



Delays In Residential Building Construction

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Abstract:

In construction, delay could be defined as the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project. It is a project slipping over its planned schedule and is considered as common problem in construction projects. There are many projects in India currently with major clients out of which 1 to 5 % complete on time and remaining part project got delayed or some even not completed till date. A construction project is commonly acknowledged as successful when the aim of the project is achieved in terms of predetermined objectives that are mainly completed the project on time, within budget and specified quality of the project. One of the most important problems that may occur in the construction project is delays and the significant of these delays varies considerably from project to project. Any disruptions to the project objectives will certainly contribute to project delays with its specified adverse effects on project objectives. Delays on construction projects are a universal phenomenon.

They are almost always accompanied by cost and time overruns. Even though various studies have been considered into the causes affecting delays, these studies seldom discuss common and general causes of delays in construction delays. Thus comprehensive studies on these delays are essential.

This paper deals with delays caused in Pebble park project in Handewadi located in Hadapsar city, Pune. In this project until now the delays are caused due to all those common reasons like incompetent contractor, delay in payment of subcontractors, quarrel between fitters, etc as they are unable to complete the given tasks according to the schedule. And due to this further work is also getting hampered causing delays. This paper along with delays also suggests a remedial measure to solve the problem. Here firstly all relevant data like plan, elevation, specification, schedule, cashflow was collected from the organisation. After getting all the relevant data quantities for all the activities were found. As quantities were calculated schedule for the pebble park project (residential building) was prepared with help of MSP 2010(Microsoft soft project) and with the help of MSP only resources were assigned for the particular project. Later in this pebble park project we compared planned schedule with actual schedule. An at last with the help of indicatorsSchedule variance, cost variance, start variance and finish variance in MSP we could actually come to knowby how many days the project has been delayed and by how much cost it has been exceeded.

1.Introduction

Project management helps you deliver the right results on time, within budget, and without going into crisis mode. When a project falters, project management techniques also help you get it headed back in the right direction.

Construction industry in India is growing with very fast speed. In India, construction is the second largest economic activity after agriculture. There is a major part for infrastructural project in 2011 budget. Indian economy grew by just 6.9% GDP in the second quarter of 2011-12 financial year and out of that construction sector grew by 4.3%. The Indian construction industry is an integral part of the economy and a conduit for a substantial part of its development investment, is poised for growth on account of industrialization, urbanization, economic development and people's rising expectations for improved quality of living.

The construction industry is large, volatile and requires tremendous capital outlays. Typically the work offers low rate of returns in relation to the amount of risk involved. In construction, delay could be defined as the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project. Delays occur in every construction project and the significance of these delays varies considerably from project to project. Delays on the project are universal phenomenon. They are almost always accompanied by cost and time overrun. Construction projects have debilitating effect on parties (owner, contractor and consultant) to a contract in terms of a growth in relations, distrust, litigation, arbitration and cashflow problems. Ogunlana studied the delays in building project in Thailand, as an example of developing economics. They concluded that the problems of the construction industry in developing economics could be nested in 3 layers.

- Problem of shortages or inadequacies in industry infrastructure, mainly supply of resources.
- Problems caused by clients and consultants and
- Problems caused by incompetency of contractors.

Battaineh (1996-1999) evaluated the progress reports of 164 building and 28 highway projects in Jordan. The results indicate that delays are extensive: the average ratio of actual completion time to the planned contract duration is 160.5% for road projects and 120.3% for building projects. Assaf (1995) studied the causes of delays in large building construction projects in Saudi Arabia. Four most significant causes of delay from their

study were included: approval of shop drawings; delays in payment to contractors and the resulting cash problems during construction; design changes and conflicts in work schedules of subcontractors.

Assessing the impact of delay is sometimes a contentious issue. Several delay analysis methods are available but no one method can be universally used over another in all situations. The selection of the proper analysis method depends upon a variety of factors including information available, time of analysis, capabilities of the methodology, and time, funds and effort allocated to the analysis.

Before analysing construction delays, a clear understanding of the general types of delays is necessary. There are four basic ways to categorize delays:

- Critical or Non-Critical
- Excusable or Non-Excusable
- Concurrent or Non-Concurrent
- Compensable or Non-Compensable

Before determining the impact of a delay on the project, one must determine whether the delay is critical or non-critical. Additionally, all delays are either excusable or non-excusable. Both excusable and non-excusable delays can be defined as either concurrent or non-concurrent. Delays can be further broken down into compensable or non-compensable delays. In this way delays can be classified according to their meanings.

