

Simplifying Tracking On MSP Using Custom Field

Anas Kasmani^{1*}, Huzaifa Khan², Haris Junani³, Amaan Qureshi⁴, Avinash More⁵,
Suresh Suryawanshi⁶

^{1,2,3,4,5,6}Department of Civil Engineering, Rizvi College of Engineering, Mumbai, India

Abstract: Every one of us is a manager of projects of our own life. From a house wife to an employee to money expert, from banker to doctor, from engineer to manager from a teacher to a student, we all work on different tasks with deadlines. (without any concern about / having nothing to do with) our occupation, normal behaviors, or location in an organization, we all work on tasks that are mixed and involve people who do not usually work together. The project may have a simple goal that does not require many people or a great deal of money or it may be quite complex, calling for (many different kinds of people or thing) skills and huge amount of useful thing's/valuable supplies. But the bottom line is that every one of us manages projects. Because of this the purpose of dealing with the project should not be only execution but effective and (producing a lot of waste) execution of project is extremely important. Which is needed to be highlighted? Construction Firms in India, Construct the Projects in a Traditional way, this sometimes proves Expensive & tiring & Boring too. Traditional way also proves to be Time Using/ Eating/ Drinking, and Confusing. The presented work will provide them an Opportunity to clearly watch/notice/celebrate/obey the difference between the Microsoft Project (MSP) and the Traditional Planning ways of doing thing. which speeds up Construction and also make the Project Cost Effective with Proper Planning. Construction industry is a sector in which time and money play a very important role. As in this industry each project has its unique characteristics it becomes very important to plan and schedule the various activities of an individual project. The delays caused results in increase of expenses which hampers the budgeted cost. Hence planning and scheduling has to be done and followed for the successful execution of the project in this report a hypothetical project is considered and planning and schedule for its execution is done by using MSP.

Keywords: Planning, Scheduling, Microsoft project, Project management, Traditional ways, Cost effective.

1. Introduction

1) General

Construction sector has a great significance at both national level as well as inter-national stages. In our country it stands second for providing employments. A vast population of the country is dependent on the construction industry for the job and shelter. This industry is fundamental for the development of the economy of any nation. It is definitely one of the most challenging industry owing to its unique and exclusive nature of every project and involving many parties.

A project is overly constrained by some factors such as time, cost, quality and risks involved. In order to organize and prioritize these factors an efficient project management is necessarily needed. The aim of every construction industry is to complete the given task within the specified time and budget and to achieve different project goals.

2) Importance of Project Management

Project gets started at the right way but as it goes ahead/move forwards further, gets off the track. Because of this it's important to manage the activities in the right way, this way project management plays a very important role in arranging the critical activities of the project which is called as job to function in the appropriate way. Project Management aid the project in better (wasting very little while working or producing something) to deliver services.

3) Purpose of Project Planning

- Project planning for construction is an important tool that project managers use to break a large, complex project into smaller steps.
- Project planning requires gaining an understanding of exactly what the final desired project outcome is and defining the steps that will be required to achieve that outcome.
- Project plans for construction projects allow project managers to chart out all of the tasks that are required for a project and gain an understanding of the total resources required to complete each task.
- Additionally, the project plan will include how long each task will take and the sequence that each task must be completed.
- Once a strategic plan has been created, the project management team can create a budget and an estimated timeline for substantial completion. Because it is incredibly important to get both the budget and timeline as accurate as possible the first time, the plan for the construction project must also be accurate.
- Although there is always the possibility that unforeseen delays may happen, anticipating as much as possible about the project and incorporating it into the plan can help project managers produce an accurate picture of the project timeline.

*Corresponding author: anaskasmaniengineer@gmail.com

4) Purpose of Project Scheduling

- A Schedule is the reflection of the plan
- It is the strong desire/formal decision about something of time and sequence of operation in the project and their (group of people/ device made up of smaller parts) to give the overall completion time.
- The process of scheduling uncovers flaws in the plan, leading to easy rewriting/redoing of the plan.

