Only Full-Time Work

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A common plea from management experts and critical-chain schedulers is to end "bad multitasking". Often these pleas are ignored, and few articles have been written addressing the question, except by critical-chain proponents. Critical-path schedulers can benefit from seriously considering these criticisms and examining their schedules for errors due to multitasking. Schedulers need to consider the effect of multitasking on

- Work quality and employee productivity
- Duration-based tasks
- Predecessor and successor relationships

Work Quality and Employee Productivity

The cost of switching people's attention from one piece of work to another can reduce productivity and increase errors. Some critical-chain authors feel that multitasking causes work estimates to increase by 200% to 300% (Patrick) and total project duration to increase by 15% to 25% (Zultner). These claims are presented in the context of using a whole critical-chain methodology, including buffers, shorter estimates, and other specialized techniques.

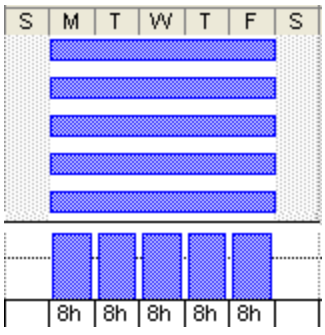
Mainstream business writers have also called for an end to excessive multitasking (Shellenbarger and Sandberg). Mistakes, confusion, miscommunication, and wasted time are symptoms of trying to do too many things at one time. One study even tied it to memory loss (Sternstein).

Project managers need to be aware of how often a schedule requires each resource to switch from one task to another. An experienced professional may be able to manage a complex set of simultaneous assignments with little loss of productivity, while an inexperienced person may easily become overwhelmed. Based on the literature, it is clear that there must be some cost related to task switching, although quantifying its impact is likely impossible. The impact certainly varies depending on the project and the people involved.

Duration-Based Tasks

Develop a schedule using classic critical-path techniques, and each task has both an estimate for duration and work. If there are sufficient resources available to do the work, the duration estimate may limit the total length of the task. For instance, it is possible for a task to require one person to spend only eight hours of work, but the task will take at least five work-days. Some construction tasks require drying or preparation time, for instance. IT tasks may require external approvals or sign-offs that require specific lead times. Often this work appears on a schedule as a single, five-day task with eight-hours work.

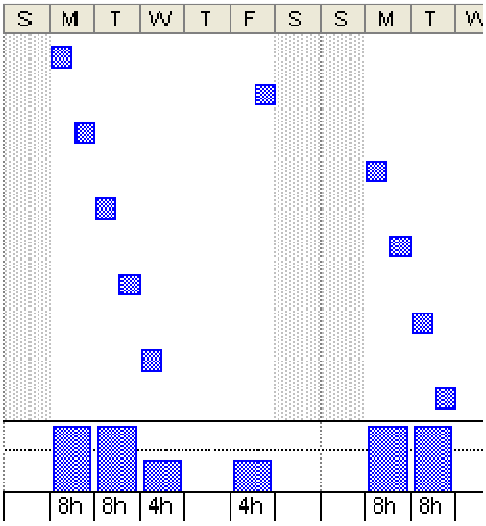
Critical-path schedulers can fall into a trap when two or more such tasks are scheduled simultaneously for the same resource. According to a resource-loading graph, a full-time resource could perform up to five of these tasks at the same time. All five would start on Monday and end on Friday. The total work-hours are 40, a typical work load for one week.



Five part-time tasks appear to be one week's work, but will likely take longer

A typical outcome would be that the resource would complete four of the five tasks late. Even if the resource tries to get all five tasks started as quickly as possible, he or she must start with one task before proceeding to the second, then third, then fourth, then fifth. If all of them truly require five days from their start, then only the first will end on time. In real situations a resource might be able to make up the time by compromising quality, working overtime, or pressuring others to help. These measures do not improve the quality of the schedule; they just hide the symptoms of the problem and they take control and awareness from the project manager.

A more accurate representation of the tasks might be that there is four hours of full-time work required at the start, four days of wait-time, then four hours of full-time work to complete the task. Representing the tasks as ten tasks with logic showing the four-day delay allows a better representation of the actual work. The resource will start two tasks on Monday, two on Tuesday, and the fifth Wednesday morning. The resource will then finish the first task on Friday and work through until end-of-day on Tuesday week two, when all five tasks will be complete.



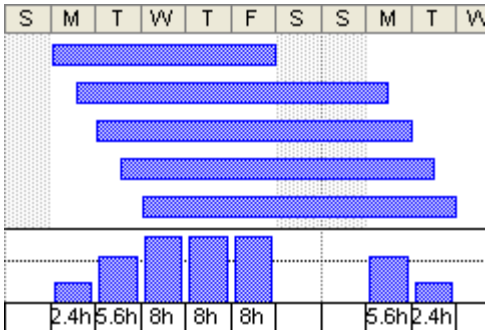
Using ten tasks gives a more realistic schedule

The benefit of breaking the work down into ten tasks instead of five is accuracy and control. The disadvantage is that it requires twice as many tasks to represent the same work. Depending on the project, the resources, and the work involved, the management overhead of the extra tasks might not be worth the increased accuracy and control.

Many schedules will appear to work well, despite overlapping part-time work. These schedules inevitably create conflict and stresses for the project team, though. Where possible, project managers should consider creating only full-time tasks, and gaining control over these scheduling decisions. At the very least, project managers should review their critical-path schedules with an eye for common-sense impossibilities created by part-time work assignments.

Predecessor and Successor Relationships

It is possible to maintain the lower task-counts of part-time tasks, while still making the schedule realistic. The key is proper, fully-informed use of schedule logic.



Five tasks with staggered start dates give a realistic schedule, but resource use may not be accurate

An accurate schedule could be created by setting all five tasks as successors to a single milestone, then staggering each task using lags. The first task has no lag, the second a half-day, the third a full day, the fourth a day-and-a-half, and the fifth a two-day lag. Using appropriate lags, it is possible to create a five-task schedule that matches the more accurate model created using ten tasks above.

The project manager needs detailed knowledge to set the correct lag times and the correct predecessor-successor relationships. The lag time will change based on the nature of each part-time task and its impact on the resource performing it. In this example, the resource needs a half-day to get a task started, before he or she can start the next.

In other situations, the resource might need a specific amount of time at the beginning, middle, or end of the task. Some scheduling tools allow the project manager to set a custom work contour for each task, showing the exact number of hours of work needed on day 1, day 2, day 3, and so on, within a single task. This feature could help to document the reasons for specific delays. Before using these features, though, the project manager should determine if it might be simpler to split the task into multiple parts instead.

If the project manager understands the details of the tasks, he or she can correct for some of the scheduling traps created by multitasking. No matter how a project manager chooses to correct the schedule, he or she needs to look especially closely at groups of part-time tasks, particularly when the same resource must start and complete several tasks at or around the same time.

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