This paper deals with delays caused in Pebble park project in Handewadi located in Hadapsar city, Pune. In this project until now the delays are caused due to contractors as they are unable to complete the given tasks according to the schedule. And due to this further work is also getting hampered causing delays. This paper deals with the remedial measure for Pebble park project. Here firstly all relevant data is collected for i.e plan, elevation, photographs, specifications,. After getting all the relevant data quantities for all the activities were found. As quantities were found out schedule for the Pebble Park project was prepared with help of MSP 2010(Microsoft soft project) and with the help of MSP only resources were assigned for the project. Later in this project we compared planned schedule with actual schedule. And at last with the help of indicators like Schedule variance, cost variance, start variance and finish variance in MSP we have found the project in terms of cost, schedule and days. Here with the help of MSP we have tracked the project i.e with this tracking we have found out that by how many days the project has been got delayed and also the most important thing is the cost parameter we have also found out the cost difference i.e because of delay in project, how it has

hampered the cost parameter. So with the help of this software we are able to find out the cost parameter and days of the project.

In this paper we have focused on various factors leading to delays of the project and on the other hand we have seen that how MSP can be useful tool to solve this problem.

2.Objectives Of The Study

The main objectives of this study include the following:

- To prepare schedule of project using MSP
- To find cost of the project using MSP
- To compare actual work to planned work
- Finding causes of delay.
- Suggesting possible remedies

3.Scope Of Work

Pebble park project is dealing with major problems such as delays due to number of reasons. The major reason is financial problem, lack of coordination between different departments, resource availability. With proper tracking we can control and achieve goal of the project within time and budget. If there are any delays in the project we can come to know in advance and also the progress of project can be tracked using MSP.

4.Flowchart For Methodology Of Project

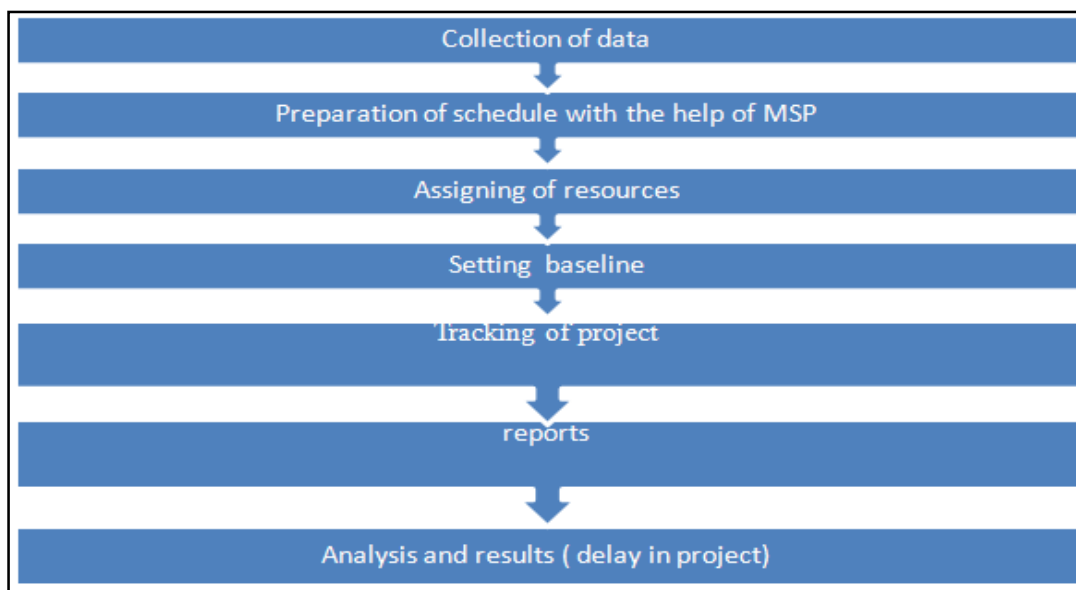


Figure 1

5.Documented Case Study

5.1.Site: Pebble Park project

5.1.1.Luxurious 2 BHK Apartments In Hadapsar Near Handewadi, Pune

Location is close to the Magarpatta IT Park, and Kharadi IT Park and also near to M.G road as well as top-of-the-line modern amenities and features, Pebble Park offers 2 BHK luxurious apartments for those who want to settle for the best home in Hadapsar, Pune. It offers all modern amenities to the customer. Client has not appointed any PMC for the desired work.



