



## White Paper 2013-09

### Crude Estimates of Possible Project Overrun

*Project planning is systemically always optimistic. It supposes that tasks are handed over between contributors without any inefficiency, that resources are fully available when they are needed, and even sometimes are not resources loaded so that they are quite unrealistic! What should then be a rule of thumb when it comes to project delays?*

#### Why project planning is (almost) always optimistic

Because project planning almost never accounts for inefficiencies in the handover of tasks between contributors, or for intrinsic complex issues like workplace congestion, effective coordination of contributors, resource multitasking (between tasks on a single project or between different projects), etc, conventional project schedules for complex projects are fundamentally optimistic.

At the same time we know from an ample literature that tasks durations are often exaggerated by those responsible for them as they feel it is a commitment on which they might be judged later. This psychological effect to 'pad' one's estimates of the duration needed to do the job might seem to be a factor that could compensate the relative optimism of project planning. Yet we also know that once a task duration is entered in a schedule, activities tend to fit within that timeframe (through such effects as the Student's effect – people start at the latest possible moment, Parkinson's law – work tends to fit the time available - or simply because people lack of incentive to be effective when they feel that they have time to do a particular activity). Finally, statistically, tasks almost always take more time than what was entered in the baseline schedule. The optimistic nature of conventional project planning still holds in practice.

#### What is the impact of project planning optimism?

Because conventional project planning is fundamentally optimistic, reality is always worse. Activities are late. To mitigate the situation, tasks get reassigned, sequences of tasks reworked.

Of course those tasks which are particularly important are those on the critical chain (the critical activities and resources that drive the project delivery). For more than 90% of the project tasks, delays on individual activities have a weak impact on the overall project outcome because they have intrinsic float by not being critical. However it is important to identify those activities which are normally not critical but might become so. Such tools as convergence monitoring (refer to [White Paper 2012-04](#)) are particularly adapted for this task.

Good practice involves including a buffer (schedule contingency) in front of the main convergence points and in front of the final project delivery and monitor

how this buffer evolves with the progress of the project. However this practice is not yet widespread in the scheduling of large, complex projects. On the other hand, for very important convergence points where the extra work and dedication can accelerate delivery, it is not rare in project environments to see significant extra work being put in to be ready on time.

In the absence of a buffer, the reality is that projects end up to be generally late compared to the initial plans. Beware those who have committed a delivery date on a large, complex projects and which project schedule is intrinsically too optimistic!

**We consider that the basic delay that can be expected is generally, on the order of 15 to 20% of the initial project duration**

#### List of factors that influence the impact of conventional planning optimism

Here are a list of factors that are favourable for recovering from the intrinsic planning optimism, and those factors that make the situation worse:

Factors favourable for recovery	Unfavourable factors
Limited complexity – linear project	High complexity, highly converging project with many different contributors (in particular supply chain of complex equipment)
Convergence monitoring and usage of buffers in front of main convergence points	Poor convergence monitoring, no buffers in schedule
Schedule is realistic for manpower-intensive phases of work through good resourcing and there are resource margins for acceleration / compensation of poor productivity (e.g. possibility to go in 2x8 or overtime)	Poor resourcing of schedule for manpower intensive phases of work. No realistic assessment of required productivity
Schedule has the right balance that allows good quality update and change agility	Highly complicated schedule with high detail that requires lots of resources for update or change
Key activities duration ascertained from past projects' similar activities, not from opinions	No data backup as to the duration of key activities
Possibility to count on project team to work overtime to fix critical project office deliverables	Rigidity of project team productivity

## Rule of thumb for delays to be expected in complex projects

At PVD we use the following rule of thumb for delays in complex projects: we consider that the basic delay that can be expected is generally, on the order of 15 to 20% of the initial project duration for a typical project plan. The following factors will diminish this estimate:

- Low complexity of project schedule (in particular, low value and complexity of procurement, and number of project offices),
- Existing possibility/margin to compensate delays through specific effort (project office, construction site),
- Existing lessons learnt on similar projects with actual durations,
- Existence of buffers on critical chain (diminish basic delay estimate by the duration of the buffer).

The following factors will tend to make this estimate be a minimum ballpark estimate:

- High complexity of project schedule, in particular regarding complicated procured items and complex logistical arrangement; and regarding split project offices with poor communication,
- Poor resourcing of key manpower-intensive activities that do not allow for any visibility on the available margins for additional effort should key activities fall behind,
- No convergence monitoring (including reliable schedule update).

This rule of thumb might look hugely significant but it corresponds often to the reality of large, complex projects – which can get much worse once they start getting astray. At some stage in the 1970's in the North Sea, offshore projects were routinely costing 3 times the initial budget; and that is a ratio which is often observed in complex projects involving new environments or technologies.

The consequence on cost will ensue from the schedule delays, often with somewhat less acuity because procured items keep the same value; additional costs are to be expected from the manpower (including subcontracts) and equipment, including project office and construction site work. Cost overruns to be expected are thus, as a rule of thumb, on the order of 10-15%. This is higher than the contingency taken by Contractors – often around 5-7% of the cost at contract award- but reflect quite well the actual final outcome of most projects once all Change

Orders and other claims have been settled. After all, changes from the final client are also part and parcel of the project complexity!

## What can be done to make schedules more reliable?

Beyond the good practices related to realistic resourcing of manpower-driven phases of the project, the best practice is to introduce buffers in front of all the important converging points, and monitor these buffers as part of the convergence monitoring process.

It is possible to diminish the durations of many activities by taking a ratio compared to what people will commit to do. It is routinely possible to diminish by 30% the announced duration of engineering tasks without impacting the quality of the deliverables, which creates space for buffers.

In the end, for complex projects it is necessary not to be too ambitious and optimistic in the schedule. This might be difficult in contractual contexts where a short schedule could be an argument for competition. Should it happen – which is the case more often than what would be recommended, contractor and owner alike must expect necessarily the project realization to be delayed compared to the optimistic schedule developed by and for salespeople. Contractors need to ensure there are appropriate opportunities in the contract and the Owner should ensure it has a sufficient reserve to cater for the inevitable growth both in terms of costs and delays.

## Conclusion – Will you contribute to the movement towards less optimistic schedules?

The rule of thumb we propose in this paper could seem at first utterly excessive but in reality, is really a minimum that can be observed. Unless the project industry makes some efforts to ban competition on the basis of overly optimistic

schedules, Owners and Contractors alike must expect significant schedule and cost overruns from their complex projects. The paper gives indications as to what could be done to improve the reliability of project schedules. At PVD, we work to explain to Owners and Contractors alike how implementing those good practices at an early stage could avoid so much disappointment and conflicts later. Join us in this movement seeking to establish less optimistic schedules for large, complex projects!

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