

# Delay Analysis for an on-Going Multi Storied Residential Apartment Building by Scheduling with the Optimisation of Resources Using MSP

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**Abstract**—Delay is one of the most serious problems faced in construction industry. It plays a vital role in the project evolution. Delay in any task is mainly deals with the time over run and cost variation, effects the completion of the project work, leads to clashes and litigation. It is very important to analyze the delay in any project for the wellness and positive success of the project. This can be achieved by analyzing and tracking the day to day task status in order to minimize the project delay. By using Microsoft project the day to day start time, duration and finish time are recorded and differentiating the task, critical path along with the causes of delay in the task performance of project are rectified. The delay can be overcome through proper planning, scheduling, tracking, resource allocation and resource leveling by project management.

**Index Terms**— delay analysis, cost, time, project management.

## I. INTRODUCTION

In construction industry DELAY is the most common phase in every project. Before execution of any construction project a pre-planned documentation will be prepared which include planning, scheduling, budgeting, cost estimation, controlling, and monitoring the task within start and end dates of the project as per the client requirement. If there is any suspension in the work as per the above mentioned documentation, once the execution is started then it is automatically considered as DELAY in the project without termination of the project after its predicted date.

DELAY cannot be controlled it is just bought about by the employers, employees and the contractor. It directly affects the time and cost of the project along with the society. There are many significant and specific reasons for the cause of delay as mentioned the delay in the project delay as to be remunerated by the civil contractor as well the as the

employees on an ultimate stage called as liquidation loss. The delay in the project will directly affect the inter-related tasks. However this damage can be overcome from the technical point of view by using advanced software technique called DELAY ANALYSIS by using MICROSOFT PROJECT (MSP) software.

Subsequently, delay privileges are the key cause of conflict in the construction field and it had become the most difficult task to overcome the disputes. This made for the evaluation of advanced technologies by improving the existing DELAY ANALYSIS TECHNIQUES. Due to their exclusive presentation and processes, the advancement adapted that the various techniques yields different analysis results for the same delay consequence. Due to these kind of disputes will affect the delay analysis results such as functionality of the programming software used for the analysis, resource allocation and resource leveling..

## II. CONCEPT OF ISSUE

Due to improper planning and management the problem of delay in the work has been raised which led to the vast financial loss in the project. In past recent years the civil contractors started following the new scientific technologies but still there was a need for the advancement of the technology in order to overcome such difficulties. Later the concept of construction project management has been evolved.

Thus, care has to be taken for the proper execution of the project accordance to the approved plan and schedule with the quality resources and man power. Each and every task of the project as to be carried out in a systematic manner and should be regularly cross checked with the original plan. If there is any variation in the project it can be identified by using delay analysis technique with the utilization of the Microsoft project software. Hence the main concept is to reduce the delay in the project and complete each and every task of the project more economical and within scheduled time.

## III. SCOPE OF THE STUDY

The key objective of the study is to complete the project within the specific period of time along with the allocated resource as well as the budget fixed for the specified task with proper usage of manpower, materials, machineries and equipment. This can be achieved from the well planned schedule within fixed period of time and cost.

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- The main aim of the project is to determine the delay in the ongoing construction project.
- Various task of the project as to be scheduled based on documentation, selection, and sequencing.
- To determine the cause and effect of the project delay.
- The most important purpose of delay analysis is to establish the reason and provide solution to complete the project within completion date.
- To verify whether the ongoing project task is progressed as per the scheduled date and cost or not.
- Each and every task of the project as to be executed as per the plan and should be regularly updated and compared with the actual schedule.
- To examine whether there is any delay process of the work by tracking the task.
- Hence the delay analysis can be done by using MSP Software.

Hence, the main purpose of the project is to study how to complete the project with approved quality with in the scheduled date with the available resource most effectively and economically. If there is any delay in the project it can be overcome by rescheduling the project plan by using advanced MSP Software technology.

#### **Project management**

A project management is the application of knowledge, skills, tools, and techniques to the project activities to need the project requirements. This has been done by using modern software such as Microsoft project.

The main purpose of project management is as follows:

- The detailed study of scope, scheduling, budgeting and controlling the project as per the Clint requirement.
- Each and every task as to be estimated with accurate usage of resources and manpower.
- Maintenance of good co-ordination between co-workers for the easy flow of the project.
- Progress of the project should meet the planned schedule of the project.

Proper maintenance of the records regarding the process as well as progress of the work carried out in site.