Figure 2

- Name of the company: Kumar Builders.
- Name of the project: Pebble Park, Handewadi, Hadapsar.
- Scope of the project: completion of 4 building's (each building consisting of 4 wings), G+15 stories building.
- Duration of the project: 36 months
- Planning to execution: done by Kumar builders alone.
- Delays in project: yes(6 months delay)

6. Research Methodology

6.1. Collection Of Project Data

In the Pebble park project, initially all the relevant data has been collected i.e. Building Drawings, Specifications, types of resources, contract document, quantities, planned schedule, photographs, etc. Pebble Park project is residential building which consists of 4 buildings (A,B,C,D). Each building consisting of 4 wings and each wing has G+16 stories.

6.2. Preparation Of Schedule Using MSP Software

With the help of MSP schedule has been prepared for the project according to the information collected from the organization. Before preparing the schedule initially different activities are identified with the help of data given by the organization and resources required for the project by rate analysis. It has been found that in all there are 486 activities and 89 resources required for this residential building. With the help of relevant data from the organisation, schedule for the project has been prepared using MSP i.e. by linking all the activities and after linking all the activities, with the help of different linking options, total duration of the project was found i.e. 723 days. Later these days were compared with planned days of the organization which was more than what we found by MSP hence actual days required are 723 days of and planned days were 856 days.

From the given fig. total duration of the project can be seen by using MSP.

