table 3.

**Table-3:** Governing factors

Sl.NO	CATEGORIES	GOVERNING FACTOR	R.I.I.
1	Planning/drawing	Method of construction adopted	0.68
2	Government work	Availability of concerned approval authority	0.68
3	Finance	Budget limit	0.73
4	Labours	Shortage of labours	0.82
5	Labours	Lack of safety measures	0.73
6	Execution	Lack of construction knowledge	0.77
7	Execution	Weather condition	0.82
8	Other	Conflicts	0.72

4. Identification of impact of constraints by updating the project which is taken for this study has initial duration 327days.

5. Duration of the project after considering the impact of constraints on project is 374days, which is 47days more than initial scheduled duration. Details of scheduling and resource sheet is as shown in Fig 3, Fig 4 and Fig 5

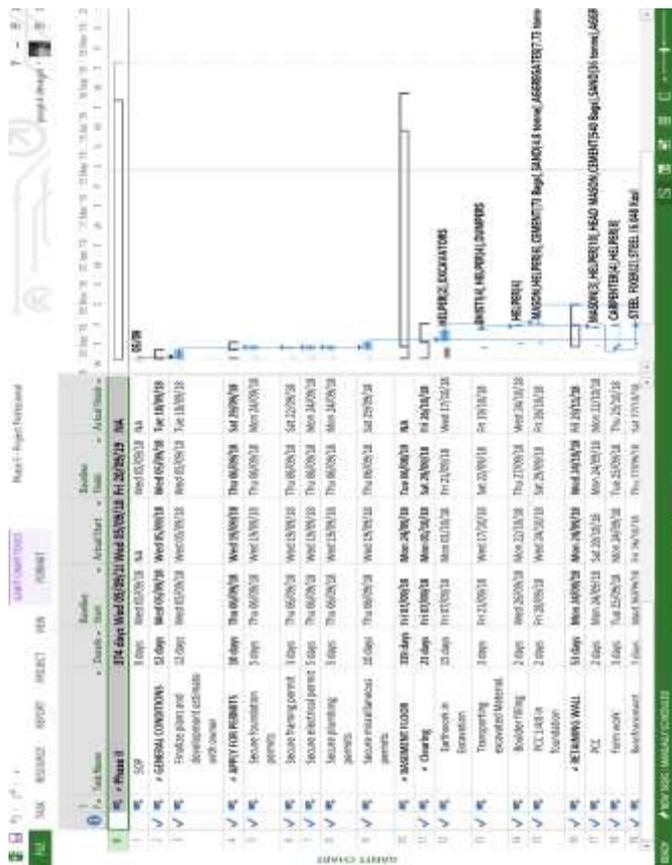


Fig 3. Updated scheduling

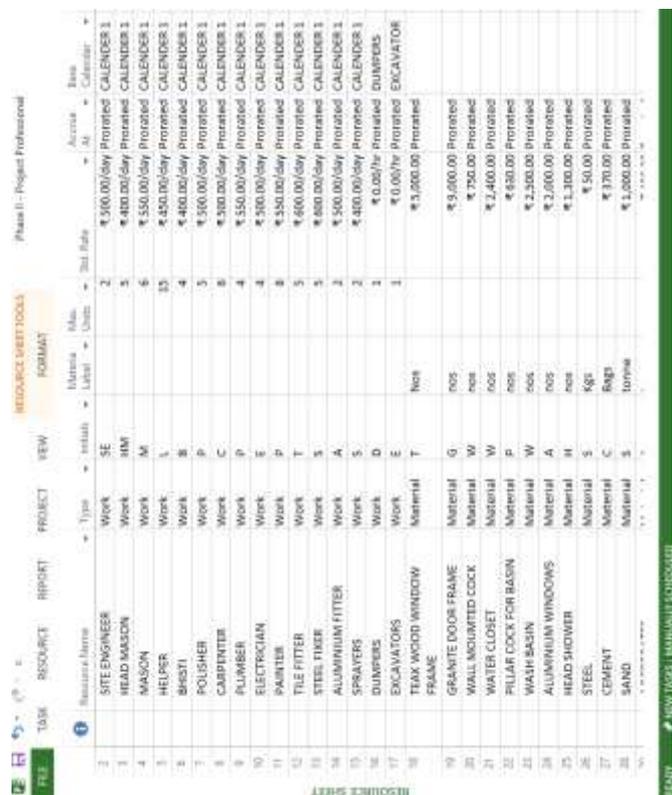


Fig 4. Updated scheduling resource sheet



Fig 5. Updated scheduling resource sheet

### 3. CONCLUSIONS

1. The major constraints which cause delay in construction activities are identified by using R.I.I. method is as shown in Table 4.

Table 4. Governing factors

Sl.NO	CATEGORIES	GOVERNING FACTOR	R.I.I.
1	Planning/drawing	Method of construction adopted	0.68
2	Government work	Availability of concerned approval authority	0.68
3	Finance	Budget limit	0.73
4	Labours	Shortage of labours	0.82
5	Labours	Lack of safety measures	0.73
6	Execution	Lack of construction knowledge	0.77
7	Execution	Weather condition	0.82
8	Other	Conflicts	0.72

2. The total duration of the project execution after considering the impact of the identified constraints was 374 days, which was 47 days more than initial scheduled duration.

## REFERENCES

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## BIOGRAPHIES



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