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PERFORMANCE SOLUTIONS

DCMA 14-POINT ASSESSMENT FOR PROJECT SCHEDULE

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MANAGING SCHEDULE QUALITY

In 2005, the Defense Contract Management Agency (DCMA) first released a set of schedule assessment guidelines known as the DCMA 14 Point Assessment. While numerous other Agencies and organizations, such as GAO, NAVAIR, NASA, NDIA, and DOE, have released their own schedule-driven guidelines or assessment criteria, the DCMA 14 Point Assessment is the most widely known and utilized.

- A project schedule, when well-constructed and maintained, is an indispensable tool to aid a PM in managing and directing project work
- A qualitative assessment draws upon the team's experience and expert judgment to determine if the schedule is a realistic and executable.

Developed in response to the Electronic Industries Alliance (EIA) standard 748 for Earned Value Management Systems (which is maintained by the National Defense Industrial Association (NDIA) and accredited by SAE International) the DCMA 14 Point Assessment was last formally published in 2012 through the Earned Value Management System Program Analysis Pamphlet (PAP) identified as DCMA-EA PAM 200.1.

In the past decade, the 14 Point Assessment has been decoupled from Earned Value Management, and while it may serve as an enabler of reporting earned value, it is no longer viewed as a part of EVM.

The DCMA 14 Point Assessment is intended to serve as tool-agnostic, bare minimum assessment for schedule health. It does not provide the complete picture of project health, merely the construction and performance of the Integrated Master Schedule (IMS).

A well-constructed schedule may still be unachievable or incomplete. It should be used as a first pass, requiring failures to be analyzed in greater detail. It does provide an indication of critical path accuracy and requires continuous workstream governance, but does not offer any sort of validation of scope.

Does that mean the 14 Point Assessment should be disregarded or ignored? Certainly not. The 14 Point Assessment provides a quantitative assessment of schedule quality based on measurable criteria rooted in industry defined scheduling best practices.

Besides, some checks are better than no checks, and automating as many of these as possible frees up analysists to analyze. Here we will dig into each of the 14 points of assessment criteria and how they may serve as indicators to potential problem areas, why they are critical for a healthy project schedule, and where a deeper schedule analysis may be necessary.

1. LOGIC

The logic check looks to ensure all incomplete activities have defined predecessors and successors. Just one missing link can have a significant impact on the project completion date, so it is imperative the team analyze the network logic to ensure they capture all dependencies. The DCMA threshold for this metric is that no greater than 5% of incomplete activities should miss a predecessor and/or successor. However, it is common for organizations to self-impose a more rigorous policy that all incomplete activities have predecessors and successors, except for milestone, level-of-effort, and summary tasks. At the very least, it is advisable that tasks without true in scope predecessors or successors be linked to the project start or project finish milestone, respectively. This indicates you considered the dependencies and not simply missed them.

2. LEADS

A lead is a negative lag between two tasks in which a task starts some number of days before the finish date of its predecessor. Using leads can have adverse effects on the project total float, therefore impeding the ability to determine the true critical path. For this reason, this is one of the few metrics where the DCMA threshold is zero. Rather than using leads, it is better to decompose activities to a level of detail in which traditional finish-to-start relationships can be used.

3. LAGS

Positive lags between tasks, where a task starts some number of days after the finish date of its predecessor, can also adversely affect analysis of the project critical path. Additionally, lags can be confusing if the reason for them is not immediately clear. DCMA is more lenient with this metric, setting the threshold at 5% of total task relationships. However, in many cases it is better to represent a lag with an explicitly named task. For instance, rather than adding a 5-day lag to account for shipping time to the customer, represent shipping time with a separate task.

4. RELATIONSHIP TYPES

The preferred relationship with tasks is the finish-to-start relationship. Ideally, all tasks in the schedule would be sequenced this way to have the clearest understanding of the critical path. There are instances, however, in which alternative relationships are appropriate. DCMA maintains that at least 90% of all activity relationships should be of the finish-to-start variety. Start-to-start or finish-to-finish relationships may be used in cases where that is the true nature of the dependency. For example, it is reasonable that an audit may not begin until the activity being audited begins. It also makes sense that a Quality Assurance (QA) inspection may not finish until the process or product being inspected is complete. Start-to-start and finish-to-finish relationships should not be used, however, simply to schedule activities in parallel if they do not truly depend on each other. In such instances, it is better to give the two parallel activities the same finish-to-start predecessor(s).