5) Purpose of Project Tracking

- Project tracking is a project management method used to track the progress of tasks in a project.
- By tracking your project, you can compare actual to planned progress, and identify issues that may prevent the project from staying on schedule and within budget.
- Project tracking helps project managers and stakeholders know what work has been done, the resources that have been used to execute those tasks, and helps them create an earned value analysis by measuring project variance and tracking milestones.
- Key to project tracking is the use of project tracking tools and project management techniques.
- For example, status reports allow managers to track project progress by providing an overview of tasks, risks and milestones at any point of the project life cycle. Other types of project reports like progress reports can gather extra details that provide further insight into deliverables and performance.
- This data can then be distributed to the project team and stakeholders to keep them updated.

2. Objectives

The Objective of this Project is to make things simpler and easier to use. As we all know Microsoft Project is an advance tool for all the project managers to plan and schedule project in a proper manner. When we talk about Tracking, Microsoft Project does not have that in build feature. Where we can track the delay of the project. Of course, through Microsoft Project we can calculate the Expected cost to complete a given task or project. But What about the delays, we all have those Formula to calculate it. Calculating manually can create lots of errors and it will be time consuming.

This is where My Actual Project begins Where our objective is to make this process simple itself in MSP. Before This there is one more major problem, that is when we try to track the project it becomes difficult to compare the planned project. As MSP does not have an in-built feature to show or compare planned vs actual. In that scenario usually project manager saves the file two times in which one file is planned and the other file is where tracking of project begins. Now to avoid these types of simultaneous opening of two files our team came-up with the solution where now We can have that planned project as well as the actual project in the Same MSP file. Isn't it sounds WOW? Now to Explain all of these Technique and tricks we have come with an Example of Manufacturing of Tables. Where we will show you how these all works in detail

and after this example you will get a clear idea how it will be useful in other similar projects.

3. Literature Review

2017, Ch. Chowdeswari, D. Satish Chandra, SS. Asadi, "Optimal Planning and Scheduling of High-Rise Buildings", studied the applications of MSP in every single aspect of a project from planning and scheduling phase. Irrespective of nature of work, location or norms in an organization, all the members work on tasks that are varied and involve people who do not usually work together but for the same objective. By this paper they provided how to do planning and scheduling for a building which is a multi-storied (G+8) with Microsoft Project (MSP) software by observing the site conditions, labor productivity, and available resources with proper utilization of time and resources. Labor productivity must be given extreme importance in calculating the activity duration and reliable plan, and knowing the well-founded methods in the computation of various labor productivities and for its improvement. The relationship between the tasks and their interdependencies should be known.

2017, Rashmi J V, Amey A Kelkar, Vishwanath K G, "Planning and Scheduling of a Multi-storeyed Residential Building with Conventional Execution Approach as Compared with Application of Project Management Techniques", made an effort to estimate the overall cost and time required to execute a multistoried residential building by use of conventional construction execution practices and by adopting project management techniques to compare the results for justification. The study focuses on the cost, duration and resource management that have been employed for the execution of the project. The extract of data obtained from the building site is titled as plan A Conventional execution approach. An analysis of planning and scheduling was again carried out for the same multi-storied building by applying project management skills and techniques with help of M.S. Project software. This was carried out to obtain comparison with plan A- Conventional execution approach. The resulting analysis was titled as Plan B- Project Management approach. From the results it is concluded that the use of project management techniques in a proper way reduces the cost and time of construction, without affecting the quality and performance. Use of Microsoft Project software gives a proper scheduled path which helps in setting a track for all the activities, to check if there is deviation from planned cost and schedule.

4. Method and Methodology

A. Tracking Operations in MS Project

1) MS Project Actual vs. Planned % Complete

In MS Project there is no default field available to calculate the Planned % complete or the Baseline % completed. These are the Steps that how we create a customized field to capture planned % complete to compare it against the actual % complete.

2) *Step 01: Calculate the duration in days.*

MS Project stores the duration in minutes, so in order to use the duration in days in our calculations create a customized number field and name it as “Duration in Days”.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Number 1’ and assign title as “Duration in Days”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

3) *Formula:* Val (ProjDurConv (Duration, pjdays))

4) *Syntax:* ProjDurConv (expression, durationunits)

5) *Formula Explanation:* ProjDurConv is an available function in MS Project to convert the duration in two Days(pjdays) or Hours(pjhours) or minutes or in any other available format.

