

The Realistic Person-Year

Here's the situation. You're a project manager and you've met with your customer and scoped out an application they need to have developed. The customer wants delivery within the next 12 months. You've estimated that the project requires two person-years of effort. You also feel that the customer won't be too upset if the schedule slips a month, maybe even two months. If you juggle some assignments around, you figure you can free up two people to staff the project. My question to you is "How long will it take to complete the project?"

I'll give you my favorite answer...it depends. It depends upon the assumptions you make and the realities of your workplace. It depends upon how accurate your effort estimates are and whether there will be unforeseen changes...yada yada yada. The one thing that I will say right off the bat though, is that even if everything goes perfectly and without surprises, there's only a "snowball's chance in you know where" of finishing anywhere close to a calendar year.

To see what I mean, let's listen in on the following lunch conversation between Tony Baggadonuts, the project manager, and his colleague Jane Brane.

Jane: So, do you think you'll be able to finish the Owens project in a year?

Tony: I'm going to assign two people pretty much full time. I estimated it should take about two person years of effort, so it'll be tight, but we should be in the ballpark. Plus, I get the feeling that if we slip a month, maybe two, Owens will still be okay with that.

Jane: Hmm. So you were able to split the effort exactly in half between each staff person? And, I guess your assuming each person can work in parallel for the duration of the project. Gee, I've never seen that happen before. You must have planned out one heck of a work breakdown structure.

Tony: Work breakdown structure? No, I haven't gotten that far into it yet. I haven't decided who I'm going to be able to assign either. I'm just doing high level stuff right now to see if it's feasible.

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Jane: (Jane wonders if Tony has factored in things like vacation time, the new training initiative, etc., and decides to change the subject.)

Here's my take on Tony's situation:

It appears that Tony hasn't had a chance to factor in some of the important realities yet. One of his first mistakes was to assume the work could be equally divided and performed entirely in parallel, and that each staff member would perform at the same rate. Another major faux pas is thinking that effort (person-years) can be directly mapped into duration (calendar time). Okay, okay...let's get off Tony's case.

The bottom line here is that a person-year of effort generally takes a lot longer than a calendar year to complete. I've developed a little formula that can help give us a ballpark estimate of translating effort into duration. The basic idea is that there are 52 weeks in a year, which translates into (52x5) 260 potential working days. But nobody can be expected to work 260 days over the course of a calendar year. We need to back out things like vacation time, training time, sick leave, etc. Let's assume that Tony's company gives 5 holidays, 10 vacation days, and 3 training days. Let's also assume that someone may take an additional 2 days off for sick leave or personal leave. That totals up to 20 days which we need to subtract from our 260 day baseline. Those 20 days produce an immediate schedule slip of a month, so Tony is already a month behind schedule and the project hasn't started yet.

We're not done yet. We need to subtract any other time that a person must commit to during the year that is not related to the project or hasn't been budgeted for the project. My favorite example is meeting time. Let us suppose that Tony will hold a two-hour staff meeting each week, and, like many planners in my experience, he did not factor this into his effort estimates. So, 240 days translates to 48 weeks, and each weekly meeting consumes a quarter of a day, so 12 days are taken up with meetings. That leaves 228 days of direct project work available. We're still not done.

Sorry, but I've got to pick on Tony again. Hey Tony...yoohoo...have you ever heard of multitasking? Whenever I go through an example like this in class I ask the participants to raise their hands if they are required to multitask. Guess how many hands go up? Right...100 percent. So, following along our logic, Tony should back out the number of days a person would be working on other projects from the 228

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remaining days.

Okay, okay, I'll give Tony a break...forget the multitasking, he's already in enough trouble. Oh, just one more thing to factor in and then we'll be done. Have you ever been interrupted when you were in the middle of doing your work? Someone peeks into your cubical and asks a few questions or wants to talk about last night's basketball game, your wife calls and tells you pick up a bottle of wine on the way home (of course, this doesn't happen to me...I never run out of wine), etc., etc. Eventually, you get back to doing what you were doing, until the next interruption occurs. You get the idea. Bottom line...no one works at 100 percent efficiency. I actually worked for a company where we were required to measure what I'll call the productivity factor, so I tell many of my clients that if their staff productivity factor is 75 percent or higher they are doing remarkably well.

So how do we factor in the productivity factor? I guess it's time I gave you the formula I promised...

$$\text{Calendar Time} = 52 / (P * (52 - X))$$

In the above formula, '**X**' represents the total non-project, non-budgeted time commitments during the year (expressed in weeks), and '**P**' represents the productivity factor (75% is expressed as .75). In the example we were discussing, '**X**' was 32 days, which is 6.4 weeks. Let's assume a productivity factor of 75 percent. Plugging those components into the equation gives a calendar time of 1.52 years. So, in this example, a person-year of effort takes more than 18 months to complete.

Here's another little factoid to factor into our planning. Be very careful when you specify daily work hours in a planning tool. Many planning tools default to effort-driven tasks. So, if you set up your plan by plugging in an 8-hour work day calendar, and you estimate 8 person-hours of effort for a task, the tool will translate that to a duration of one calendar day (assuming only one person is assigned to the task full time).

See the problem? Here's an example. Suppose we are supposed to work from 9-5 in our company. That's an 8-hour work day in terms of clock time, but that's not the unit we should be using for scheduling. Let us further assume we get an hour for lunch. That leaves 7 hours to actually do our work, and if we apply a productivity factor of 75 percent, we only get 5.25 hours of productive work out of

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those 7 hours. Remember this little example next time you think about planning using an 8-hour day.

As my tenth grade geometry teacher used to say, in her Hungarian accent, "Isn't mathematics vunderful?"