



Metrics

Metrics for measuring progress

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Task Progress

A metric is a system for the measurement of the physical progress of tasks. Many types of metrics can be defined.

In any given planning, different metrics can be used. It is good practice to use the same metric for similar tasks. Similar tasks are f.i. tasks belonging to a same summary, to a same type of activity.

The physical progress of any task is always expressed in % complete. The range of values is 0% for nothing done at all to 100% for task finished.

We must differentiate between the measured progress (also called actual progress) and the planned or scheduled progress.

The actual progress is measured using the metric.

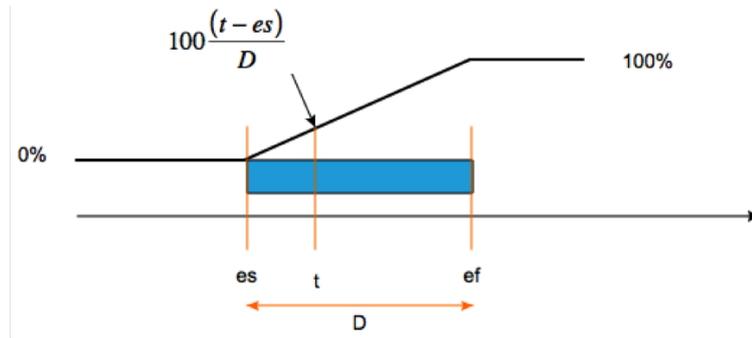
The planned or scheduled progress is always assumed to be linear over time. This means that the planned progress is expressed as a linear function of time elapsed.

The progress function is defined as follows:

$$\begin{aligned}t \leq es &\Rightarrow pct = 0 \\es < t < ef &\Rightarrow pct = 100 \frac{(t - es)}{D} \\es \leq t &\Rightarrow pct = 100\end{aligned}$$

Whereby,

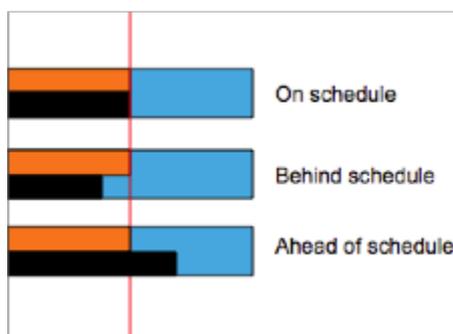
es: early start
ef: early finish
t: current date
pct: progress as %



Comparing the actual (measured) progress to the scheduled (linear in time) progress, tells us if the task is:

- On schedule: actual % = scheduled %
- Late: actual % < scheduled %
- Ahead: actual % > scheduled %

In the figure below, actual % is shown in black, scheduled % in orange.



Metrics

The most commonly used metrics for expressing the actual progress are the following:

Binary metric

The task progress only takes two values: 0% or 100%.

Binary metric will be used for **short** tasks.

A task is short when it's duration is small compared to the progress measurement intervals.

If this interval is f.i. 1 week, then a task of a few days is short.

Fixed steps

A series of fixed steps are defined and progress is registered accordingly.

Example: 0-10-25-50-75-95-100%

10% stands for: execution of task has **just begun**.

95% stands for: execution is **finished but**, a small detail is still pending.

Setting a task at 95% will keep it under attention. Setting it at 100% will cause it's disappearance from the radar screen.

A variation can be: 0-1-25-50-75-85-99-100.

Fixed step metrics are widely used.
See more below

Calculated progress

Some activities allow for an easy calculation of progress.
Eg. handling enumerable items:

- $\text{pct} = 100 \cdot (\text{Installed items}) / (\text{Total to install})$
- $\text{pct} = 100 \cdot (\text{Issued documents}) / (\text{Total to issue})$
- $\text{pct} = 100 \cdot (\text{Constructed length}) / (\text{Total length to construct})$

The piping and cabling contractors traditionally have sophisticated progress monitoring systems. The suit our needs to capture progress perfectly.

Bear in mind that in such case, there must be congruence between elements in our planning and the corresponding elements of the contractors planning.

Hint

A strange twist in peoples brains makes that when questioned about the percentage complete, most of the people can estimate this value without difficulty till 50%. After that, most seem to have difficulties in estimating the fraction of work done.

*Think of asking the complementary question: how much work is left?
You will see that once over the 50% barrier, this question is easily answered.*

More on Fixed Steps

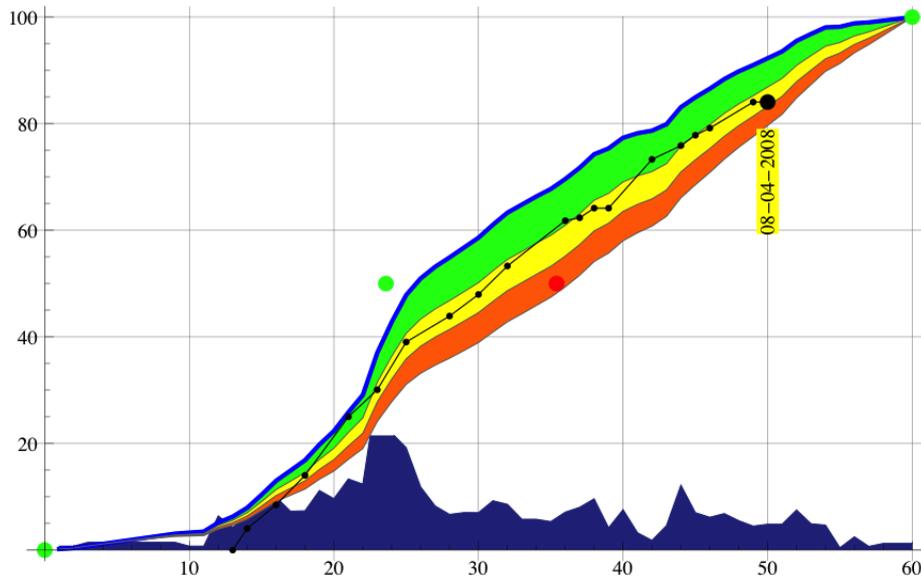
Consistency

Fixed steps are widely used because it is **easy to ensure consistency** in reporting progress.
Consistency is more important than precision.

The reason being that

- we deal with a dynamic process, whereby progress evolves constantly,
- and that we are interested in monitoring **trends** more than high precision momentary situations.

We should always keep the ultimate purpose of measuring progress in mind: producing progress curves like this one:



The black dotted line is the actual track of the project or part of it.

Consistency is achieved by assigning a precise and fixed significance to every % step value. In many cases the significance is trivial: fraction of work done. **Estimations** are sufficient.

Special case: tracking documents

There are some special cases, e.g. the **tracking of document** production. In such case, we must define fixed and agreed meanings for every % step.

Example:

just started	5%
draft ready	25%
draft reviewed and commented	35%
comments processed	50%
issued for approval	75%
comments processed	85%
issued final approval	95%
approved and filed	100%

Or any similar system.

Fixed steps are sufficiently precise

Experience has proved that fixed steps are sufficient for the purpose of tracking project progress.

One can object that the steps are quite coarse (steps of sometimes 25% points are taken). Nevertheless are the results significant.

The reason is simple.

- on the tasks at 0%, the error is 0
- on the tasks at 100%, the error is also 0

Active tasks represent 15 to 20% of the total task count.

Therefore will the error on the progress estimation be damped-out.

Due to the fact that we monitor large number of tasks, we will underestimate some progress

and overestimate some others. In the sum, this will tend to cancel out.

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