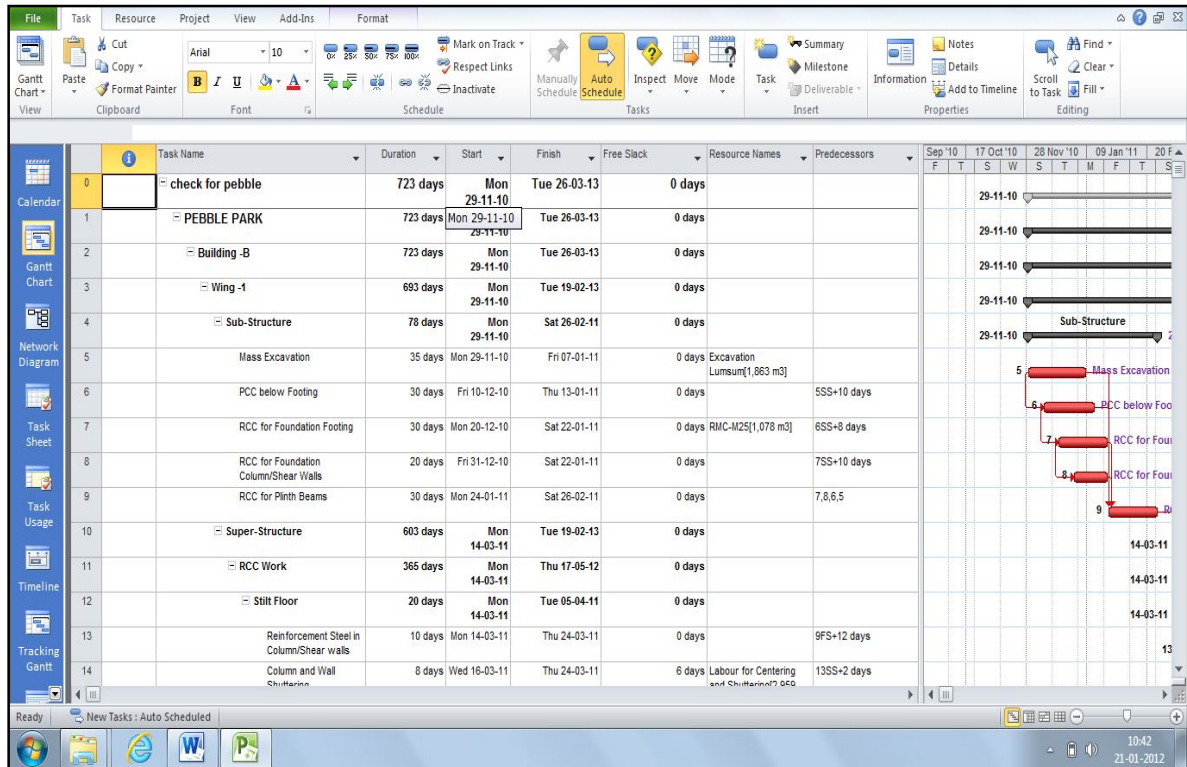


Figure 3 : Shedule Of Activities