The fourth relationship type, start-to- finish, can unnecessarily complicate the network logic of the schedule and should be used only in extremely rare cases.

5. HARD CONSTRAINTS

Constraints in general should be used sparingly, allowing task dates to be the natural result of dependencies and activity duration. When necessary, however, soft constraints (Start No Earlier Than and Finish No Earlier Than) are preferable because they allow the schedule to continue to be logic driven. By contrast, hard constraints (Start No Later Than, Finish No Later Than, Must Start On, and Must Finish On) artificially prevent the schedule from shifting to the right. This has the potentially disastrous effect of obscuring the possibility of late performance before it is too late to take corrective action. Hard constraints can also obscure the schedules critical path. The DCMA threshold for hard constraints is that no greater than 5% of incomplete activities in the schedule should use them. However, this is another area where an organization may choose to impose limits that are more restrictive. Ideally, there should be no hard constraints in the schedule. It is more advisable to use deadlines to represent hard dates, allowing the schedule to forecast late delivery early while it is still possible to correct it.

6. HIGH-FLOAT

While corrective actions address immediate or actual DCMA defines high float as total float of 44 days (approximately 2 working months) or greater. Intuitively, one would assume that activities with high float would be a good thing, a form of schedule margin. However, high float is more often the result of missing dependencies. It is a rare activity that can slip more than two months without impacting the project completion date. The threshold for this metric is set at 5% of total incomplete activities.

7. NEGATIVE FLOAT

Negative float occurs when the project schedule is forecasting a missed deadline, or when a hard constraint is holding a task further to the left than it would otherwise be. In either case, it is indicative that some future critical date is likely to be missed and that the project team may need to either fast track or crash the schedule to reign it back in. Ideally, DCMA would like to see no negative float at all. If the negative float is accurate with regards to a critical or contractual date, the project manager may request an explanation and corrective action plan.

8. HIGH DURATION

Part of the planning process is decomposing work packages to a level where the activities are discrete enough to track and manage. DCMA considers any incomplete activity with a baseline start date within the detailed planning period or rolling wave and a baseline duration of greater than 44 days (about 2 working months) to be in violation of this metric. Activities beyond this duration make it difficult to objectively estimate resources and assess performance. In cases where an activity cannot be broken down further, the project manager should have an articulable method of performance assessment. The DCMA threshold for high duration is 5% of incomplete activities.

9. INVALID DATES

The invalid date check applies only during execution of the project. This may affectionately be referred to as the DeLorean rule, for those Back to the Future fans. A task is said to have invalid dates if it has forecast start/finish dates in the past or actual start/finish dates in the

TAKE NOTE

- The DCMA 14-Point Assessment offers the project manager a great way to objectively evaluate the quality of the schedule over the life of the project.
- DCMA threshold for missed tasks is 5%, though recovery at a certain point becomes unlikely after a project falls too far behind.
- While satisfying these guidelines doesn't necessarily mean the schedule is feasible, not satisfying them almost certainly means it is not.
- It would be in the best interest of all project managers to routinely perform this assessment to maximize the likelihood of on-time project performance.

future, with respect to the project status date. The threshold for this metric is zero. Tasks which have not yet started or completed must be pushed beyond the status date, and tasks which have started or completed early must be revised with the actual start/finish dates on which they occurred. This is one of the more critical metrics, as tasks that violate this call into question the validity of the rest of the schedule.

10. RESOURCES

Ideally, all project schedule activities should have costs or resources assigned to them. In practice, not all organizations resource load their project schedules. Additionally, there are occasions where tasks with durations greater than zero are representative of time but have no work associated with them, such as procurement lead-time or customer review of deliverables. This is one of the more flexible metrics of the 14-point assessment. In the case of organizations that resource load their schedules, it is still a good metric to evaluate to ensure no activities were missed during the resource estimation process..

