

White Paper

Tracking Extension of Time with Microsoft Project or Primavera P6

Introduction

Extensions of time is a contentious issue in the management of any project and in particular where completion later than the contracted date is subject to liquidated damages.

This paper covers Supertech’s methodology for setting up a project schedule structure to give visibility to, model and track the effects of extension of time events using Microsoft Project or Primavera P6 planning software.

Preconditions and Terminology

This paper assumes the reader has a professional level of understanding in Critical Path Methodology (CPM) and is a practitioner in Microsoft Project or Primavera Panning Software.

The principles and practice described are illustrated using Microsoft Project but also apply to Primavera P6.

It is important that the terminology and rules when calculating and making an application for extensions of time are clearly understood as these can vary depending on the contract conditions.

For this paper we define an **Extension of Time (EOT)** as that additional period of time required to complete a scheduled task due to out of contract additional scope work, or delay resulting from site conditions preventing the task to be finished within the specified contract period. Extensions of time could be on the critical path or run concurrently with no-effect on the critical path.

Project Schedule Setup

- **The Contract Section** – This section, as illustrated in Figure 1, is structured to give visibility to the agreed **Contract Start**, **Contract Period** and **Contract Completion Without Extension of Time**. Provision is made under the **Extension of Time** sub-section to list the concatenated extensions of time tasks and their effect on the critical path to calculate the **Contract Completion With Extension of Time**.

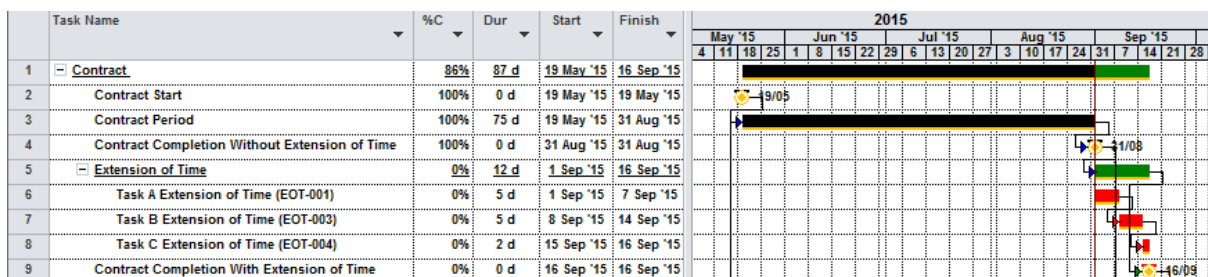


Figure 1 illustrating the Contract Section for setup, modeling and tracking Extension of Time

- **Key Milestones Section** - This section, as illustrated in Figure 2, is structured to give visibility to the **Contractor’s key progress events** and in the illustrated example includes the **Contract Start**, the **Forecast Completion**, the Contractor’s **Delay Allowance** and the Contractor’s **Forecast Contract Completion**.
- **Forecast Completion** date is based on the CPM determined completion based on the construction task driven schedule, were the task durations represent the expected durations based on the budgeted volume of work and the required resources for completing the work for the stated task contract period. The duration of the task is **Net** and exclusive of any possible delays due to inclement weather for example.

