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## Loosening Dates: QPM™ and Microsoft® Project

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### Introduction

Stripe 15 of New Leaf’s Quantitative Project Manager (QPM™) Series explores a project plan with "tight" dates, then loosens them to make room for additional, real-world details. Stripe 15 provides two New Leaf spreadsheet tools (with directions) to accomplish this aim: *Full QPM™ Tight Date* and *Full QPM™ Loose Date*.

By using Microsoft® Project<sup>1</sup> (MS Project) in conjunction with the New Leaf tools, dates can be loosened more precisely. MS Project also makes it easier to construct a network logic diagram and determine the project's critical path. When a project's size exceeds 20-40 tasks, MS Project can help organize the project's proliferating details.

The two New Leaf spreadsheets offer other advantages. They provide a convenient way to create less biased, three-point range estimates of a task's effort. Also, the spreadsheets can help the project manager create the initial *shortest reliable targets* for cost and schedule (as well as revise the targets later, during the project).

How can the project manager get the best out of both MS Project and New Leaf’s tools?

[NOTE: This paper assumes that the reader is a certified QPM™ and is familiar with MS Project and how it works. The discussion is sufficiently generic that a knowledgeable reader should be able to substitute another computer scheduling tool in place of MS Project and achieve the same effects.

In this paper, a task's *cost* will usually be *measured in staff-hours or staff-days of effort*, and may be called *cost*, *labor*, or *effort*. The terms *task* and *activity* will be used interchangeably.]

### Entering the initial project activities

For a small project (under 20-40 tasks), the initial listing of the project tasks can be conveniently done in *Full QPM™ Tight Date*. The names of each task are easy to remember and can be quickly entered.

<sup>1</sup> Microsoft® Project is a registered trademark of the Microsoft Corporation.

For a larger project (over 20-40 tasks), the initial listing of the project tasks is better begun by using MS Project. MS Project allows the user to create a hierarchy of the Work Breakdown Structure's (WBS) deliverables, with the tasks at the bottom level of the hierarchy. The outline structure of the WBS helps the planner remember all the individual tasks. Because the tasks are ordered by deliverable, they will later need to be reordered by task finish date in order to create a baseline chart in *Full QPM™ Tight Date*.

### **Estimating the project work**

For both small and large projects, *Full QPM™ Tight Date* is the most convenient tool for estimating the labor required for each individual activity. MS Project allows the user to display a table of "tasks only." This list of task names can be conveniently cut and pasted (values only) into *Full QPM™ Tight Date*. At this point, every task is marked "C" for critical path.

Using the spreadsheet's range-based estimates to reduce estimating bias, the planner can compute the *mean value* of the task's effort and cut and paste it (values only) back into MS Project.

### **Assigning resources**

For small projects, the "Staffing Availability" column (with the 1.0 default) in *Full QPM™ Tight Date* will suffice. For large projects, MS Project allows the user to enter particular staff members by name, and their availability by percentage (100% being full time).

When a resource staff person is assigned to a task that already possesses an effort value in the "work" column, MS Project computes a "tight" duration and a "tight" date to the task. The formula is:  $\text{Effort} / \text{Staffing} = \text{Duration (or due date)}$ . The only way to uncouple effort and duration is to leave the resource assignment blank.

### **Constructing the network logic diagram**

In a small project, the network logic (or precedence) diagram must be created on a separate piece of paper that accompanies printouts of either of the QPM™ spreadsheets. The precedence diagram reveals the task paths, the path merge points, the critical path, and the finishes for each task.

Sort the spreadsheet tasks by the finish dates from the paper network logic (precedence) diagram. In the case of ties, the critical task should come first. Remove the "C" label from all off-critical tasks.

After the project start date and the current date are entered in the spreadsheet, the tasks will display their planned finish dates. (**Only the critical path tasks** have accurate finishes in *Full QPM™ Tight Date*. Accurate finishes for all tasks are noted on the paper copy of the network logic diagram.)

In a large project using MS Project, after all tasks and milestones have been linked to their immediate predecessor(s), the network will extend from the "Start" to the "Finish"

milestones. When the network has been completely linked, MS Project can automatically calculate the critical path (preliminary) and display it on the Gantt chart.

### Inserting merge buffers

In a small project using *Full QPM™ Tight Date*, the planner can inspect the network logic diagram and insert a row for only those merge buffers on the critical path (as suggested in the spreadsheet's directions). These buffers will correct the planned critical path and the planned project completion date. (Later, as the project unfolds, these planning buffers will be removed as they are encountered.)

In a large project using MS Project, the planner can inspect the network and create each merge buffer by adding a task with three specific attributes: no assigned resource, an effort of zero (0), and a duration of the merge buffer (see the one-day merge buffer illustrated in Figure 1). Again, as the project unfolds, these planning buffers will be removed as they are encountered.