#### **IV. OBJECTIVE OF PROJECT MANAGEMENT**

Construction project management aims at plan, co-ordination and control the complex and diverse activities of modern industrial project. All projects are sharing same ideas such as projection of ideas and activities into new actions. The main importance of project management is to analyses as many uncertainties and issues and to plan, organize and control the activities which leads to the successful completion of the project without risk.

#### **Setting objectives**

The project management should have specific objective. Such objectives will enhance the chance of achieving g the desired outcome of the project.

#### **Performance and quality**

The end product of the project as to be satisfactory for which it is been planned, quality as to be maintained from the higher management to the staff at operation level.

#### **Budget**

The project must be completed without exceeding the approved expenditure. Financial sources are not always inexhaustible a project might be abundant if the fund run off before the completion. If it happened the money used in the project will be forfeited. In the extreme cases the project contractor could face ruin. Hence proper care to be taken for cost budget and financial management.

#### **Time for completion**

Actual progress as to match the planned progress, all the significant stages of the project must take place on late than their specified dates and completed on or before their respective dates as scheduled so that the entire project will be completed on or before the planned finish date. The time scale objective is very much important because the late completion of the project leads to the various fluctuations in the project management.

#### **V. PROJECT MANAGEMENT SOFTWARE**

- Collecting the data
- Analysis
- Reporting

#### **VI. PROJECT TIME AND COST MANAGEMENT**

The project time management process gives guidelines how to monitor and control the time spent on different task and activities of the project.

The project time management process will perform the following:

- Putting in place a process for recording time within the project
- Using time sheet for monitoring the time spent by the staff
- Controlling time spent by implementing time sheet approvals
- Monitoring project progress by using a time sheet register
- Identifying and resolving time management issue
- Keeping project up to date at all the times

The objectives of the project cost management process are as follows;

- Identify each of the cost with in the project

- Ensure that expenses are approved before purchasing the corresponding items
- Keeping a central record of all the cost that are incurred
- Controlling overall cost of the project
- Determining the expenses are adequately budgeted
- Monitoring and controlling the instances of overspending in the project

## **VII. PROJECT QUALITY AND RISK MANAGEMENT**

The quality management has two components such as quality improvement process and quality assurance process. The task of the quality management process as listed below:

- Setting quality target which are to be met by the project team
- Listing the method of measuring those quality targets
- Taking action required for the accurate measurement of the quality
- Identifying quality issues and quality improvement actions
- Reporting on the overall level of the quality achieved by the project team
- Performing quality assurance to provide customer with assurance

The project risk management aims at the steps required to perform risk management with in the project. The objective of this process is to identify the risk and take action such that the occurrence of the risk in the project is minimized.

The risk management involves the following steps:

- Identify the critical and noncritical risks
- Documenting each risk in depth by completing the risk identification
- Taking action to reduce the likelihood of occurring the risk
- Reduce the impact of risk on the project.

## **VIII. DELAY ANALYSIS**

Delay is one of the most complicated issues in the present construction industry. Delay is mainly defined as the task or the process in which time and cost overrun which effects the completion of the work, leading to the disputes and the litigation. This interruption in the construction planning and the scheduling weighs economic and public effect on the parties involved in the project. This critique focus on the causes and the effects due to delay on day to day task

performances in the construction site and to overcome the issue with an effective solution using MS Project software.

In construction, the word delay denotes that happening at a later time than planned, projected, quantified in a contract or elsewhere the date that the parties agreed upon for the delivery of a project. Delay is the slowing down of work without stopping construction entirely and that can lead to time overrun either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project.

The owner and the contractor recompense for the additional charge for the completion of the project due to delay in large construction projects. When the construction project and the completion time exceeds it is considered as the construction project delay. It is necessary to conduct detailed examination and documentation of delay aspects and then choosing the correct schedules to pledge these delay factors within budget and quality maintenance. The liabilities and inaccuracies occurred due to delay leads to wastage of time and cost.

## **IX. TYPES OF PROJECT DELAY**

The inefficiency of the project is caused due to delay it has been categorized in to internal delay and external delay, these are explained as follows:

### **Internal Delays**

The main causes for the internal delay are due to internal conflicts between the management and the contractors as well as improper controlling of the resources and coordinating the tasks. The different types of resources that are causing delay in the project are as mentioned below.