11. MISSED TASKS

The missed tasks metric is indicative of schedule performance against the baseline plan. It is the percentage of tasks which have a baseline finish on or before the project status date, which have actual or forecast finish dates later than their baseline finish dates. It does not include tasks which are currently forecasting late if those tasks have baseline finish dates after the status date. In that way, it is purely retrospective. The DCMA threshold for missed tasks is 5% of the projected complete tasks, though recovery at a certain point becomes unlikely after a project falls too far behind.

12. CRITICAL PATH

The critical path test is a Boolean pass/fail metric intended to evaluate the integrity of the network logic in the schedule. This test is performed by first identifying the critical path in the schedule, and then intentionally introducing some amount of schedule slip to the first task on the path. If a commensurate amount of schedule slip occurs on the project finish milestone, the test has been passed. A failed test is indicative of missed dependencies and requires deeper analysis of the network logic.

13. CRITICAL PATH LEGEND INDEX (CPLI)

The Critical Path Length Index (CPLI) is a measure of required schedule efficiency to complete a project or critical milestone. It is something of a schedule counterpart to the To-Completion Performance Index (TCPI). It is defined as the duration from now to the baseline finish of task/milestone being measured (number of working days on the critical path) and total float, divided by the same duration without float. Total float in this instance is the variance between the current forecast and baseline finish date of the task/milestone projected finish date. A CPLI of 1.00 indicates that the project must execute exactly to plan to achieve the task/milestone. A CPLI above 1.00 indicates that there is a remaining schedule margin, while a CPLI below 1.00 indicates that the team must overachieve to meet the baseline finish date. DCMA considers a CPLI below 0.95 to be indicative of a potential issue requiring further investigation.

14. BASELINE EXECUTION INDEX (BEI)

The final metric, Baseline Execution Index (BEI), is another indicator intended to measure performance against the baseline plan. Put differently, it measures the throughput with which the project team is accomplishing tasks. DCMA defines two calculations, cumulative and hit task. The cumulative calculation is calculated by dividing the total number of tasks that have completed regardless of baseline by the sum of tasks without a baseline date and tasks with a baseline finish date on or before the current reporting period (status date). A BEI of 1.00 indicates the project team is executing on plan, with greater than 1.00 indicating ahead of schedule and below 1.00 indicating behind schedule. DCMA considers a BEI below 0.95 to be indicative of a potential issue requiring further investigation. The hit task ratio is the total number of tasks baselined to have been completed in a period or on or before the status date that has been completed. The hit task ratio will never exceed 1.00 but can certainly be lower if baseline performance is not being achieved.

FINAL WORD

There are plenty of different best practices and industry standards you can draw from to ensure schedule build quality. Contrary to the 14 Point Assessment, the GAO Schedule Assessment Guide recommends limiting and justifying use of soft constraints, ensuring Schedule Risk Assessments are routinely conducted, and development of a corresponding schedule narrative or basis document. NAVAIR has its own 11 Point Assessment document, which differs from the DCMA 14 Point Assessment.

To this end, Edwards has established a suite of schedule support tools including a not only a schedule factors checklist aligned to both the DCMA 14 Point Assessment and GAO Best Practices, but also a task logic filter and a series of analysis tools. The Edwards Schedule Toolset is free tool provided to our clients and students. These more advanced analytics functions include:

- Critical Path Analysis tool: Enhances visibility into multiple critical paths in a projects schedule, both visually and by offering customized filtering options
- Continuous Critical Path: Tests the critical path to any schedule task , validating that the logic path covers every working day from start/status to the selected task, and automating the deadline method
- Critical Path Length Index (CPLI): Measures the relative efficiency to complete any task in the schedule by comparing critical path length (duration from the beginning of the project or status date to the selected task baseline finish) to the critical path length with slack added (duration from the baseline finish to the current finish of the selected tasks) as a percentage.
- Baseline Execution Index (BEI): Scores the schedule based on the tasks or milestones that were completed on or before their baseline finish dates, as well as identifies how many tasks do not contain a valid baseline

The DCMA 14 Point Assessment does not dictate any hard and fast rules for schedule development, rather, it offers fantastic way to objectively evaluate schedule quality over the life of the project. While satisfying these guidelines does not necessarily mean the schedule is viable, not satisfying them certainly means it is not. It would be in the best interest of all project managers to routinely perform this assessment to maximize the likelihood of on-time project performance.

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