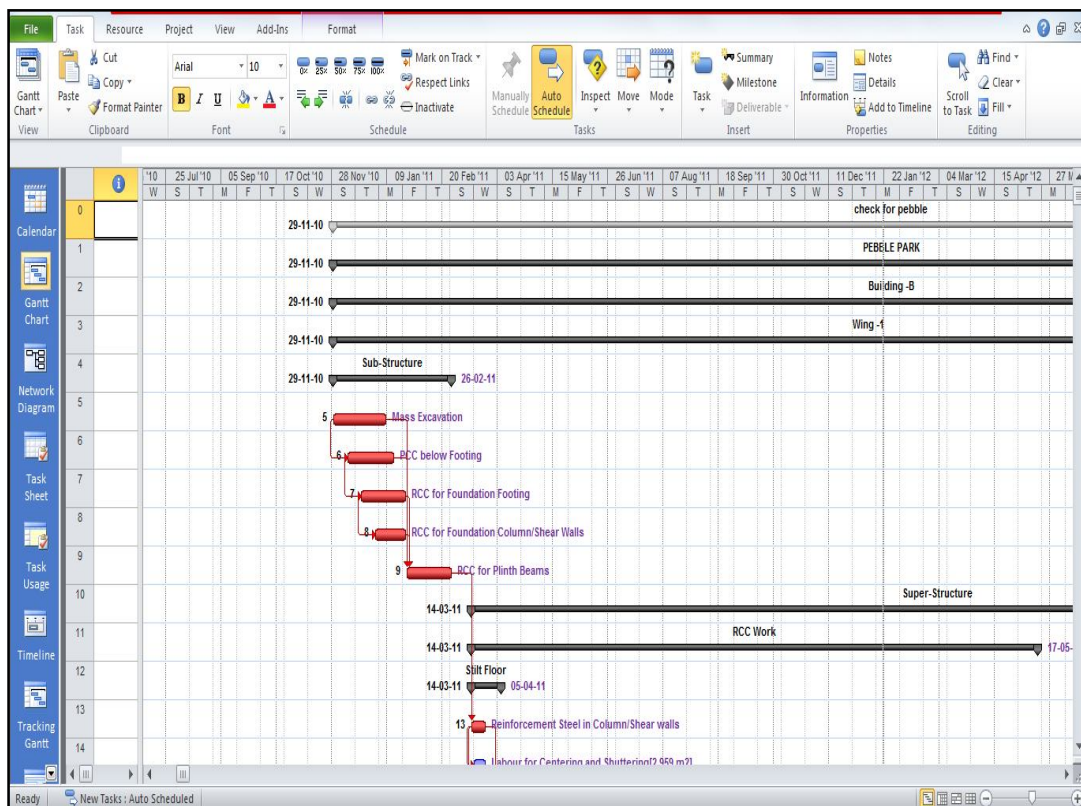
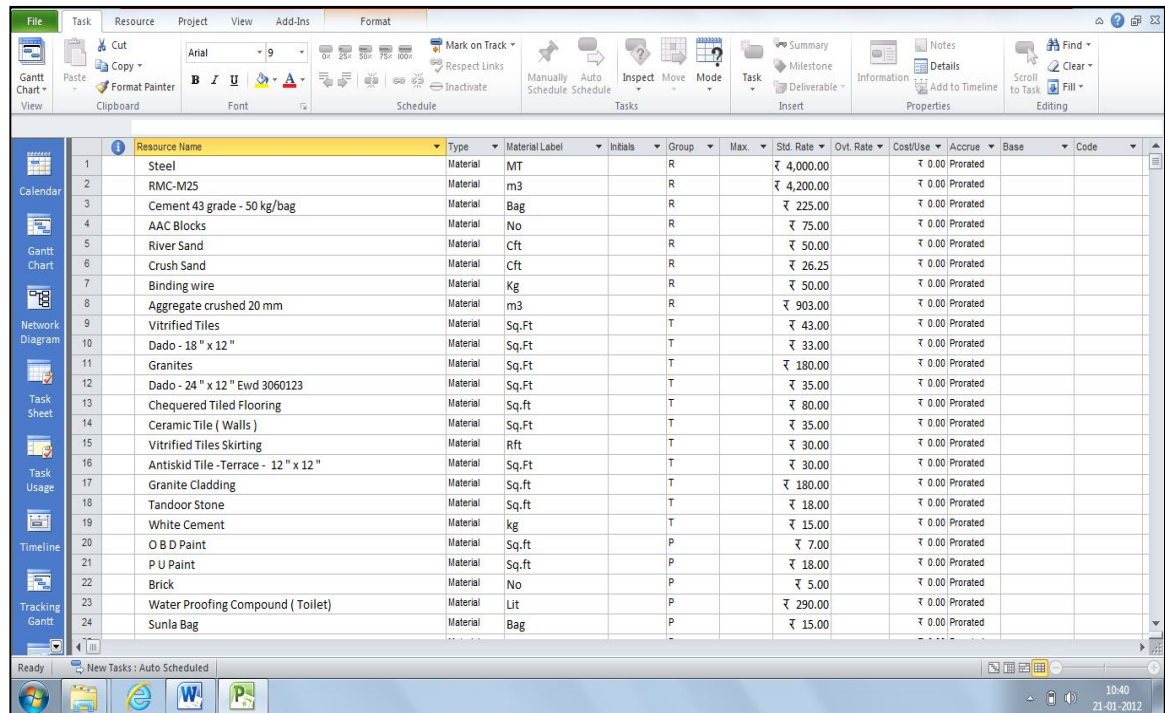


