Critical Path Method:
Fool Me Once, Fool Me Twice
By Hal Macomber

Fool Me Once -- Task durations are estimates.

The critical path method (CPM) is considered THE standard for managing projects. Customer contracts often require developing and maintaining the critical path schedule in great detail. Universities teach CPM in project management courses. CPM is the primary function of the best-selling project management software. Large plots of project schedules hang in construction trailers and project management offices depicting the network diagram and the critical path. No project professional in his or her right mind would start a project without calculating the critical path. So, if it is so widely used, then why are projects late, over budget, and dissatisfying customers?

We are fooled by the critical path. The central presumption for establishing a critical path is that we know how long each activity or task will take. When the activities are then strung together according to precedence relationships one can find the minimum time through the project. That is the "critical path."

So what is the problem? How could you know what the real time will be for completing a task? You can't. It is complicated by not knowing exactly who will be performing the task. (Rookies take longer than experienced people.) And it is further complicated by not knowing the circumstances (or situation) for performing the task. (Even experienced people can be distracted or can have an "off" day.)

So what does this mean for anyone managing projects? If you think that managing a project means just keeping your eye on the critical, then you are mistaken. Knowing who will perform and the circumstances for performance make more of a difference. Don't be fooled.

Fool Me Twice -- Task durations are fabrications.

Let's say you produce a critical path (for whatever reason). The generally accepted approach is to ask each key performer to provide durations for the tasks and the precedence relationships. With this data you can find the longest path through the network of tasks. With this approach you overcome one of the problems previously identified. So, is there still a problem? You bet.

Success with the critical path method hinges on knowing task durations – how else are we to coordinate action? Each person will estimate the time it will take them to perform. If they are at all risk averse, then they will also buffer that duration based on their experience performing similar tasks. Why? Because they don't want to be the person responsible for getting the project off track. However, we don't know what those buffers are. One person might add a 20% buffer while another adds a 500% buffer. Eli Goldratt, author of Critical Chain, and founder of the Avraham Goldratt Institute, suggests we can safely assume that all durations are at least twice as long as they need to be.

What are we to do? We must investigate task level of effort (estimated hours to perform) for every task on the critical path and consider carefully its application. Durations alone are not sufficient. We are fooled twice when we accept durations as stated.

Fool Me Again -- Task durations vary.

Experienced project managers will tell you the critical path moves on a project. Why? Tasks don't start and finish as represented in the project schedule. This would be fine if all the performers for critical path tasks were always available to perform on the project, but this is not the case. In most organizations people are working on more than one project at a time or project work is in addition to their normal work responsibilities. This creates the situation where they must manage priorities – "Do I spend my time on this or on that?"

We don't know all of what must be done. Oftentimes ad hoc work (those tasks that seem to arise in the course of doing the other work)

encompasses as much time as the planned work of the project. To the extent that this ad hoc work requires the same resources as the work on the plan we see projects get behind. Performing this work often shifts the critical path.

Task durations therefore are probabilistic. They will range from times that are as short as the actual time applied performing the task to as long as multiples of the task times depending on how much waiting time and distraction time is incurred. Projects by their nature make it difficult to gauge those probability distributions because each project is unique. Our only avenue is to manage the project to minimize the variability.

Fool Me Again and Again! -- Task durations depend on the quality of the conversations.

Schedules are not commitment. We have been fooled enough to know that! Just because we say a task is on the critical path doesn't mean it will get done. Only when the intended performer promises to perform will it get done (and even then, maybe not). Commitment is produced in conversation. When people freely promise there is a possibility of commitment. Absent conversation, tasks will not complete as desired.

Declaring complete is the key action for keeping any project on track. People do not do what the schedule says they should do. Yet, project managers too often expect that people will do just what the master schedule says they should do. Why? We can't do tasks that are not ready to be done. Tasks on the critical path necessarily must wait for the task preceding it. Unfortunately, performers in sequence may not be in conversation with each other. They don't know that a task is complete therefore releasing the work for the next person in line. These performers may work in different divisions, companies, or just not be aware that another person is dependent on them. Declaring complete – saying, "I'm done" – is the step to keep work flowing.

One-way communication doesn't work. Project members are informed of the schedule. Performers are told which tasks they should do. Status is given as a report by someone other than the performer. None of this produces commitments. You must be in two-way conversation to have people perform to the schedule. Only the fool thinks "telling" suffices.

Let's Not Be Fooled -- Planning is conversation.

The future is uncertain and unknowable. Commitments must be adjusted as the future unfolds. Those adjustments can be done by the project manager or anyone on the project team. However, only those people involved in planning the project will be in the position to notice and then assess the need for adjustment.

So, why use critical path? All planning is practice. Each time through a project plan the participants prepare themselves for the future that is unfolding. Will it turn out just as they plan? Of course not. But taking the time to plan prepares them for the eventuality of the future being different than they expected.

Do you want your projects to finish on time and on budget?

- Accept the plan as represented on the critical path is what will not happen; task starts and finishes are uncertain.
- Investigate the level of effort for every task on the critical path. Adjust buffers in accordance with the circumstances and the competence available.
- Make assignments only when the work is ready – prerequisite work is complete and resources are available.
- Measure the performance of your planning practices as a basis for eliminating the sources of task variability.
- Include performers in planning conversations to give them practice for the inevitably uncertain future.

Let's stop fooling around on projects. Stay in conversation with all key performers and insist they do the same with those people supporting them. Use those conversations to continue exploring possible ends and means. It is the one and only avenue for succeeding with projects.