6) *STEP 02: Calculate the Elapsed days.*

Based on the start date of the project and the status date, calculate the days elapsed. This is required to calculate the percentage.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Number 2’ and assign title as “Elapsed Days”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

7) *Formula*

IIf(ProjDateDiff(Start,[Status Date])/480>=Val(ProjDurConv([Baseline Duration],pjDays)),Val(ProjDurConv([Baseline Duration],pjDays)),IIf(DateDiff(“d”,[Baseline Start],[Status Date])<=0,0,ProjDateDiff(Start,[Status Date])/480))

8) *Syntax:* IIf (expr, truepart, falsepart)

Formula Explanation: If the Project date difference between the project start date and status date is >= duration means that duration for the task completion is over and hence return the project duration. If the condition is false, it means that the duration is still not completed and we need to compute the elapsed days. But if the elapsed working days is 0 or negative (which means the planned task is not yet started) we need to set the elapsed days as 0. Hence you see another ‘If’ condition in the false part of the first ‘If’ condition.

9) *STEP 03: Calculate the Planned Percentage complete.*

Planned % complete is calculated based on the ‘Elapsed Days’ (Number 2) and ‘Duration in Days’ (Number 1) fields created in above steps.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Number 3’ and assign title as “Planned Percent”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

10) *Formula:* Number2/Number1

11) *Syntax:* Division (Math)

Formula Explanation: Dividing the Elapsed days by Duration

of the task to get the percentage of completion for the task.

12) *STEP 04: Format the Percentage complete column.*

To display the percentage complete field as text with a % sign, create a new text field column and in the formula format the Number3 field.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Text 1’ and assign title as “Planned % Complete”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

13) *Formula:* Format (Number3, “0%”)

14) *Syntax:* Format (expression [format [first day of week[first week of year) all in ‘[are optional]

15) *Formula Explanation:* Format the Number3 field as text and adds % sign at the end. This is one of the simple ways of arriving at the planned % complete.

16) *Forecasting of Task / Project in MS Project*

In MS Project there is no default field available to calculate the Forecast of task or project. In the upcoming Example I will explain and share the technique how to create a customized field to capture Forecast of task or project. For Now, note the steps use in the Example.

17) *STEP 05: Calculate the Forecast Duration in days of Task or Project.*

MS Project stores the duration in minutes, so we cannot use the baseline duration for the calculation of forecast in order to avoid error we will use the “Duration in Days” in our calculations. Because value stored in custom field is the whole number which is required. create a customized number field and name it as “Forecast Duration”.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Number 4’ and assign title as “Forecast Duration”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

18) *Formula:* [Number1]/[SPI]

19) *Syntax:* Division (Math)

20) *Formula Explanation:* Dividing the “Duration in Days” by SPI to get the percentage of completion for the task.

21) *SPI*

SPI (schedule performance index) shows the ratio of the budgeted cost of work performed to the budgeted cost of work scheduled.

$$SPI = BCWP / BCWS$$

22) *Project Duration*

In MS Project there is no default field available to calculate the Project Duration. In MSP we always came across different duration. When we put data in duration that is the working duration in hours. Thus, what we see in the duration column that is the working hours of work. Which is further converted in days with respect to project calendar. So, to Calculate Project Duration our team as created formula which is displayed below Basically, what we mean by project duration? Simply to answer it, the duration for which the project is started and finish

including holidays is known as Project Duration.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Number 5’ and assign title as “Project Duration”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

23) *Formula:* Date Value([Finish])-Date Value([Start])+1

24) *Syntax:* Subtraction and Addition (Math)

25) *Formula Explanation:* Subtracting the “Finish” Date by “Start” Date and Adding 1 to get Project Duration.

B. Reference Key Points

1) Forecast Finish Date

In MS Project there is no default field available to calculate the Predicted Finish date of Task/Project. So, to Calculate Project/Task Forecast Finish Date our team as created formula which is displayed below.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Date1’ and assign title as “Forecast Finish Date”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

2) *Formula:* Proj Date Add([Start], [Duration1], "standard")

3) *Syntax:* Proj Date Add(date, duration, calendar)

Note: We Need to change calendar according to task calendar for accurate results.

4) *Formula Explanation:* Initial Starting with Start Date then adding Duration1 that is manual input of duration with respect to Task Calendar.

Duration1: we need to create a custom field, Type: Duration where we can manually add duration for our reference finish date.