Figure 4: Gantt chart for Pebble Park project .

6.3. Assigning Of Resources

After completing the schedule work the next step is to assign resources with the help of MSP and as assigning of resources is done actual cost of project can be known. And hence along with days we will come to know the cost of the project after assigning of resources. So after this assignment project feasibility can be known that if the project is actually within budget and time. So it's not just important to get the schedule for the project but also budget of the project should be known in order to know the feasibility of the project.



Resource Name	Type	Material Label	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base	Code
1 Steel	Material	MT		R		₹ 4,000.00		₹ 0.00	Prorated		
2 RMC-M25	Material	m3		R		₹ 4,200.00		₹ 0.00	Prorated		
3 Cement 43 grade - 50 kg/bag	Material	Bag		R		₹ 225.00		₹ 0.00	Prorated		
4 AAC Blocks	Material	No		R		₹ 75.00		₹ 0.00	Prorated		
5 River Sand	Material	Cft		R		₹ 50.00		₹ 0.00	Prorated		
6 Crush Sand	Material	Cft		R		₹ 26.25		₹ 0.00	Prorated		
7 Binding wire	Material	Kg		R		₹ 50.00		₹ 0.00	Prorated		
8 Aggregate crushed 20 mm	Material	m3		R		₹ 903.00		₹ 0.00	Prorated		
9 Vitrified Tiles	Material	Sq.Ft		T		₹ 43.00		₹ 0.00	Prorated		
10 Dado - 18" x 12"	Material	Sq.Ft		T		₹ 33.00		₹ 0.00	Prorated		
11 Granites	Material	Sq.Ft		T		₹ 180.00		₹ 0.00	Prorated		
12 Dado - 24" x 12" Ewd 3060123	Material	Sq.Ft		T		₹ 35.00		₹ 0.00	Prorated		
13 Chequered Tiled Flooring	Material	Sq.Ft		T		₹ 80.00		₹ 0.00	Prorated		
14 Ceramic Tile (Walls)	Material	Sq.Ft		T		₹ 35.00		₹ 0.00	Prorated		
15 Vitrified Tiles Skirting	Material	Rft		T		₹ 30.00		₹ 0.00	Prorated		
16 Antiskid Tile - Terrace - 12" x 12"	Material	Sq.Ft		T		₹ 30.00		₹ 0.00	Prorated		
17 Granite Cladding	Material	Sq.ft		T		₹ 180.00		₹ 0.00	Prorated		
18 Tandoor Stone	Material	Sq.ft		T		₹ 18.00		₹ 0.00	Prorated		
19 White Cement	Material	kg		T		₹ 15.00		₹ 0.00	Prorated		
20 O B D Paint	Material	Sq.ft		P		₹ 7.00		₹ 0.00	Prorated		
21 P U Paint	Material	Sq.ft		P		₹ 18.00		₹ 0.00	Prorated		
22 Brick	Material	No		P		₹ 5.00		₹ 0.00	Prorated		
23 Water Proofing Compound (Toilet)	Material	Lit		P		₹ 290.00		₹ 0.00	Prorated		
24 Sunla Bag	Material	Bag		P		₹ 15.00		₹ 0.00	Prorated		

