9 Metrics to Ensure Schedule Quality

Introduction
Acumen’s targeted research and decades of experience with client project schedules has yielded nine metrics which provide strong indication as to whether or not a project will ultimately achieve execution success. While a high quality schedule is not a guarantee of on-time delivery, the overwhelming majority of successful projects most often score very highly on schedule quality metrics.

Schedule Quality Metrics
The following metrics, using thousands of observable data points, have proven to have the highest correlation with project success.

1. Missing logic
This is the most fundamental schedule quality check. In theory, all activities in a project schedule should have at least one predecessor and one successor. Failure to achieve this will impact the quality of results derived from a time analysis as well as a risk analysis.

Without logic, a schedule is merely a collection of tasks without explicit precedence. With complete logic, the schedule is the roadmap to proper execution. Tasks without successors are effectively “dead ends” and undermine the ability to truly know when the project will complete.

Correcting missing logic is not a trivial exercise… tasks cannot be linked arbitrarily, rather the logic must accurately capture the true precedence of operations required to complete the work.

2. Logic Density™
In theory, this value should be at least two. An average of fewer than two logical links per task indicates that the schedule should be reviewed and updated. An upper limit of four relationships is also recommended – logic density above this threshold indicates overly complex logic within a schedule. Complexity adds confusion and will obscure the true goals of project performance. Schedule logic should be easy to follow, so that it is clear exactly which work is to be performed and in which sequence.

3. Critical
Critical activities are those tasks which, when performed late, will delay the overall finish of the project. In most projects, only a subset of tasks will be critical, meaning that some tasks in the project can slip some amount of duration without impact to the targeted project completion date. While all projects will have a critical path, the more activities in the schedule that are critical, the higher the risk to on-time implementation.

By planning with realistic durations, continuous review and mitigation of risk, and an understanding that problems will occur during execution, the number of critical tasks can be minimized, improving the possibility of a successful outcome.

4. Hard Constraints
Hard constraints force activities to conform to predetermined start or finish dates. While this may quickly place an activity into the targeted timeframe, this technique inhibits an activity’s timeframe to calculate properly using schedule logic. Often, constraints are used as a substitute for logic, reducing the schedule’s usefulness,
While a small number of activities with low detail is unlikely to fully derail a project, the majority of tasks in the project plan should contain sufficient detail for the team to understand the exact scope and sequence of work.

5. Negative Float
Negative float occurs in a schedule when project goals, according to the plan, cannot be accomplished. This is a measure of the amount of time needed to recover in order to deliver on time. When a baseline plan is created with negative float, it is a plan oriented toward failure. Similarly, any plan in active execution that develops negative float must be reevaluated and optimized so that the negative float does not ultimately impact the committed completion date. The appearance of negative float in a schedule requires immediate corrective action. If negative float is allowed to build, the project may ultimately become unachievable.

6. Insufficient Detail™
When a schedule is developed with fewer activities, it can be created quickly. However, the absence of proper detail is a detriment to the schedule. Lengthy task durations indicate that the work has not been planned to a level of detail required to manage the work. While it is simpler to link longer tasks and manage a schedule with fewer tasks, the team may lack the understanding of the fine details required to execute the work. If an activity duration is greater than 10% of the project duration, the activity is considered to have insufficient detail. While a small number of activities with low detail is unlikely to fully derail a project, the majority of tasks in the project plan should contain sufficient for the team to understand the exact scope and sequence of work.

7. Number of Lags
A lag is a duration applied to a logic link often used to represent non-working time between activities such as concrete curing. Lags tend to hide detail in schedules and cannot have progress applied as with normal activities. Lags should typically be replaced with activities so that their real-world progress can be understood. Lags lack the ability to capture resource requirements. A lag may not always consume project resources, however, the lag itself can never have project resources assigned to it. Without an ability to assign resources, the true impact of a lag will be unknown to the project team.

8. Number of Leads
Leads are Lags with negative values. These are often used to adjust the successor start or end date relative to the logic link applied. Used improperly, this can result in the successor starting before the start of the predecessor. While useful in some circumstances, frequent use of lags is often an indicator that a schedule is not achievable.

9. Merge Hotspot
Also known as merge bias, merge hotspot is an indication as to how complex the start of an activity is. If the number of links is greater than two, then there is a high probability that the activity in question will be delayed due to the cumulative effect of all links having to complete on time in order for the activity to start on time. While certain key milestones in a project may not be able to occur without completion of a number of previous tasks, merge hotspots often represent attempts to close missing logic, rather than correctly sequence activities in a project. Merge hotspots set the stage for activity slippage and a convergence of tasks without sufficient resources.
Conclusion
While a sound plan is not the sole element used to ensure project success, it is a highly correlated factor. Projects often fail due to either unrealistic, poorly thought out plans, or weak execution. A sound plan can help to mitigate these failure scenarios, while boosting the overall chances of on-time delivery.