5) Forecast Total Project Duration

In MS Project there is no default field available to calculate the Project Duration. In MSP we always came across different duration. When we put data in duration that is the working duration in hours. Thus, what we see in the duration column that is the workings hours of work. Which is further converted in days with respect to project calendar. So, to Calculate Project Duration our team as created formula which is displayed below. Basically, what we mean by project duration? Simply to answer it, the duration for which the project is started and finish including holidays is known as Project Duration.

How to do it: In MS Project, right click any column and select insert column. Then select field name as ‘Number 6’ and assign title as “Forecast Project Duration”. Then right click the newly inserted column and select ‘Customize Fields’. On the custom attributes click on the radio button ‘Formula’ and type in the formula as below. In the next section click ‘Use Formula’ and then click OK.

6) *Formula:* DateValue([Date1])-DateValue([Start])+1

7) *Syntax:* Subtraction and Addition (Math)

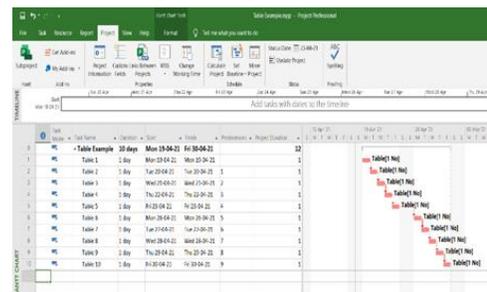
Formula Explanation: Subtracting the “Finish” Date by “Start” Date and Adding 1 to get Project Duration.

5. Result

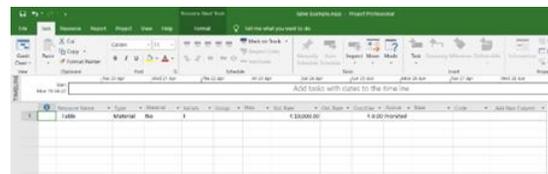
A. Manufacturing of Tables

Create a Project for manufacturing ten Tables and it takes one table per day. The cost of making is Rs. 10,000/- per table. At the end of 5th day only three tables were completed and the cost incurred for making the three tables were Rs. 20,000/- per table. Find the Forecast delay, expected cost to complete the project and Variance in cost. Track the project on 5th day and compare the actual vs planned completion.

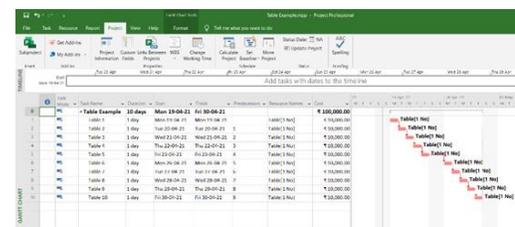
Solution: Creating Task with Duration and assigning Predecessors. Starting the project from Monday [19-04-21] after assigning predecessors MSP automatically calculated finish date. If you notice Start date is 19-04-21 and Finish date is 30-04-21 that is project duration which is 12 days.



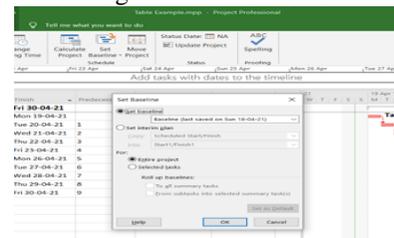
Now Creating a Resource that is Table as material for Rs. 10,000/- per table in resource sheet and Assigning Resources in the Activities.



Here we can see MSP have automatically calculated cost by cost column.

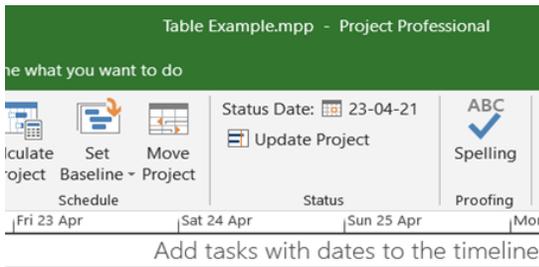


Now After Assigning everything, we need to set a baseline for applying other settings in different columns.

