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Debunking Popular Scheduling Myths
Rules Do Not Always Apply

As I developed my project management skills, I learned several "rules" that I have since found are not necessarily true. Here are three such "myths" that beg for further scrutiny.

Myth #1 - Overtime Hours are More Expensive than Normal Hours

There is a general misconception that overtime work costs more than regular time work. This is not necessarily accurate. Overtime hours may cost less than standard time because the burden costs are already factored into the base rates.

For instance, let's say that Alice has a billing rate of $33/hr, which is based on a $15/hr wage cost, plus $15/hr overhead, plus $3/hr profit. For accounting purposes, a standard hour has a cost of $30 and a billing rate of $33.

Now, let's suppose that Alice gets a 50% premium for overtime hours, and we can bill Alice's overtime hours at a 10% premium.

Alice's real cost for overtime hours is $22.50 (less than the $30 for standard hours). Moreover, we can bill Alice at $36.30 (with the 10% premium). In this case, the profit per hour jumps from $3 to $13.80.

Not a believer, yet? Let's try a more conservative example. In this case, there is an additional burden cost of $5 (one-third of the normal burden), and there is no premium billing for overtime hours. The cost of an overtime hour is $27.50 ($15 times 150%, plus $5). We still bill at $33 per hour, with a profit of $5.50.

In most cases of overtime accounting there is no need to include a charge for the overhead, which is covered by the charges for the first 40 hours per week. Where there is additional burden for overtime, it is likely to be considerably less that the normal burden.

I find it ironic that most of our traditional scheduling systems expect us to input a markup for overtime hours.

Myth #2 - Expediting is More Expensive

Have you ever driven along a highway where a construction project seemed to be going on forever? You drive for miles and miles, past thousands of orange barrels and cones, past hundreds of barriers and signs, past dozens of expensive cranes, bulldozers, backhoes and such, and miles of temporary concrete dividers. Yet there are hardly any people in sight. Where are the workers? Why are there ten miles of detoured traffic and only 10 yards of active work?

Not only that, but you drove by that spot six months ago and hardly anything has changed.

Getting beyond your immediate frustration with the traffic slowdowns, your ever-inquisitive mind drifts to the topic of waste. How much money is tied up in all of this paraphernalia? How

much money could be saved by expediting these projects (as well as reducing the inconvenience to the driving public).

Period Costs & Hammocks

The typical project will contain a combination of labor-based costs, materials costs, and other costs such as equipment rentals and supplies. Consider that many of these are period-based costs. That is, the costs are associated with the duration of the use, rather than the intensity or frequency of use.

If we look at the highway type projects, such as discussed above, we can list several period-based costs. These would include field trailers, office equipment including computers and phones, earth moving equipment, and such. What about all of those orange barrels and cones? They must represent a reasonably-sized capital investment. What about foremen? The longer the job, the longer the cost.

Now that you are aware that it may not cost more to schedule overtime, it would be a good idea to evaluate different project durations. You may find that a shorter duration will save you money because of lower period costs.

Some scheduling tools will have a "hammock" function. A Hammock is a type of task that does not have a fixed time duration. Instead, it automatically calculates its duration from the tasks that it is associated with (or group of tasks that the hammock spans).

You can use the hammock function for all tasks that have resources or costs that are associated with time periods that are dependent on other tasks. For instance, let's say that we rent a backhoe, at $200 per day. We create a "hammock" task, called "Rent Backhoe", and assign a cost of $200 per day. We note a start-to-start relationship with the first task that requires the backhoe, and a finish-to-finish relationship with the last task that requires the backhoe. That's it. If the string of tasks using the backhoe stretches out for 21 days, then the rental cost is automatically calculated as $4200. If the schedule is compressed to reduce that span to 16 days, then the backhoe cost is automatically recalculated to $3200.

By setting up these period cost tasks, using hammocks, you can easily see the effect of squeezing time out of the schedule. Often, the additional costs of overtime and/or night work (if any) can be offset by the reduction in period costs. Maybe not all of the time, but, with this method, you don't have to guess about it.