- Materials and subassemblies
- Manpower
- Money
- Equipment and machineries

### **External Delays**

At many stages of the project it requires some external agencies involved in sanctioning the project and clearances once the project started to execute the project some criteria as to be followed such as:

- Site surrounding public nature
- Political stability of the state
- availability of electrical and water supply
- analyzing the tax benefits

Some of the documentation certificates as to be obtained from the following authorities,

- pollution control board
- plan approval from the municipality
- certificate from town planning authority
- site survey certificate

## **X. DELAY CRITERIA**

The main aim of the study deals with the numerous aspects causing the delay mainly due to payment issue, improper material supply, unexpected accidents at site, lack of details in structural and architectural plan, in-sufficient labors, availability of materials in long distance where resources





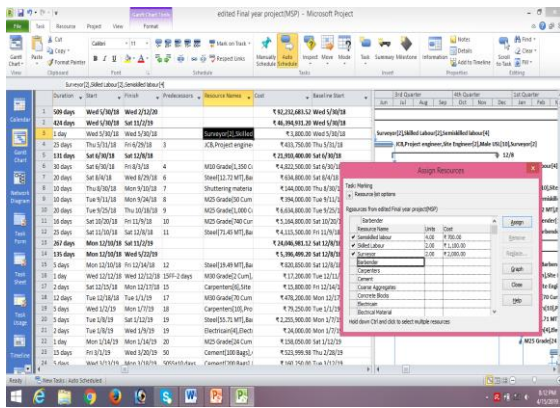


FIGURE.3 Resource Assigning

Resource assigning is the process in which each and every task of the project is assigned with the resources as per the task requirement and there budgeting as per the planning and scheduling

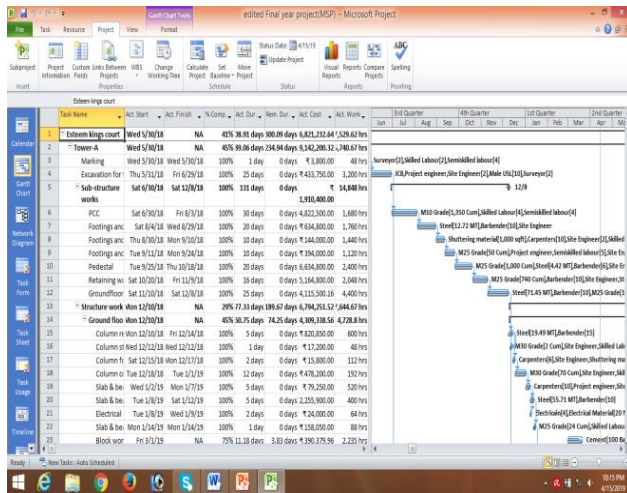


FIGURE.4 Baseline Setting

A baseline is set in order to set a record of start date, finish date, duration, work and cost estimation with respective to the original project plan when the plan is completed and refined

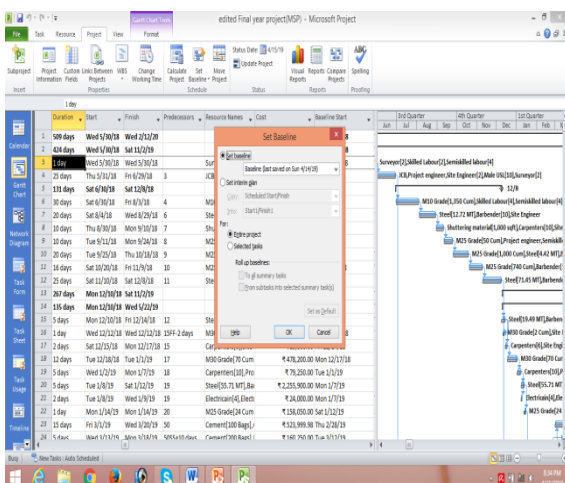


FIGURE.5 Fast Tracking and Tracking

Fast tracking is the process in which the task as been overlapped in order to overcome the delay in the project this can be achieved by adding up the resources such as labors and equipment so that the delay in the project can be overseen

Then the project as to be tracked in order to determine the percentage of completed and percentage of has to be processed for the timely completion of the work within the scheduled period

## XVII. DELAY ANALYSIS

As per the actual project planned The duration of the project:335 days

Planned budget: 271,000,011.04

After tracking the updated project plan

The duration of the project: 509 days

Actual budget: 92,232,683.52

## XVIII. CONCLUSION

From this case study it has been analyzed that the management of time is very critical in construction project because cost and time are interdependent. The schedule delay may play an important role in the direction of project success. By applying crashing and fast tracking techniques helps to overcome the delay by the addition of resources and lapping the task by increasing the no of labors for the speedy completion of the project without causing delay with in scheduled period of time, each and every task as to be tracked in order todetermine the percentage of task completion which helps to identify the delay in the project comparative to the actual scheduled plan. This is achieved by using Microsoft project software

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