

CRITICAL PATH METHOD

Introduction

If you have been into project management, I'm sure you have already heard the term 'critical path method.'

If you are new to the subject, it is best to start with understanding the 'critical path' and then move on to the 'critical path method.'

Critical path is the sequential activities from start to the end of a project. Although many projects have only one critical path, some projects may have more than one critical paths depending on the flow logic used in the project.

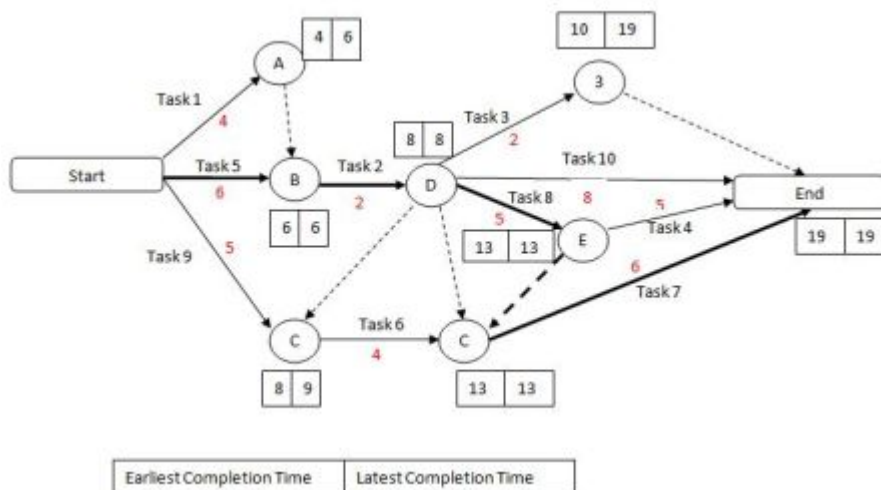
If there is a delay in any of the activities under the critical path, there will be a delay of the project deliverables.

Most of the times, if such delay is occurred, project acceleration or re-sequencing is done in order to achieve the deadlines.

Critical path method is based on mathematical calculations and it is used for scheduling project activities. This method was first introduced in 1950s as a joint venture between Remington Rand Corporation and DuPont Corporation.

The initial critical path method was used for managing plant maintenance projects. Although the original method was developed for construction work, this method can be used for any project where there are interdependent activities.

In the critical path method, the critical activities of a program or a project are identified. These are the activities that have a direct impact on the completion date of the project.



Key Steps in Critical Path Method

Let's have a look at how critical path method is used in practice. The process of using critical path method in project planning phase has six steps.

Step 1: Activity specification

You can use the Work Breakdown Structure *WBS* to identify the activities involved in the project. This is the main input for the critical path method.

In activity specification, only the higher-level activities are selected for critical path method.

When detailed activities are used, the critical path method may become too complex to manage and maintain.

Step 2: Activity sequence establishment

In this step, the correct activity sequence is established. For that, you need to ask three questions for each task of your list.

- Which tasks should take place before this task happens.
- Which tasks should be completed at the same time as this task.
- Which tasks should happen immediately after this task.

Step 3: Network diagram

Once the activity sequence is correctly identified, the network diagram can be drawn *refertothesampledigramabove*.

Although the early diagrams were drawn on paper, there are a number of computer softwares, such as Primavera, for this purpose nowadays.

Step 4: Estimates for each activity

This could be a direct input from the WBS based estimation sheet. Most of the companies use 3-point estimation method or COCOMO based *functionpointsbased* estimation methods for tasks estimation.

You can use such estimation information for this step of the process.

Step 5: Identification of the critical path

For this, you need to determine four parameters of each activity of the network.

- Earliest start time ES - The earliest time an activity can start once the previous dependent activities are over.
- Earliest finish time EF - $ES + \text{activity duration}$.
- Latest finish time LF - The latest time an activity can finish without delaying the project.
- Latest start time LS - $LF - \text{activity duration}$.

The float time for an activity is the time between the earliest ES and the latest LS start time or between the earliest EF and latest LF finish times.

During the float time, an activity can be delayed without delaying the project finish date.

The critical path is the longest path of the network diagram. The activities in the critical path have an effect on the deadline of the project. If an activity of this path is delayed, the project will be delayed.

In case if the project management needs to accelerate the project, the times for critical path activities should be reduced.

Step 6: Critical path diagram to show project progresses

Critical path diagram is a live artefact. Therefore, this diagram should be updated with actual values once the task is completed.

This gives more realistic figure for the deadline and the project management can know whether they are on track regarding the deliverables.

Advantages of Critical Path Method

Following are advantages of critical path methods:

- Offers a visual representation of the project activities.

- Presents the time to complete the tasks and the overall project.
- Tracking of critical activities.

Conclusion

Critical path identification is required for any project-planning phase. This gives the project management the correct completion date of the overall project and the flexibility to float activities.

A critical path diagram should be constantly updated with actual information when the project progresses in order to refine the activity length/project duration predictions.

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