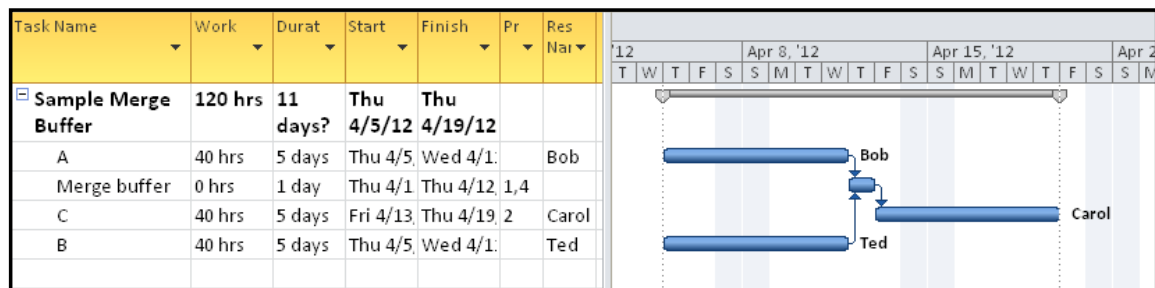


Figure 1. Microsoft® Project table and Gantt chart with merge buffer

### "Looser" dates

Stripe 15 of QPM™ discusses how the "availability" of a resource may not capture all the details of the real world of project work. In particular, company holidays, personal vacations, and other individual staffing complications make it likely that the tightly constructed initial dates must be loosened.

In both of the QPM™ spreadsheet tools and in MS Project, one way to loosen a date a little is to *reduce the availability* of the resource assigned to the task. In the QPM™ spreadsheet tools, this means adjusting "Staffing Availability" to less than one Full Time Equivalent (1.0 FTE), say 0.5, or some other lesser fraction. In MS Project, it means adjusting the resource to less than 100% availability.

MS Project has a second, and very precise, way to loosen the dates: the calendar. MS Project has a basic calendar for the whole project that can be customized to include all of a given company's holidays and time off. Even better, MS Project has the ability to create additional individual calendars for each staff member's particular vacations and work interruptions. The result of adjusting the plan with these tools is a looser, but not completely "loosened," set of project dates.

### **Completely loosened dates**

Many small, informal projects have due dates that are almost completely unrelated to the actual work hours. So do some highly professional projects. For example, an engineering firm knows that the drawings for a building will take from 10-15 billable hours to complete, but also knows that the drafting department cannot deliver the work in less than two weeks. The few hours of effort are only loosely connected to the two weeks of duration, yet both must be included in the plan.

For the small project with loose dates, *Full QPM™ Loose Date* will be a convenient way to plan the the project. In this spreadsheet, the tasks' completion dates are independent of the effort calculations. The durations are no longer calculated from the labor effort; they are calculated from the declared dates. However, each duration is checked to be sure that it provides sufficient time to complete the estimated labor. The careful planner may generate a first set of independent dates by cutting and pasting (values only) the dates from *Full QPM™ Tight Date*. These dates are internally consistent and can then be further loosened by by the planner.

For the large project, MS Project maintains the resource-driven coupling between labor and duration. To loosen (extend) the whole project's schedule, one helpful trick is to reduce the available working days project calendar. For example, to extend the whole project by 20%, remove Fridays from the work calendar. An alternative method is to add schedule buffers at the major project milestones by inserting a task that has: zero (0) effort, no staffing, and the desired number of duration days of schedule buffer.

The resulting MS Project dates are goals to which can be added the approximate 8% project buffers for cost and schedule. Alternatively, the dates can be cut and pasted into *Full QPM™ Loose Date*, where they may be further adjusted and where the exact calculation of the shortest reliable targets of cost and schedule can be made.

### **Tracking the project**

The small project can be easily updated in the *Full QPM™ Loose Date*. After recording each task's actual effort and completion date in the project plan, the revised project goals and 98% reliable targets help the project manager make mid-term adjustments and manage stakeholder expectations. *Full QPM™ Tight Date* and *Full QPM™ Loose Date* both display the Project Progress Percent Performance (P<sup>4</sup>) Charts and the Project Baseline Chart to help the manager guide the project.

For the large plan in MS Project, the Tracking Gantt comparison of the baseline plan to the actual results can help the project manager make mid-term adjustments in cost and schedule. In addition, cutting and pasting (values only) the current actual values for cost and date into *Full QPM™ Loose Date* can show the manager the current smallest reliable targets for cost and schedule.

### **Conclusion**

The careful project manager of a small project can successfully plan and manage the project work using the two New Leaf spreadsheet tools, *Full QPM™ Tight Date* and

*Full QPM™ Loose Date.* In addition to the spreadsheets, the manager will need to construct a network logic diagram by hand.

Projects whose tasks' efforts are almost independent of (only loosely connected to) their due dates should be tracked using *Full QPM™ Loose Date*.

For larger projects, a computer scheduling tool such as Microsoft® Project can justify the overhead of learning to use it. The MS Project results should be *integrated* with the spreadsheet tools for: better unbiased task estimates, exact 98% reliable targets for cost and schedule, P<sup>4</sup> Charts, and the Project Baseline Chart.

Integrated tool use supports optimal project management.

#### **About the Author**

**John M. (Jack) Nevison**, PMP, is the author of six books and numerous articles on computing and management. During the course of his business career, Nevison has built and sold two businesses, managed projects, managed project managers, and served as both an internal and external consultant to Fortune 100 companies. He is a past president of the Mass Bay Chapter of the Project Management Institute (PMI®), a past president of the Greater Boston Chapter of the Association for Computing Machinery (ACM), a certified Project Management Professional (PMP®), and a Phi Beta Kappa graduate of Dartmouth College.

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