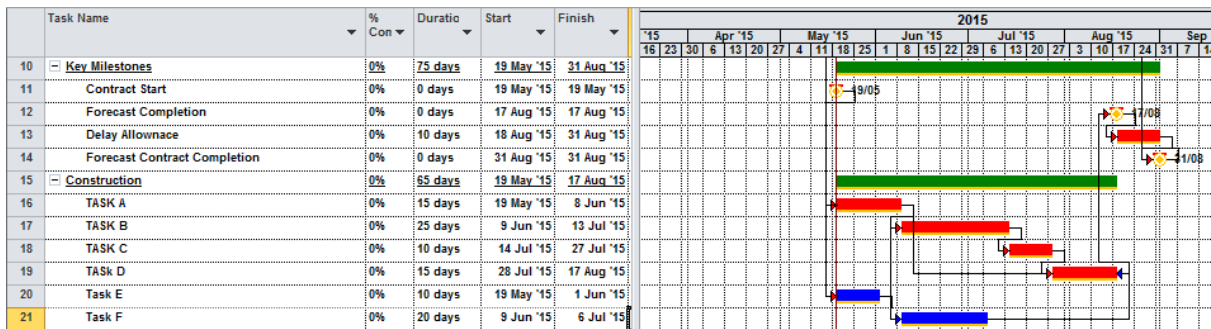


Figure 2 illustrating the Contractor's Key Milestone and Construction Section

- **Delay Allowance** – This represents the Contractor's allowance to cover supplier and subcontractor delay risk, expected construction inefficiencies and the delay effects due to inclement weather.
- **Contractor' Float** – This represents the Float between the Contractors Forecast Completion With Delay Allowances and the Contract Completion with Extensions of Time if applicable. For simplicity, the paper assumes the Contractor's Float is included in the Delay Allowance.
- **Contract Mandated Delay Allowances** - Depending on the contract type and conditions specific delay allowances may be mandated and required to be incorporated into the schedule, a set inclement weather period for example. Where specific delay allowances occur these shall have to be exhausted before subject to additional extension of time claims. For simplicity, the paper's example excludes contract mandated delay allowance.
- **Construction Section** – Illustrates the CPM relationship between tasks before commencement of the project and subsequent schedule update.
- **The Liquidated Damages Section** – This section, as illustrated in Figure 3, is structured to model the difference between the **Contract Completion with Extension of Time** and the Contractor's **Forecast Contract Completion** date. The difference being the period **Not** covered by Extensions of Time that may be subject the contract application of liquidated damages at a set daily rate. This period will remain zero until all of the Contractor's **Delay Allowance** is exhausted. Causation might be due to a number of factors such as additional Supplier, Subcontractor delays and inefficiencies.

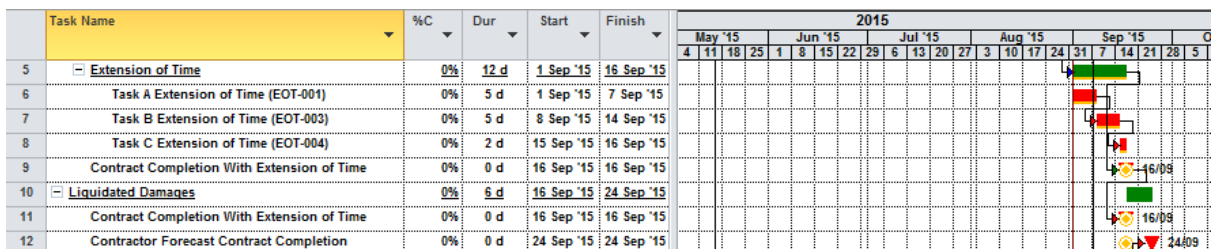


Figure 3 illustrates the Liquidated Damages Period or The Contractor's Forecast Contract Completion beyond Contract Completion With Extension of Time.

- The following section of this paper illustrates the schedule updating process and how to give visibility to and track extensions of time.

The Role of the Baseline

- The calculation of Extension of Time as described in this paper does **NOT** rely on and is **Independent of the Baseline Control**.
- Baseline control should still be exercised from the commencement of the contract, and at subsequent report periods to track gains and slippages between report periods. The Baseline Maintenance process is **Not** addressed in this paper.

The Schedule Updating with the Extension of Time Process

Update 1 (The Basics):

- **Step 1:** Before the first schedule update, set the Baseline for all of the Project tasks including the Contract Summary schedule and the Contractor's schedule.
- **Step 2:** Update the schedule for the report period using the software recommended process.
- **Step 3:** Add Tasks that represent and qualify, under the contract, as a legitimate Extension of Time. These tasks are illustrated in Figure 4 and should be inserted in parallel with the effected task and represent the delay effect and period.

