

# DELAYS & ANALYSIS IN UNDERGROUND METRO PROJECTS

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**Abstract** - Delays are quite common on construction projects. Delay in any activity or operation is an overshoot of time that affects the completion of the work, leading to disputes and litigation. It is therefore essential to study and analyze the causes of construction delays. This thesis focuses on studying the main factors causing delays and daily case analysis to minimize delays. To overcome the problem in our study, we encourage to collect daily data from the workplace i.e., start time, end time and completed task, etc. they are recorded in MS Project differentiating between critical activities and activities, as well as delays caused and reasons for delays. Collected data were analyzed using MS project and priority the delay was predicted using the SPSS software based on the ranking.

**Key Words:** Project Management, Delays, Software

## 1. Introduction

Delay is one of the most common problems in construction project disputes and complaints. In essence, the delay is the time elapsed either from the date of execution indicated in the contract or from the date set for the assignment of the commitment. Most large businesses complete after these set dates for a variety of reasons. These delays can have extreme financial effects on the company. Basically, the delays are obvious. The delay can be divided into compensable or non-compensable delays. Unfortunate circumstance: all rallies lose somehow and there are no real champions. Reputation is also at stake.

When disputes arise, cases of delay can be documented unless agreements are reached. To recover the damage caused by delays, a distinction must be made between delays and gatherings that are responsible for them. In any case, delay the circumstances are of an unpredictable nature on the basis that many delays can occur at the same time and can be caused by several gatherings or by none of the major gatherings (force majeure, etc.)

Delays in construction projects are costly from time to time as there is normally a construction advance including who loads the plot, administrative staff engaged in the project whose expenses depend on time, and the gradual expansion of labour and material costs. In any case, in more astounding projects, problems will emerge that are not foreseen in the first contract, other legitimate forms of construction are therefore used, for example, the exchange ordinances, waivers of privileges, and addenda.

In construction projects, too indifferent projects where a timeline is used to design the work, delays constantly occur. It is what is late that decides whether a project or another deadline date, such as a benchmark, will be completed late. Before deciding on the effect of a delay on your project, you need to decide whether the delay is critical or not critical.

Furthermore, all delays are understandable or not surmountable. Reasonable and non-exceed able deadlines can be characterized as simultaneous or non-simultaneous. Construction projects tend to be one-off.

A project team comes together to deliver a unique breakthrough at a specific site under conditions that will never change. They are exceptionally confusing and require the joint designation of authorizations, individuals, products, plants and materials.

## 2. Different Methodologies

### 2.1 RESEARCH METHODOLOGY

In this study, Microsoft Project was used for planning and scheduling and for delay analysis.

The planned vs-built technique was used. Various data was collected in the form of bar graphs and site drawings. The bar charts are converted over the network by the MSP and a critical path is discovered.

### 2.2 COLLECTION OF PROJECT DATA

Initially, all relevant data such as drawings, specifications, resource types, quantities, planned calendar, photographs, etc.

### 2.3 CALENDAR PREPARATION USING MSP SOFTWARE

With the help of the MSP calendar that will be prepared for the project based on the information gathered by the organization. Before preparing the schedule, the various activities are identified using the data provided by the the organization and resources required for the project by the tariff analysis.

### 2.4 DESIGN OF THE QUESTIONNAIRE

A questionnaire is an analytical tool consisting of a set of questions in order to collect information from respondents.

They are designed for statistical analysis of responses. Questionnaires should be prepared in one way those respondents need to be able to read and answer questions.

The analysis was used using a four-point Likert scale and the weight is given as follows:

- 1 - Strongly disagree
- 2 - I disagree
- 3 - Moderate
- 4 - Ok
- 5 - Absolutely agree

### 3. Reasons behind Delays

There are three basic methods of classifying the types of delays:

- Critical and non-critical
- Excusable and not excusable
- Refundable and non-refundable

#### 3.1 CRITICAL AND NON-CRITICAL DELAYS

Delays affecting the completion of the project or sometimes a target date are considered basic delays as well delays that do not affect the completion of the project or a turnaround date are considered non-critical delays. Working possibility that these exercises will be delayed, the project completion date or a subsequent benchmark will be delayed. The number exercising effectively check the completion date of the business plan during coaching: The project itself

- The contractor's plan and timing (especially the critical path)
- The contractual requirement for the sequence and phases
- The physical constraint of the project, or how to build the work from a
- Perspective.

#### 3.2 DELAY ANALYSIS TECHNIQUES

Whether or not a delay is compensable depends primarily on the terms of the agreement. In most cases, the agreement takes into account in particular the types of non-compensable delays, for which the contract worker does not do so not get additional money, but an extension of the period may instead be allowed. Deferred examination is a systematic procedure that it should be used with corporate documentation and information collected on the corporate website. The choice of deadline the revision is based on the assortment of components and accessible records. There are five delays normally used strategies.

- Method as planned affected
- Method of analysis of the temporal impact
- Compressed analysis method as constructed or "but for"
- Snapshot / Window / Time Interval Analysis Method

- Method of analyzing windows as planned versus built ones

### 4. Software

MS Project is a PM software product developed and sold by Microsoft. It is designed to assist a project manager to develop an idea, allocate resources to tasks, track progress, manage the budget, and analyze workloads. Microsoft Project was the company's 3rd MS Windows application and in a few years after its introduction, it became the dominant PC-based project management software.