figure 5: List of resources

6.4. Setting of baseline

As the baseline is set for the project, progress for the project could be summarized by comparing it with actual schedule i.e. planned schedule is compared with actual schedule with the help of milestone and by setting baseline to the project. Baseline is to show that how that project is differing from its planned to actual scenario, and hence one can get their project scenario, if the project is achieving its milestone or not.

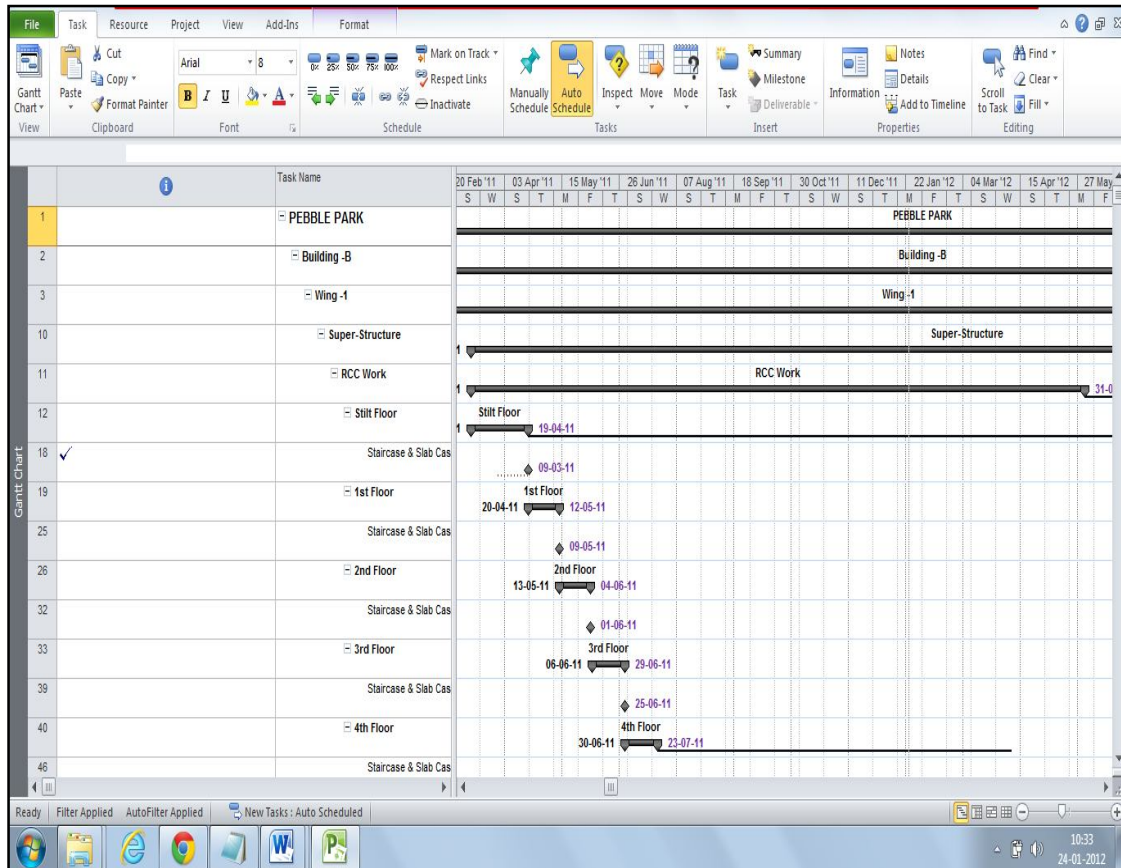


Figure 7: baseline set for the project

6.5.Tracking of the project

After saving a baseline for the project, tracking progress is all about data gathering: tasks completed, hours worked, and costs incurred. So with the help of tracking project status can be found out as now baseline is set for the project tracking of the project can be done in different ways i.e.