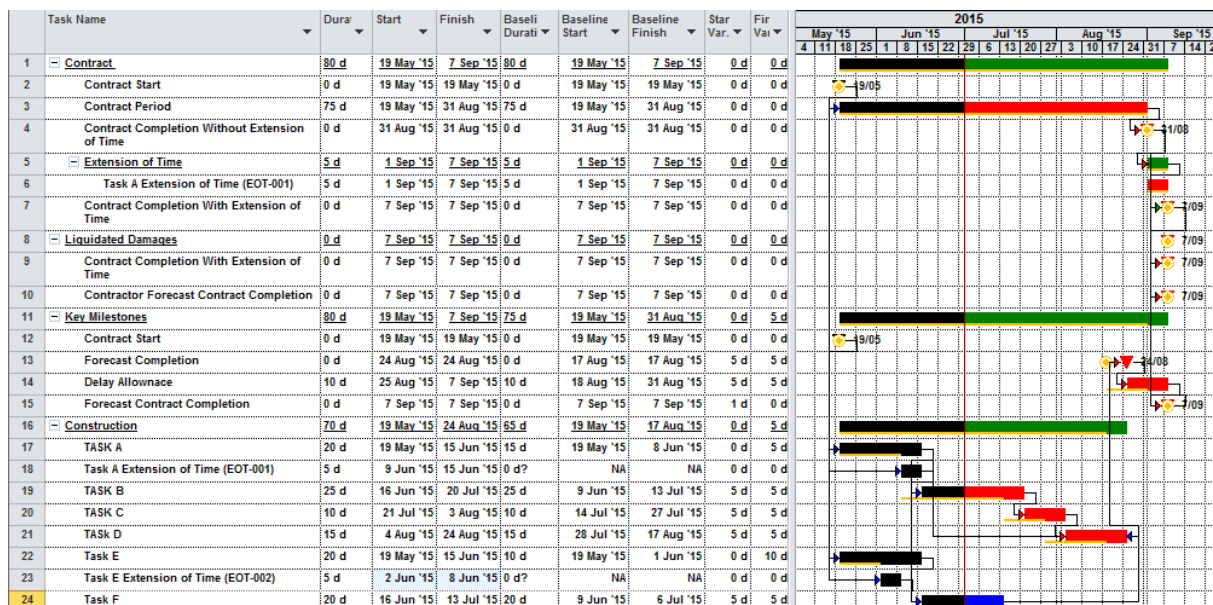


Figure 4 illustrates the updated schedule with the addition of parallel tasks representing the extension of time.

- In the Figure 4 example there are two extensions of time tasks:
 - EOT-001 for Task A with an EOT of 5 days representing a task duration increase from 15 to 20 days. This task at the time of the Status/Data date was on the critical path.
 - EOT-002 for Task E with an EOT of 5 days. The task duration increased from 10 Days to 20 Days with only 5 days claimable as a legitimate delay, and the remaining 5 days attributed to the Contractor's own delay. This task is not on the critical path.
- **Step 4:** Assess those tasks that affect the critical path then copy and inset these tasks to the **Contract Extension of Time** Subsection and establish their dependencies between the **Contract Completion Without Extension of Time** and the **Contract Completion With Extension of Time**.

- **Step 5:** Reset the Baseline for the **Contract** Section of the schedule then Copy and Paste the revised **Contract Completion With Extension of Time** date to the Baseline **Liquidated Damages** section for the **Contract Completion With Extension of Time** and **Contractors Forecast Completion** and to the Contractor's **Key Milestones** section **Forecast Contract Completion** Milestones.

Update 2:

- **Step 1:** Update the schedule for the next report period.

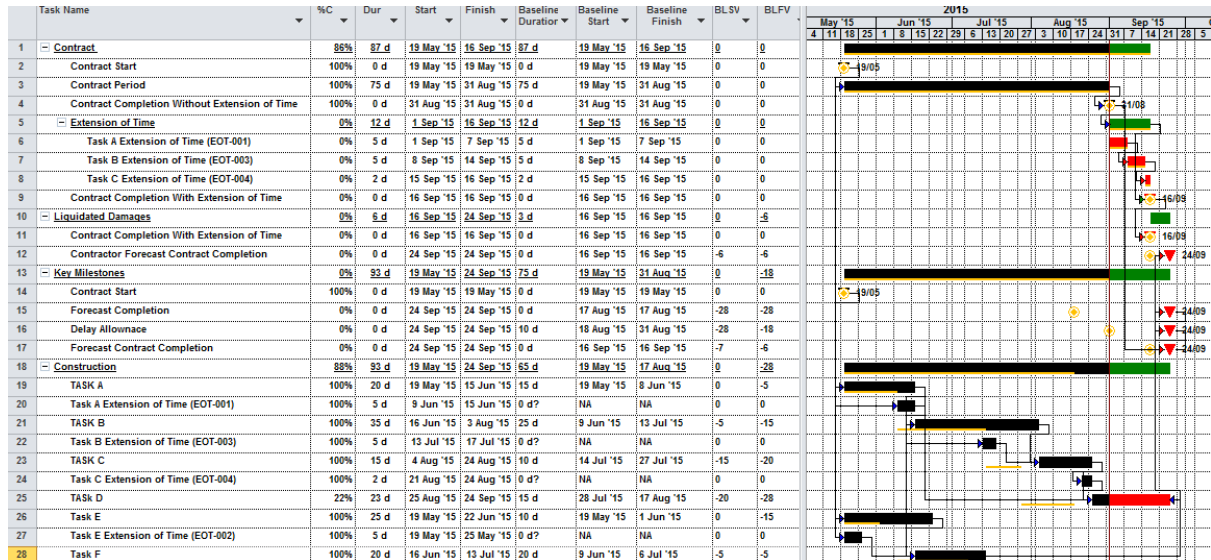


Figure 5 illustrates the updated schedule with the addition of parallel tasks representing the extension of time.