Myth #3 – Free Float is Available for Slippage

Don’t you just love it when you learn something that is very useful, only to find that there is a significant exception that negates the find? Free Float is one of these items.

What We Learned

Float represents the difference between the earliest time that a task can be performed and the latest allowable time. There are two types of float: ***Total Float*** and ***Free Float***. Each type can be used differently. (Note: Microsoft Project substitutes the term “slack” for float.)

Total Float is the duration that a task can slip without extending the end date of the project. The more total float, the more time contingency there is in the project. We can use this information for two key purposes. The first is to determine which of the tasks are more "critical". That is, which task has less time contingency (float or slack) and must be watched more closely. When key dates and milestones are in danger of being missed, total float helps us to determine which tasks need to be expedited.

A further use of total float is to analyze schedule risk and trends. The more tasks there are with low float, the higher the risk of missing target dates. We can compare total float values from the previous schedule update to gauge how much a project is slipping. Even though the most limiting tasks might be running on time, the reduction of float on lessor tasks could be an indication of impending trouble.

It is important to remember that total float should not be used as an invitation to arbitrarily allow work to slide. It should be treated as contingency, to be doled out when appropriate, under management control. We need to also remember that total float is calculated across a chain of tasks. If someone uses the total float for a task that is early in a sequence (by letting the task slip), it reduces the total float for all subsequent tasks that lie within that chain.

Free Float addresses this chaining issue. Free Float is the measure of how much a task can slip without affecting the earliest start of any other task. Let's look at some roofing work, as an example. Placing the roof shingles has two predecessors: Get Shingles, and Place Underlayment. If the scheduled finish of the underlayment is June 22nd, and the earliest delivery of the shingles is June 8th, we can say that there are 2 weeks of free float on the procurement task. Slipping the delivery of the shingles, by up to two weeks, will not delay any other tasks (and might even be preferred for cost or space purposes).

Regarding these two types of float, we can keep in mind that free float can usually be used freely by the responsible task manager, but total float should be managed at a higher level, so as not to affect the work of others.

What We Didn't Learn

All of the above discussion ignores what happens when we assign resources to the tasks. Once we do that, the movement of any task can impact on two aspects of the schedule. These are: when the work will be done and when the resource will work on it.

The measure of free float helps us to evaluate the impact of a change or slip in the task timing. What it does not do is tell us what happens to the resource schedule. It may be OK to slip a task two weeks, when there is free float of that amount. But this pushes out the schedule for the resource, which may be needed to work on another (possibly critical) task at that time.

So what we now know about free float is that we can use it to help analyze the availability for a task to be delayed, but that if there are resources on that task, we must also evaluate the effect of delaying the resource.

Using Free Float with Resources

The bottom line is that we can still use Free Float, but with the added requirement to observe the effect of slipping such tasks on resource loadings. Here is one way to accomplish this:

1. Develop a plan to use as a base. We will assume that such a plan has satisfied your date and resource constraints.
2. Copy this plan to a baseline (target).
3. If you need to consider moving tasks having free float, you can generate a list of these by filtering on Free Float greater than zero. Identify any tasks that you wish to reschedule. Note which resources are assigned to these tasks.
4. Reschedule the tasks, staying within the allowable free float. Do not allow automatic resource leveling. (This will limit schedule changes to only the tasks that you have selected to slip.)
5. Review the resource loading for any resources that were assigned to the re-scheduled tasks. If there are any new resource conflicts, then the effects of rescheduling will have to be evaluated further. You may try doing a resource leveling, knowing that this will cause other tasks assigned to the conflicted resource to slip. You may then evaluate these slips by running a report that lists any tasks that have slipped as compared to the baseline (step 2). Warning! Don't do this unless you have a way to revert back to the schedule that you had before the last resource leveling operation.

These CPM tools (free float, baselining, resource leveling, schedule comparison and exception reports) will work for you--if you understand their limitations and uses and use them judiciously.

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