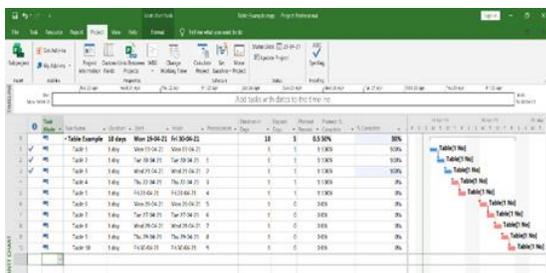


NOTE: We need to set baseline for Entire Project. It maybe changes according to your reference for my example I am setting it to entire project and to Baseline. After Creating Baseline, we need to set Status Date. That Status Date is reference from which planned % and other columns like EAC (Estimation at complete), SPI, Forecast Delay, ETC can be calculated.

According to My Question I need to set a status date at 5th day that is 23-04-2021.



After Status Date, we can go further by creating new number columns and assigning those formulas



This Way we can Compare Planned % complete and Actual Percent complete. In this File if we change the status date planned value will change according to that. Actual percent complete is the data what we have assigned after the completion of work. Before Going towards Forecast delay let us discuss the Earned Value Table and understand the further Statistic.

B. Earned Value Table (Before Applying Actual Cost)

In this Table as we can see Following terms let me explain one by one.

Task Name	Planned Value (PV)	Earned Value (EV)	Budget at Completion (BAC)
Table Example	10,000.00	0.00	10,000.00
Table 1	10,000.00	0.00	10,000.00
Table 2	10,000.00	0.00	10,000.00
Table 3	10,000.00	0.00	10,000.00
Table 4	10,000.00	0.00	10,000.00
Table 5	10,000.00	0.00	10,000.00
Table 6	10,000.00	0.00	10,000.00
Table 7	10,000.00	0.00	10,000.00
Table 8	10,000.00	0.00	10,000.00
Table 9	10,000.00	0.00	10,000.00
Table 10	10,000.00	0.00	10,000.00

- **Planned Value:** Planned Value is the approved value of the work to be completed in a given time. It is the value that you should have been earned as per the schedule.
- **Earned Value:** Earned value (EV) is a way to measure

and monitor the level of work completed on a project against the plan.

- **Actual Cost:** Actual Cost is the total cost incurred for the actual work completed to date. Simply put, it is the amount of money you have spent to date.
- **SV:** Schedule Variance (SV) indicates how much ahead or behind schedule the project is. It's used by the Program Manager (PM) and program personnel to determine how best to utilize their remaining resources.
- **EAC:** In project management, Estimate at Completion (EAC) forecasts the project budget while the project is in progress.
- **CV:** Cost variance (CV), also known as budget variance, is the difference between the actual cost and the budgeted cost, or what you expected to spend versus what you actually spent. This formula helps project managers figure out if they are over or under budget. A positive CV shows that the project is under budget, and a negative CV shows that the project is over budget. If the calculated cost variance is zero (or very close to zero), you are on budget.
- **BAC:** Budget at completion (BAC) is the original total budget estimate created at the beginning of a project.
- **VAC:** Variance at Completion (VAC) is a projection of the budget surplus or deficit. It is expressed as the difference of the Budget at Completion (BAC) to the Estimate at Completion (EAC).

Now before applying the actual cost EAC is equal to BAC which is what a successful project should be! But according to my question reality is different.

C. Earned Value Table (After Applying Actual Cost)

Applying Actual cost of table Where it took Rs. 20,000/- per table. Now see the changes in the Earned Value Table.

Task Name	Planned Value (PV)	Earned Value (EV)	Actual Cost (AC)
Table Example	10,000.00	0.00	30,000.00
Table 1	10,000.00	0.00	30,000.00
Table 2	10,000.00	0.00	30,000.00
Table 3	10,000.00	0.00	30,000.00
Table 4	10,000.00	0.00	30,000.00
Table 5	10,000.00	0.00	30,000.00
Table 6	10,000.00	0.00	30,000.00
Table 7	10,000.00	0.00	30,000.00
Table 8	10,000.00	0.00	30,000.00
Table 9	10,000.00	0.00	30,000.00
Table 10	10,000.00	0.00	30,000.00

Here we can see the changes where MSP automatically calculated EAC after getting the input of actual cost

D. Forecast Duration

According to question the given data said we have to create 1 table per day then the result on the 10th day will be 10 tables on 10th day. Now comes the reality when we checked on the 5th day according to the status date. Where We have created only 3 tables in five days. Now the question arises how many days it will take if we continue the same speed.