- **Step 2:** As for Update 1, give visibility to the EOTs within the body of the schedule and assess their contribution to the critical path, then add those critical under the **Contract, Extension of Time subsection** with Finish to Start dependency with any preceding EOT task.
- In the example illustrated in Figure 4 example, there are now two additional extension of time tasks:
 - EOT-003 for Task B with an EOT of 5 days. The task duration at the Status/Data date increased from 25 to 35 days, was on the critical path, but with only 5 days claimable as a legitimate extension, the other 5 days attributed to Contractor controlled inefficiencies.
 - EOT-004 for Task C with an EOT of 2 days. The task duration at Status/Data increased from 10 to 15 days, was on the critical path, but with only 2 days claimable as a legitimate extension, the other 3 days attributed to Contractor controlled inefficiencies.
- **Step 3:** Having assessed those tasks that affect the critical path copy these to the **Contract Extension of Time** and repeat the process as described in Update 1.
- **Step 4:** Where the critical extension of time EOT do not cover the Contractor's total delay progressively reduce the Contractor's Delay allowance until this is Zero. At this point as illustrated in Figure 5, the Liquidated Damages Summary task automatically increases in duration to identify the delay period **NOT** covered by EOT. This represents the Contractor's exposure to possible financial penalty for not completing the Project within the revised EOT contract period.

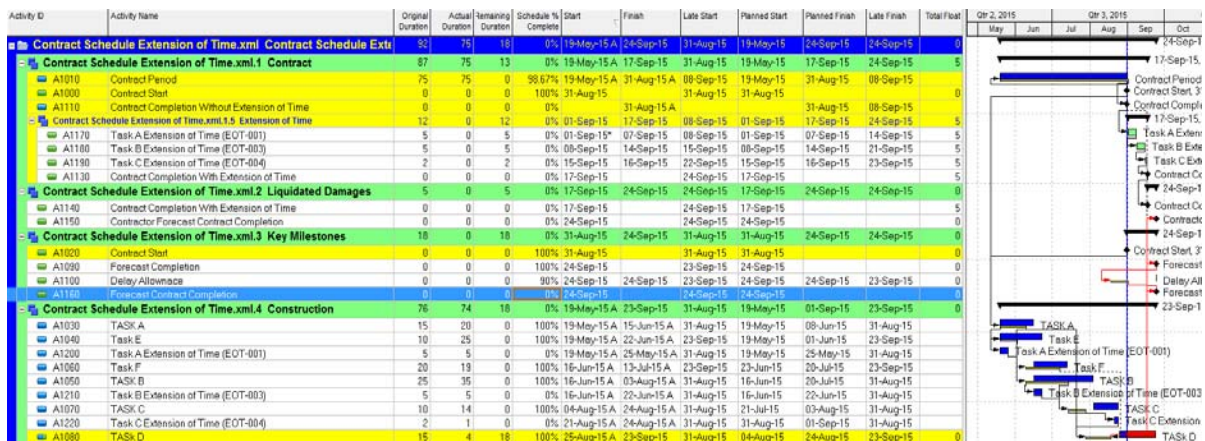


Figure 6 illustrates the described process using Primavera P6 Planning Software.

Concurrent Extension of Time

There are situations where there are concurrent multiple occurrences of tasks subject to ETO's. In this case follow the same described process then assess the contribution that each ETO makes to the critical path. Add these to these to the **Contract, Extension of Time Subsection** with their logic set to mirror their critical path contribution. This situation arises where there are separable parts or work chains tied to one contract completion date. The critical path can move between chains depending on progress and delays progressively contributing to the contract delay.

Alternative Method for Tracking Performance Against a Live Baseline

Microsoft Project has the **Compare Projects** feature that allows comparison between schedules. This is equivalent to Primavera P6 holding of live Baseline Schedule to model the effects of extension of time. The described alternate method is useful where there is a requirement for detailed tracking and forensic evaluation of the consequential contract delay of events. The process is not addressed in this paper.

Conclusion

The tracking and management of Extension of Time (EOT) can be tedious but necessary to ensure contract Extension of Time are realistically modeled and their impact assessed in real time particularly where the contract is subject to Liquidated Damages. The process should be effected at each report period so as to **NOT** to loose the impact and history of the delay events.

Supertech Project Management's experience, working with both Contractors and Client Superintendent Organizations, show that that the described process works successfully and yields satisfactory results in obtaining equitable outcomes and avoiding costs arising from litigation and disputes.

More Information

For further information about this White Paper, and other case studies and our **EVEngine Project Control System**, visit our www.evengine.net website.