- Per cent complete (% Complete)
 - Percentage of work complete (% Work Complete)
 - Actual duration
 - Remaining duration
 - Actual start
 - Actual finish
 - Actual work
 - Remaining work
 - Actual work by time period

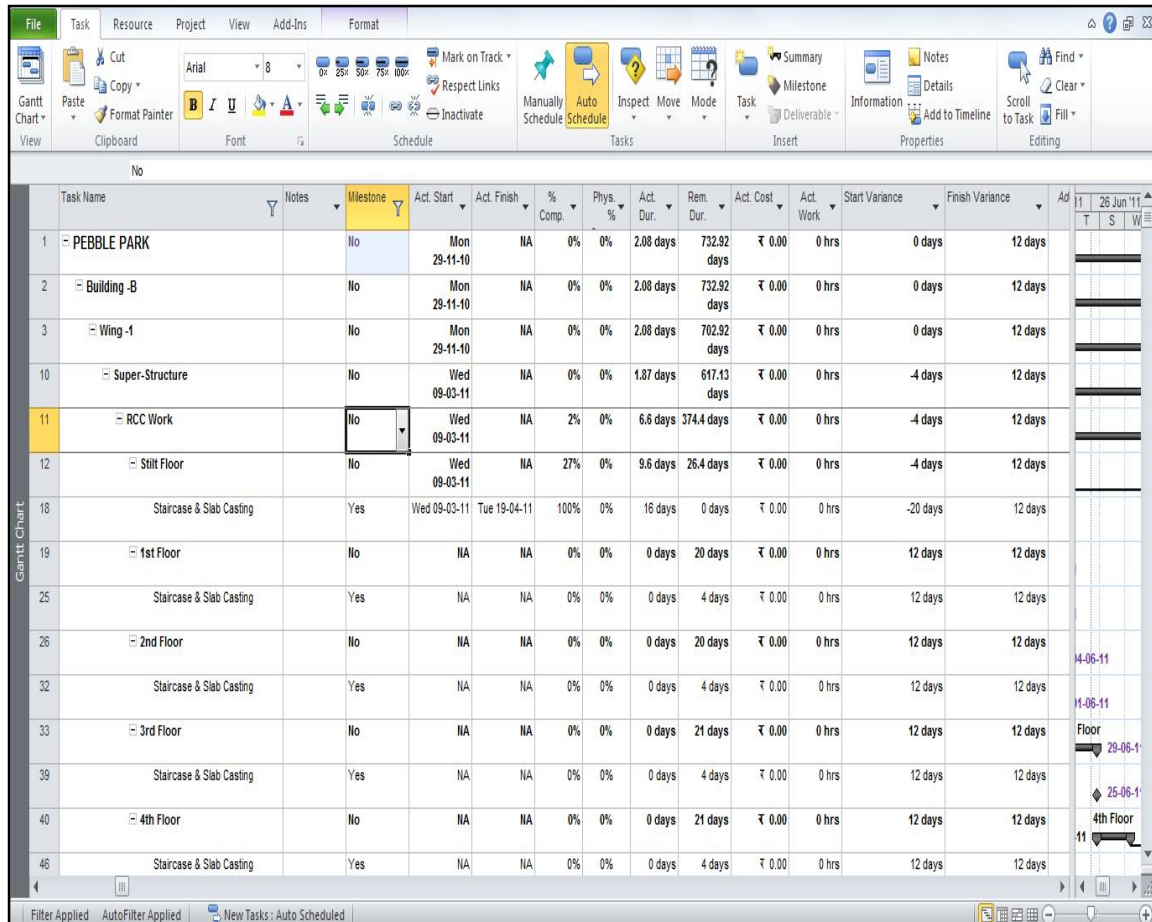


Figure 7: Tracking of the project

As in here by tracking of project start variance and finish variance indicators help to give the information regarding delays in duration. After setting baseline for the project, status is seen that how much project has been delayed from the actual milestone set for the project. From the above figure it is clear that right from the 1st floor slab casting there has been delay in the project. And the information can be in all form as listed above i.e. in terms of % complete, remaining days, etc. but the main indicators are the start variance and the finish variance. From the above fig it can be seen that start variance is 0 days and finish variance indicates 55 days. That means it is getting delayed by 12 days. This is the start of the project, similarly for other tasks tracking can be done as further data will be inserted. This is the initial stage of the project.

6.6.Reports

The last step is to get the reports for the project. Because communication is such a large part of project management, you run reports all the time. Along with pictures of schedules, reports are a mainstay for presenting project information to others. They're also handy when you want to see what's going on. During planning, reports show you where your schedule needs work to get dates, costs, and resource workloads where they should be. Once the project is under way, you can use high-level reports to see whether the project is on track. If it isn't, more detailed reports help you find the problem spots. Although the information in visual reports and text-based reports overlaps a little, you use each type of report for different reasons. Text-based reports spit out information in a specific format, which is fine when you want to see information that way. Visual reports, on the other hand, are ideal when you want to look at project performance from different angles. So in this way there are many categories for the reports according to the need of the project.

as of 23-05-12			
Dates			
Start:	29-11-10	Finish:	27-05-13
Baseline Start:	29-11-10	Baseline Finish:	26-03-13
Actual Start:	29-11-10	Actual Finish:	NA
Start Variance:	0 days	Finish Variance:	53 days
Duration			
Scheduled:	776 days	Remaining:	757.78 days
Baseline:	723 days	Actual:	18.22 days
Variance:	53 days	Percent Complete:	2%
Work			
Scheduled:	0 hrs	Remaining:	0 hrs
Baseline:	0 hrs	Actual:	0 hrs
Variance:	0 hrs	Percent Complete:	0%
Costs			
Scheduled:	₹ 479,680,532.36	Remaining:	₹ 479,680,532.36
Baseline:	₹ 479,680,532.36	Actual:	₹ 0.00
Variance:	₹ 0.00		
Task Status		Resource Status	
Tasks not yet started:	465	Work Resources:	7
Tasks in progress:	13	Overallocated Work Resources:	0
Tasks completed:	8	Material Resources:	84
Total Tasks:	486	Total Resources:	91

6.7.Results For The Project

After setting baseline and tracking the project, summary for the project was found and it can be seen that project got delayed(delayed by 53 days). At this stage delays could be found out in terms of days cost parameter can be found out in the next stage. But the main parameter is reason for these delays.

7.Reason For Delays In Project

After having an enquiry with the organisation members following reasons were found for the project delay.

- PMC plinth checking.
- Delay in payment to the contractor.
- Improper coordination between different departments.
- Quarrel between fitters and client.
- Incompetent contractor.
- Subcontractors were irregular.
- Slow down work due to rainy season.
- Improper quality work.
- Materials were not delivered on time.
- Improper inventory.

8.Conclusion

It is found that right from the 1st stage there has been delay in the project, hence proper planning is the most important for the project. If at the beginning of the project proper strategic planning had been followed there won't have created delays in the project. Construction delay is a critical function in construction projects. Projects investigated in this study exhibit a delay in Pebble Park project. In practice, this phenomenon is expected to continue unless management actions are taken to control these causes within the planned element of the design and construction works. Thus, good practice in planning, coordination, and the change of the control procedures of the public institutions needs to be recognized and the implications understood.

In summary, this paper summarized some reasons behind the delays caused in this site and proposes some recommendation, which might enable the contractor organization to

develop in house competitiveness for the achievement of one of the major goal in construction of a project, on 'time' completion.

The study is limited regarding to the tracking process in terms of start variance and finish variance, schedule variance and cost variance indicators have not been considered for project, which is a real-estate project. If the study of other two indicators would have done it could give more detail picture regarding delays in terms of cost. A study of infrastructure projects could give quite a different picture as it may give quite a different scenario. Moreover, there is usually reluctance from the part of the project authorities to reveal the data. More number of samples would give a clearer picture.

9.Reference

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