This is where are Forecast Duration come across where we can calculate using the above formulas in seconds. We can also proceed further with the manual calculations but when there are multiple tasks then it would be difficult to calculate and chances

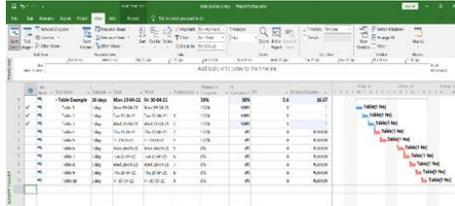
of error will be more.

Planned	Actual
1 day = 1 table	5 day = 3 tables
10 day = 10 tables	X days = 10 tables

E. Forecast Manual Calculation

$$X \text{ days} = \frac{5 \times 10}{3} = 16.667 \approx 17 \text{ days}$$

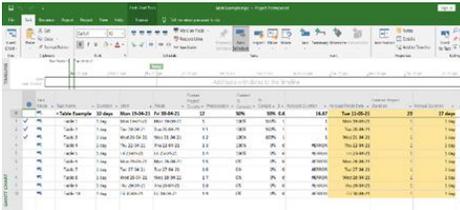
Forecast MSP Calculation (Formula input in custom field)



Note: The Error what is visible in the column that is actually the task which are not performed yet.

F. Reference Key Points

1) Forecast Finish Date



This is just for reference that how we can calculate expected finish date using MSP in seconds to make our work easy and convenient.

6. Conclusion

This Journal Paper give an idea how Microsoft Project can be more simplified using custom fields. This Journal Paper is an overview of Tracking on MSP. We can create more such formula where we can have our own results. This Results can be optimized and analyzed for further tracking. In the above results we forecasted our project delay which is a custom field achievement for the project this way we can analyze other projects too. Experience is very important in project management, but it is only part of the resource requirements.

Large-scale scientific research projects often have lots of senate grinds unit; time is special tight. Microsoft project software, is very helpful for the successful completion of project. This software has much advantage, like it can be useful for scheduling, costing, allocation of resources, tracking of project and updating. Microsoft Project is the modern tool of Project Management that aid to overcome the obstacles faced owing to traditional way of Planning and Management by the use of this MSP software, we can complete project successfully and at required time and budget.

7. Future Scope

Talking about the Scope of project, this was very few formulae which we try to create in this journal paper for creating impact in simplifying Tracking Process in MSP. MS Project has given us the power of creativity where we can showcase our talent of creating more such unique formulae after this paper more formula will be design for other sorts of problem like formats in dates, challenges faced during over allocation, etc. We need to automate these formulas which will be a kind of unique feature provide through custom fields this make things more clear and simpler for the rest of the users. In the upcoming future MS Project itself will fix those errors and problems which our facing right now. Before those future updates for now custom field is solution for every problem.

References

- [1] Jerry Reed, Yolanda Reed, Microsoft Project B.A.S.I.C.S.: Your A-Z Guide for Building Agile and Task- Based Schedules, 2019.
- [2] Ismat Kocaman, Mastering Custom Field Formulas in Microsoft® Office Project by Ch. Chowdeswari, D. Satish Chandra, SS. Asadi, "Optimal Planning and Scheduling of High Rise Buildings". 2017
- [3] Rashmi J. V, Amey A Kelkar, Vishwanath K G, "Planning and Scheduling of a Multi-storeyed Residential Building with Conventional Execution Approach as Compared with Application of Project Management Techniques", 2017
- [4] Shubham Laddha, Prerna Chanda and Sneha Khedekar, "Planning and Scheduling of a Project Using Microsoft Project (MSP)", 2017.
- [5] Sneha M. Raut, Sumit B. Bhosale, Chetan D. Patil, Aniket R. Pawar, Ganesh D. Dhone, "Planning and Scheduling of Project Using Microsoft Project (Case Study of a Multistory Building in India)". 2016.
- [6] Rathod Rajshekhar Gopal 'Planning, scheduling and delay analysis-case study' vol. 3, no. 6, June 2016.
- [7] Abhishek Sharma, K.K. Pathak, "Manpower Planning, Scheduling and Tracking of a Construction Project Using Microsoft Project Software", 2015.