#### 4.1 SPSS

Statistics are for the most part intended as the object of managing numbers and information, all the more so in general, it includes exercises, for example, accumulating information from an exam or test, plan or administration information, bring the results into a persuasive position, seek information, or obtain substantial results inductions of discoveries. While biostatistics is a science that leads us to monitor medical information with the use of statistical strategies/systems/devices or an accumulation of evidence-based methods particularly appropriate for the review of social security information.

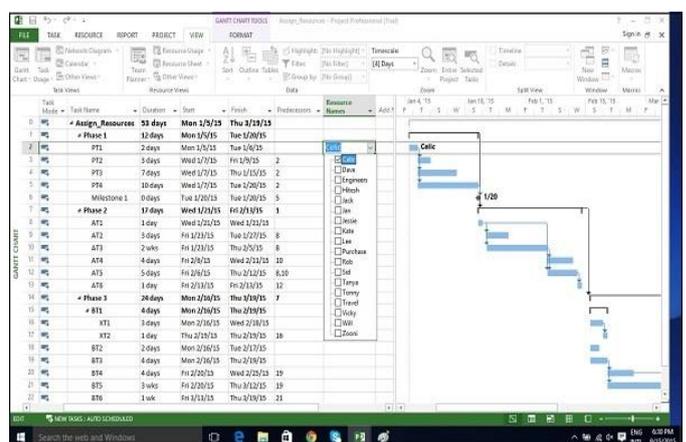
#### 4.2 PROGRAMMING IN THE MS PROJECT.

Before preparing the schedule, the various activities and resources necessary for the project are first identified. It was found that around 160 activities are needed for this project. The critical path method is the project planning method used in MS Project to link all activities. The total reference duration of the project was found to be 432 days.

#### 4.3 ALLOCATION OF RESOURCES.

Before assigning the resource, the productivity table allows you to assign the necessary workforce for each task to carry out this particular activity without compromising quality.

Chart -1: Resource Allocation



## 5. Critical use of PM Software

- Cost control

Cost control is that the process that helps us to research differences in costs from the baseline and taking more correct actions, like increasing the assigned budget or reducing the scope of work, to correct that change. Cost control is a continuous process carried out throughout the entire life cycle of the project. The emphasis here is as much on clear and timely reporting as it is on the action.

Along with cost forecasting, the cost management plan is essential for cost control. This plan contains details about how project performance is going to be measured, what the edge for deviations is, what actions are going to be taken if the edge is exceeded, and the list of persons and roles that have the executive power to make decisions.

Earned Value Management (EVM) is a great approach to measuring cost performance. Let's take an example.

After a week, you measure the progress of Activity X and see that it is 25% completed. Now how do you assess if you are well on your way to meeting the budget for the business?

First, a project manager calculates the planned value for that task (at the planning stage). Let's say task X has a budget of \$ 4000 and should be 50% completed within the week.

Planned Value (PV) of Activity X per week = \$ 4,000 \* 0.5 = \$ 2,000

Value won (EV) of activity X per week = \$ 4,000 \* 0.25 = \$ 1,000

Now you also determine the actual cost (CA) of the work, which involves other variables such as equipment and material costs (e.g., \$ 800).

Program difference = EV - PV = \$ 1,000 - \$ 2,000 = - \$ 1,000.

Difference in cost = EV - AC = \$ 1000 - \$ 800 = \$ 200.

Negative schedule variance indicates that the task is overdue, but positive cost variance indicates that it is below budget.

When managing hundreds of tasks on large projects, cost control can provide the level of transparency necessary for decision-makers to react quickly to the situation.

- Project cost software

Cost management, & many other factors of project management, become difficult with many other variables at play. The process itself is elaborate, requires attention to detail and a rigorous approach. Using project management software can greatly simplify this process.

Let's take a look at some benefits of using project cost management software:

Automating tedious quantitative analyzes during estimation and measurement helps prevent manual errors.

The integration of data into planning, estimating, budgeting, and monitoring allows continuous monitoring and rapid and proactive responses, rather than ad hoc interventions.

Decision-making is formed easier because CM software allows you to gauge alternative solutions using scenario forecasts and what-if analyzes.

Clear and simple reports in the form of dashboards and other advanced user interfaces.

The complexity of managing multi-currency in projects across geographic locations is simplified with project cost software.

Many project cost solutions allow for third-party integrations, so data can be aggregated and analyzed.

Benchmarking and standardization are possible thanks to the availability of performance data across multiple projects.

### Top Four Construction Software Capabilities Requested By Buyers



Chart -2: Benefits of CMS

## 3. Conclusions & Results

Critical elements affected by project planning are listed from the results of the software analysis. The Time management is very critical in this industry as time equals money, thus estimating the chances of timing delay can play an important role in directing the success of the project. The materiality index method is used to prioritize the factors that determine the delay and its level of significance concerning other factors. Based on these risk factors, allocating within the project schedule for the duration of the entire project can save time and money. Due to the difficulty and duration Project time, investment, and risk are more in this area. We find that the delay in the project's designed schedule is the

fundamental reason for these inconveniences. Some recommendations would be proposed to reduce the programming possibilities delay.

o Contracts are prescribed and recommended so that the honest spirit is taken in organizing and booking the project phase. It is essential to obtain expert contractors in improvement projects for profitable implementation of the project they do not authorize the subcontractor's change of visits to the intermediate activities of the project.

o Owners are advised not to delay down payments from contractors' contractors, as this weakens the contract ability of workers to finance work.

o Designers should not make mistakes and produce late design documents as this creates delays in the design.

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